Table 4.1.8 (2/7) CALCULATION SHEET FOR TEMPORARY WORK AND RAIL WORK-1

ID No. CW-4-7 | Working Name: Sand Bags | Calculation Quantity: 10 m | Remarks:

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-1	Foreman	day	1.6	0	0	48800	0	0	78,080	
	L-2-23	Common Labour	day	8	0	0	35100	0	0	280,800	
Material											
	M-B-9	Soil for Backfilling	m3	3	0	400	7600	0	1,200	22,800	50% of Soil is purchased
	M-M-15	Plastic Sack	nos.	160	0	750	1750	0	120,000	280,000	
Working Base Cost											
	CW-1-46	Excavation A	m3	6	2361	39	1711	14,166	234	10,266	
Total for	10 m							14,166	121,434	671,946	
Unit Cost for	1 m							1,417	12,143	67,195	
Unit Cost for	1 nos							89	759	4,200	

* 1 : Labor Rate : Foreman : 1
Common Labor : 5
Daily Work Volume : 20 nos. / 1 common labor

ID No. CW-4-8 | Working Name: Temporary Steel Sheet Pile (Type-C) | Calculation Quantity: 4 m | Remarks: L=9.0 long and 6.0m of Driving and Pulling Out (Type-II)

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Material											
	M-E-30	Steel Sheet Pile (Lease)	kg day	86400	16.30658	0	10.87105	14,088,884	0	9,392,589	
Working Base Cost											
	CW-3-9	Driving In of Steel Sheet Pile (Type-II)	m	6	9909.067	76.17755	8578.669	59,454	457	51,472	
	CW-3-10	Pulling Out of Steel Sheet Pile (Type-II)	m	6	9754	67	8548	58,524	402	51,288	
Total for	4 m							14,206,863	859	9,495,349	
Unit Cost for	1 m							3,551,716	215	2,373,837	
Unit Cost for	1 nos							1,420,686	86	949,535	

* 1 : Steel Sheet Pile : 48 kg/m x 9 m long x 4 m dstnc / 0.4 m wide
= 4320 kg
* 2 : Leasing Term : 200 days

ID No. CW-4-9 | Working Name: Installation of Tierod and Wale (Temporary) | Calculation Quantity: 10 ton | Remarks: Excluding Material

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-58	Shotcrete Machine Wet Type : 0.8~1.2	hourly	5	68498.33	0	40476.29	342,492	0	202,381	
	A-2-1-72	Truck Crane; 16 ton, Oil Pressure	hourly	33	135641.1	1020	115858.5	4,476,156	33,660	3,823,330	
Labour											
	L-2-1	Foreman	day	5	0	0	48800	0	0	244,000	
	L-2-13	Rigger	day	10	0	0	39000	0	0	390,000	
	L-2-6	Welder	day	5	0	0	39000	0	0	195,000	
	L-2-23	Common Labour	day	5	0	0	35100	0	0	175,500	
Others											
		Miscellaneous	L.S.					385,552	2,740	402,489	8%
Total for	10 ton							5,204,200	36,400	5,432,700	
Unit Cost for	1 ton							520,420	3,640	543,270	

* 1 : All rates are quated from Japanese Manual (P294)

ID No. CW-4-10 | Working Name: Removal of Tierod and Wale (Temporary) | Calculation Quantity: 10 ton | Remarks: Excluding Material

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-72	Truck Crane; 16 ton, Oil Pressure	hourly	20	135641.1	1020	115858.5	2,712,822	20,400	2,317,170	
Labour											
	L-2-1	Foreman	day	3	0	0	48800	0	0	146,400	
	L-2-13	Rigger	day	5	0	0	39000	0	0	195,000	
	L-2-23	Common Labour	day	3	0	0	35100	0	0	105,300	
Others											
		Miscellaneous	L.S.					244,178	1,900	248,830	9%
Total for	10 ton							2,957,000	22,300	3,012,700	
Unit Cost for	1 ton							295,700	2,230	301,270	

* 1 : All rates are quated from Japanese Manual (P294)

Table 4.1.8 (3/7) CALCULATION SHEET FOR TEMPORARY WORK AND RAIL WORK-1

ID No.	Working Name	Calculation Quantity	Remarks
CW-4-11	Temporary Double Steel Sheet Pile	4 m	L=9.0 and 15.0m long and 4.7 and 10.7m of Driving and Pulling Out (Type-II)

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Material											
	M-B-9	Soil for Backfilling	m3	55.9	0	400	7600	0	22,360	424,840	50% of Total Volume
		Structural Steel(Purchasing),									
	M-E-4	SS41	kg	114.9075	5225	0	275	600,392	0	31,600	
	M-E-12	Tierod (Lease)	kg day	56250	60	0	40	3,375,000	0	2,250,000	
	M-E-77	C-beam (Lease), SS41	kg day	96960	3.623684	0	2.415789	351,352	0	234,235	
	M-E-30	Steel Sheet Pile (Lease)	kg day	2304000	16.30658	0	10.87105	37,570,358	0	25,046,905	
Working Base Cost											
	CW-1-46	Excavation A	m3	111.8	2361	39	1711	263,960	4,360	191,290	
	CW-1-8	Tamper Loading	m3	111.8	1760	60	2600	196,768	6,708	290,680	
		Installation of Tierod and Wale									
	CW-4-9	(Temporary)	ton	4.7	520420	3640	543270	2,445,974	17,108	2,553,369	
		Removal of Tierod and Wale									
	CW-4-10	(Temporary)	ton	4.7	295700	2230	301270	1,389,790	10,481	1,415,969	
		Driving In of Steel Sheet Pile									
	CW-3-9	(Type-II)	m	4.7	9909.067	76.17755	8578.669	46,573	358	40,320	River Side
		Pulling Out of Steel Sheet Pile									
	CW-3-10	(Type-II)	m	4.7	9754	67	8548	45,844	315	40,176	River Side
		Driving In of Steel Sheet Pile									
	CW-3-9	(Type-II)	m	10.7	9909.067	76.17755	8578.669	106,027	815	91,792	Field Side
		Pulling Out of Steel Sheet Pile									
	CW-3-10	(Type-II)	m	10.7	9754	67	8548	104,368	717	91,464	Field Side
Total for	4 m							46,496,405	63,222	32,702,638	
Unit Cost for	1 m							11,624,101	15,806	8,175,660	
Unit Cost for	1 set							4,649,641	6,322	3,270,264	

* 1 :	Steel Sheet Pile :	48 kg/m x	24 m long x	4 m dstnc /	0.4 m wide	
	=	11520 kg				
* 2 :	Tie Rod Dia 42mm :	15 kg/m x	7.5 m long x	4 m dstnc /	1.6 m pitch	
	=	281.25 kg				
* 3 :	Channel Beam 200x90 :	30.3 kg/m x	4 m dstnc x	4 pieces =	484.8 kg	
* 4 :	Structural Steel SS400 :	15 % of Total of Tierod and Beam	=	114.9075 kg		
* 5 :	Soil Volume :	6.5 m wide x	4.3 m high x	4 m =	111.8 m3	
* 6 :	Leasing Term :	200 days				

ID No.	Working Name	Calculation Quantity	Remarks
CW-4-12	Temporary Dewatering by D100mm	50 m	Width is 3m. Number of Working Day is 180 days including Installation and Removal

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
		Submergible Pump; D100mm									
	A-2-2-47	5.5 kW	daily	60	26,903	0	13,589	1,614,187	0	815,329	for Driving
	A-2-2-15	Generator; 100 kVA	daily	60	215064	10800	160745.1	12,903,843	648,000	9,644,708	for Driving
		Truck Crane; 4.9 ton, Oil									
	A-2-1-75	Pressure	hourly	1	55145.89	720	48324.47	55,146	720	48,324	for Installation and Removal
Labour											
	L-2-1	Foreman	day	0.2	0	0	48800	0	0	9,760	for Installation and Removal
	L-2-23	Common Labour	day	2.8	0	0	35100	0	0	98,280	for Installation and Removal
	L-2-4	Electrician	day	0.17	0	0	39000	0	0	6,630	for Driving
Total for	50 m							14,573,175	648,720	10,623,031	
Unit Cost for	1 m							291,464	12,974	212,461	
Unit Cost for	1 place							14,573,175	648,720	10,623,031	

Table 4.1.8 (4/7) CALCULATION SHEET FOR TEMPORARY WORK AND RAIL WORK-1

ID No.	Working Name	Calculation Quantity	Remarks
CW-4-17	Temporary Double Steel Sheet Pile for Drainage Component	4 m	L=8m long and 3.3m of Driving and Pulling Out (Type-II)

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-1-1	Backfill (Soil) A	m3	165.12	6076	87	5043	1,003,269	14,365	832,700	
	CW-1-46	Excavation A	m3	220.16	2361	39	1711	519,798	8,586	376,694	
	CW-1-46	Excavation A	m3	55.04	2361	39	1711	129,949	2,147	94,173	for Replacement
	CW-1-8	Tamper Loading	m3	55.04	1760	60	2600	96,870	3,302	143,104	
	CW-4-9	Installation of Tierod and Wale (Temporary)	ton	0.66102	520420	3640	543270	344,008	2,406	359,112	
	CW-4-10	Removal of Tierod and Wale (Temporary)	ton	0.66102	295700	2230	301270	195,464	1,474	199,145	
	CW-3-9	Driving In of Steel Sheet Pile (Type-II)	m	37	9909.067	76.17755	8578.669	366,635	2,819	317,411	River Side
	CW-3-10	Pulling Out of Steel Sheet Pile (Type-II)	m	37	9754	67	8548	360,898	2,479	316,276	River Side
	CW-3-9	Driving In of Steel Sheet Pile (Type-II)	m	37	9909.067	76.17755	8578.669	366,635	2,819	317,411	Field Side
	CW-3-10	Pulling Out of Steel Sheet Pile (Type-II)	m	37	9754	67	8548	360,898	2,479	316,276	Field Side
Total for	4 m							3,744,425	42,876	3,272,303	
Unit Cost for	1 m							936,106	10,719	818,076	

* 1 :	Steel Sheet Pile :	48 kg/m x	16 m long x	4 m dstnc /	0.4 m wide
	= 7680 kg				
* 2 :	Tie Rod Dia 42mm :	9 kg/m x	4 m long x	4 m dstnc /	1.6 m pitch
	= 90 kg				
* 3 :	Channel Beam 200x90 :	30.3 kg/m x	4 m dstnc x	4 pieces =	484.8 kg
* 4 :	Structural Steel SS400 :	15 % of Total of Tierod and Beam		= 86.22 kg	
* 5 :	Soil Volume :	3.2 m wide x	4.3 m high x	4 m =	55.04 m3

ID No.	Working Name	Calculation Quantity	Remarks
CW-4-18	Temporary Steel Sheet Pile with Support for Drainage	6 m	L=7.5m long and 7.5 and 3.0m of Driving and Pulling Out (Type-II)

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-2-7	Cutting Muddy Earth, 1m	m3	13.5	0	0	7400	0	0	99,900	
	CW-1-46	Excavation A	m3	40.5	2361	39	1711	95,621	1,580	69,296	
	CW-1-47	Excavation B	m3	40.5	2951	48	2138	119,516	1,944	86,589	
	CW-1-48	Excavation C	m3	40.5	3943	65	2857	159,692	2,633	115,709	for Replacement
	CW-3-17	Wale Work-B (Temporary)	ton	2.340365	558950	3200	581050	1,308,147	7,489	1,359,869	
	CW-4-10	Removal of Tierod and Wale (Temporary)	ton	2.340365	295700	2230	301270	692,046	5,219	705,082	
	CW-3-9	Driving In of Steel Sheet Pile (Type-II)	m	225	9909.067	76.17755	8578.669	2,229,540	17,140	1,930,201	River Side
	CW-3-10	Pulling Out of Steel Sheet Pile (Type-II)	m	90	9754	67	8548	877,860	6,030	769,320	River Side
Total for	6 m							5,482,420	42,034	5,135,964	
Unit Cost for	1 m							913,737	7,006	855,994	
Unit Cost for	1 set							365,495	2,802	342,398	

* 1 :	Steel Sheet Pile :	48 kg/m x	15 m long x	6 m dstnc /	0.4 m wide
	= 10800 kg				
* 3 :	H-beam for Waling 350-12x9 :	135 kg/m x	6 m dstnc x	2 pieces =	1620 kg
* 3 :	H-beam for Support 150-7x10 :	31.1 kg/m x	4.5 m long x	2 pieces =	279.9 kg
* 3 :	H-beam for Others 100-6x8 :	16.9 kg/m x	1 m long x	8 pieces =	135.2 kg
* 4 :	Structural Steel SS400 :	15 % of Total of Tierod and Beam		= 305.265 kg	
* 5 :	Soil Volume :	5 m wide x	4.5 m high x	6 m =	135 m3

ID No.	Working Name	Calculation Quantity	Remarks
CW-4-21	Temporary Dewatering by D200mm	180 day	Assumption : Working Day is 180 days including Installation and Removal

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-49	Submergible Pump; D200mm 22kW	daily	180	81,666	0	41,250	14,699,859	0	7,424,929	for Driving
	A-2-2-16	Generator; 125 kVA	daily	180	271912.2	15120	209096	48,944,194	2,721,600	37,637,275	for Driving
	A-2-1-75	Truck Crane; 4.9 ton, Oil Pressure	hourly	1	55145.89	720	48324.47	55,146	720	48,324	for Installation and Removal
Labour											
	L-2-1	Foreman	day	0.2	0	0	48800	0	0	9,760	for Installation and Removal
	L-2-23	Common Labour	day	2.8	0	0	35100	0	0	98,280	for Installation and Removal
	L-2-4	Electrician	day	0.17	0	0	39000	0	0	6,630	for Driving
Total for	180 day							63,699,199	2,722,320	45,225,199	
Unit Cost for	1 day							353,884	15,124	251,251	

Table 4.1.8 (5/7) CALCULATION SHEET FOR TEMPORARY WORK AND RAIL WORK-1

ID No.	Working Name	Calculation Quantity	Remarks
CW-4-22	Temporary Dewatering by D180mm	180 day	Assumption : Working Day is 180 days including Installation and Removal

Major Item	ID No.	Description	Unit	Quantity	Unit Cost			Cost			Remarks
					PF/C	IF/C	L/C	PF/C	IF/C	L/C	
Equipment											
		Submergible Pump; D200mm									
	A-2-2-49	22kW	daily	120	81,666	0	41,250	9,799,906	0	4,949,953	for Driving
	A-2-2-16	Generator; 125 kVA	daily	120	271912.2	15120	209096	32,629,463	1,814,400	25,091,517	for Driving
		Submergible Pump; D150mm									
	A-2-2-48	10.6 kW	daily	60	39,099	0	19,749	2,345,951	0	1,184,945	for Driving
	A-2-2-16	Generator; 125 kVA	daily	60	271912.2	15120	209096	16,314,731	907,200	12,545,758	for Driving
		Truck Crane; 4.9 ton, Oil									
	A-2-1-75	Pressure	hourly	1	55145.89	720	48324.47	55,146	720	48,324	for Installation and Removal
Labour											
	L-2-1	Foreman	day	0.2	0	0	48800	0	0	9,760	for Installation and Removal
	L-2-23	Common Labour	day	2.8	0	0	35100	0	0	98,280	for Installation and Removal
	L-2-4	Electrician	day	0.17	0	0	39000	0	0	6,630	for Driving
Total for	180 day							61,145,198	2,722,320	43,935,167	
Unit Cost for	1 day							339,696	15,124	244,084	

ID No.	Working Name	Calculation Quantity	Remarks
CW-4-23	Temporary Dewatering by D160mm	180 day	Assumption : Working Day is 180 days including Installation and Removal

Major Item	ID No.	Description	Unit	Quantity	Unit Cost			Cost			Remarks
					PF/C	IF/C	L/C	PF/C	IF/C	L/C	
Equipment											
		Submergible Pump; D200mm									
	A-2-2-49	22kW	daily	36	81,666	0	41,250	2,939,972	0	1,484,986	for Driving
	A-2-2-16	Generator; 125 kVA	daily	36	271912.2	15120	209096	9,788,839	544,320	7,527,455	for Driving
		Submergible Pump; D150mm									
	A-2-2-48	10.6 kW	daily	144	39,099	0	19,749	5,630,283	0	2,843,867	for Driving
	A-2-2-16	Generator; 125 kVA	daily	144	271912.2	15120	209096	39,155,355	2,177,280	30,109,820	for Driving
		Truck Crane; 4.9 ton, Oil									
	A-2-1-75	Pressure	hourly	1	55145.89	720	48324.47	55,146	720	48,324	for Installation and Removal
Labour											
	L-2-1	Foreman	day	0.2	0	0	48800	0	0	9,760	for Installation and Removal
	L-2-23	Common Labour	day	2.8	0	0	35100	0	0	98,280	for Installation and Removal
	L-2-4	Electrician	day	0.17	0	0	39000	0	0	6,630	for Driving
Total for	180 day							57,569,595	2,722,320	42,129,123	
Unit Cost for	1 day							319,831	15,124	234,051	

Table 4.1.8 (6/7) CALCULATION SHEET FOR TEMPORARY WORK AND RAIL WORK-1

ID No. CW-4-13 | Working Name: Angsana Species | Calculation Quantity: 1 tree | Remarks: Total height from the root is 220cm

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-1	Foreman	day	0.05	0	0	48800	0	0	2,440	
	L-2-23	Common Labour	day	0.2	0	0	35100	0	0	7,020	
Material											
	M-M-17	Manila Rope	kg	0.2	0	750	14250	0	150	2,850	
	M-D-3	Banboo Pile, Dia. 3cm)	m	5	0	0	650	0	0	3,250	
	M-I-1	Angsana	tree	1	0	0	15000	0	0	15,000	
Others											
	Ground Preparation including natural fertilizer, Red Soil and peat moss		L.S.	1			18000	0	0	18,000	
	Maintenance and Watering		L.S.	1			45000	0	0	45,000	
Total for	1 tree							0	150	93,560	
Unit Cost for	1 tree							0	150	93,560	

*1 : All rates and Costs are based on quatation from Private firms.

ID No. CW-4-14 | Working Name: Glodogan Species | Calculation Quantity: 1 tree | Remarks: Total height from the root is 170cm

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-1	Foreman	day	0.05	0	0	48800	0	0	2,440	
	L-2-23	Common Labour	day	0.2	0	0	35100	0	0	7,020	
Material											
	M-M-17	Manila Rope	kg	0.2	0	750	14250	0	150	2,850	
	M-D-3	Banboo Pile, Dia. 3cm)	m	5	0	0	650	0	0	3,250	
	M-I-2	Glodogan	tree	1	0	0	50000	0	0	50,000	
Others											
	Ground Preparation including natural fertilizer, Red Soil and peat moss		L.S.	1			18000	0	0	18,000	
	Maintenance and Watering		L.S.	1			45000	0	0	45,000	
Total for	1 tree							0	150	128,560	
Unit Cost for	1 tree							0	150	128,560	

*1 : All rates and Costs are based on quatation from Private firms.

ID No. CW-4-15 | Working Name: Flamboyant Species | Calculation Quantity: 1 tree | Remarks: Total height from the root is 220cm

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-1	Foreman	day	0.05	0	0	48800	0	0	2,440	
	L-2-23	Common Labour	day	0.2	0	0	35100	0	0	7,020	
Material											
	M-M-17	Manila Rope	kg	0.2	0	750	14250	0	150	2,850	
	M-D-3	Banboo Pile, Dia. 3cm)	m	5	0	0	650	0	0	3,250	
	M-I-3	Flamboyant	tree	1	0	0	150000	0	0	150,000	
Others											
	Ground Preparation including natural fertilizer, Red Soil and peat moss		L.S.	1			18000	0	0	18,000	
	Maintenance and Watering		L.S.	1			45000	0	0	45,000	
Total for	1 tree							0	150	228,560	
Unit Cost for	1 tree							0	150	228,560	

*1 : All rates and Costs are based on quatation from Private firms.

Table 4.1.8 (7/7) CALCULATION SHEET FOR TEMPORARY WORK AND RAIL WORK-1

ID No. CW-4-16 | Working Name: Relocating Trees | Calculation Quantity: 1 tree | Remarks: Total height from the root is 220cm

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-1	Foreman	day	1	0	0	48800	0	0	48,800	
	L-2-23	Common Labour	day	2	0	0	35100	0	0	70,200	
Material											
	M-M-17	Manila Rope	kg	0.5	0	750	14250	0	375	7,125	
	M-D-3	Banboo Pile, Dia. 3cm)	m	12	0	0	650	0	0	7,800	
Others											
	Ground Preparation including natural fertilizer, Red Soil and peat moss		L.S.	1			36000	0	0	36,000	
	Trees Preparation and Equipment		L.S.	1			25000	0	0	25,000	
	Maintenance and Watering		L.S.	1			45000	0	0	45,000	
Total for	1 tree							0	375	239,925	
Unit Cost for	1 tree							0	375	239,925	

* 1 : All rates and Costs are based on quatation from Private firms.

ID No. CW-4-19 | Working Name: Palm Botol Planting | Calculation Quantity: 1 tree | Remarks: Total height from the root is mininum 200cm

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-1	Foreman	day	0.05	0	0	48800	0	0	2,440	
	L-2-23	Common Labour	day	0.2	0	0	35100	0	0	7,020	
Material											
	M-M-17	Manila Rope	kg	0.2	0	750	14250	0	150	2,850	
	M-D-3	Banboo Pile, Dia. 3cm)	m	5	0	0	650	0	0	3,250	
		Palm Botol	tree	1	0	0	250000	0	0	250,000	
Others											
	Ground Preparation including natural fertilizer, Red Soil and peat moss		L.S.	1			18000	0	0	18,000	
	Maintenance and Watering		L.S.	1			45000	0	0	45,000	
Total for	1 tree							0	150	328,560	
Unit Cost for	1 tree							0	150	328,560	

* 1 : All rates and Costs are based on quatation from Private firms.

ID No. CW-4-20 | Working Name: Bougainvillea Planting | Calculation Quantity: 1 tree | Remarks: Total height from the root is minimum 100cm

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-1	Foreman	day	0.05	0	0	48800	0	0	2,440	
	L-2-23	Common Labour	day	0.2	0	0	35100	0	0	7,020	
Material											
	M-M-17	Manila Rope	kg	0.2	0	750	14250	0	150	2,850	
	M-D-3	Banboo Pile, Dia. 3cm)	m	5	0	0	650	0	0	3,250	
		Bougainvillea	tree	1	0	0	25000	0	0	25,000	
Others											
	Ground Preparation including natural fertilizer, Red Soil and peat moss		L.S.	1			18000	0	0	18,000	
	Maintenance and Watering		L.S.	1			45000	0	0	45,000	
Total for	1 tree							0	150	103,560	
Unit Cost for	1 tree							0	150	103,560	

* 1 : All rates and Costs are based on quatation from Private firms.

Table 4.1.9 (1/5) CALCULATION SHEET FOR BRIDGE WORK

ID No. CW-6-1 | Working Name: Furnishing of Main Beam with Reinforcing Bar | Calculation Quantity: 1 Beam | Remarks: L = 21.8 m long

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-1-31	Reinforcing Bar Setup 2	t	1.5	0	2808810	2992590	0	4,213,215	4,488,885	
	CW-6-6	Setup of PC Cable	kg	622	6250	64.708875	21799.273	3,887,500	40,249	13,559,148	
	CW-6-10	Stringing Work	cable	3	652536	108756	390495.52	1,957,608	326,268	1,171,487	
	CW-6-20	Concrete Work of Beam at A2 by Crane	m3	10.77	120	50980	223080	1,292	549,055	2,402,572	
	CW-6-9	Hole Work for PC Cable	m	21.6	11589.75	0	1713.9168	250,339	0	37,021	
	CW-6-11	Temporary Placing for Beam	beam	1	0	0	282500	0	0	282,500	
	CW-1-23	Form Work A	m2	86.501	60	0	44798	5,190	0	3,875,072	
Total for		1 Beam						6,101,929	5,128,787	25,816,683	
Unit Cost for		1 Beam						6,101,929	5,128,787	25,816,683	

ID No. CW-6-2 | Working Name: Temporary Work for Furnishing of Main Beam with Reinforcing Bar | Calculation Quantity: 1 Beam | Remarks: L = 21.8 m long

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-6-5	Depreciation of Equipment for Construction	piece	1	28375138	3096	28305763	28,375,138	3,096	28,305,763	
	CW-6-12	Clean-up of Board for Furnishing Beam	beam	1	0	0	32799	0	0	32,799	
	CW-6-13	Furnishing, Installing and Removing Board for Furnishing Beam	m	50	0	0	33161.34	0	0	1,658,067	
	CW-6-14	Installing and Removing Derrick Crane	crane	0.07	0	0	443810	0	0	31,701	1crane / 14 beams
	CW-6-15	Installing and Removing Railing System for Derrick Crane	m	0.71	0	0	9847.995	0	0	7,034	10 m / 14 beams
Total for		1 Beam						28,375,138	3,096	30,035,364	
Unit Cost for		1 Beam						28,375,138	3,096	30,035,364	

ID No. CW-6-3 | Working Name: Election of Main Beam with Anchoring Work | Calculation Quantity: 1 Beam | Remarks: L = 21.8 m long

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-6-16	Erection of Beam	ton	27	0	0	12462.6	0	0	336,490	
	CW-6-17	Installation and Removal of Equipment for Erection	L.S.	0.07	1534300.8	8640	6433438.6	109,593	617	459,531	1 L.S. / 14 beams
	CW-6-15	Installing and Removing Railing System for Derrick Crane	m	1.43	0	0	9847.995	0	0	14,069	
	CW-6-18	Cost of Equipment and Tools	Bridge	0.2	14870000	2978000	11892000	2,974,000	595,600	2,378,400	Assumption 1 bridge = 5 beams
	CW-6-19	Anchoring for Bridge Work	place	3	67545	0	447245	202,635	0	1,341,735	
Total for		1 Beam						3,286,228	596,217	4,530,225	
Unit Cost for		1 Beam						3,286,228	596,217	4,530,225	

ID No. CW-6-4 | Working Name: Furnishing of Diaphram with Reinforcing Bar | Calculation Quantity: 1 Piece | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-1-31	Reinforcing Bar Setup 2	t	0.025	0	2808810	2992590	0	70,220	74,815	
	CW-1-38	Prefabricated Scaffold for Re-Con II	m2	30	14739	62	15629	442,170	1,860	468,870	7.5 m x 22m x 2 places / 11 pieces on average
		Tightening for Cross Direction	L.S.	0.090909	16650000	3330000	13320000	1,513,636	302,727	1,210,909	1 L.S. / 11 pieces on average
	CW-6-7	Grout Work	m3	0.004091	0	19173	545192	0	78	2,230	0.045m3 / 11 pieces on average
		Stringing for Cross Direction	piece	0.545455	47610	9520	38090	25,969	5,193	20,776	6 pieces / 11 pieces on average
	CW-6-21	Concrete Work for Diaphrani at Type-A2 by Pump	m3	0.245	20270	51140	238540	4,966	12,529	58,442	
Others											
Total for		1 Piece						1,986,742	392,608	1,836,043	
Unit Cost for		1 Piece						1,986,742	392,608	1,836,043	

Table 4.1.9 (2/5) CALCULATION SHEET FOR BRIDGE WORK

ID No. CW-6-5 | Working Name: Depreciation of Equipment for Construction | Calculation Quantity: 1 piece | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-73	Truck Crane; 22 ton, Oil Pressure	hourly	3	154,913	1,032	131,788	464,738	3,096	395,363	
Working Base Cost											
		Stringing Jack	set day	32	52200	0	52200	1,670,400	0	1,670,400	(1+(2-1)) x 16 days
		Derrick Crane	set day	32	80000	0	80000	2,560,000	0	2,560,000	(1+(2-1)) x 16 days
		Rail Facility	m day	960	19000	0	19000	18,240,000	0	18,240,000	(1+(2-1)) x 16 days x 30m
		Tools for Furnishing of Beam	day	32	170000	0	170000	5,440,000	0	5,440,000	(1+(2-1)) x 16 days
Total for		1 piece						28,375,138	3,096	28,305,763	
Unit Cost for		1 piece						28,375,138	3,096	28,305,763	

* 1 : All Rates and Cost are quoted from Japanese Standard.

ID No. CW-6-6 | Working Name: Setup of PC Cable | Calculation Quantity: 80 kg | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-32	Chief of Bridge	day	1.7	0	0	68300	0	0	116,110	
	L-2-33	Bridge Worker	day	7.5	0	0	58600	0	0	439,500	
	L-2-23	Common Labour	day	6.3	0	0	35100	0	0	221,130	
Material											
		PC Cable	kg	80	0	0	4000	0	0	320,000	
		PC Hole	m	100	5000	0	5000	500,000	0	500,000	
Working Base Cost											
	CW-6-7	Grout Work	m3	0.27	0	19173	545192	0	5,177	147,202	
Others											
Total for		80 kg						500,000	5,177	1,743,942	
Unit Cost for		1 kg						6,250	65	21,799	

* 1 : All Rates and Cost are quoted from Japanese Standard.

ID No. CW-6-7 | Working Name: Grout Work | Calculation Quantity: 1 m3 | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-33	Bridge Worker	day	5	0	0	58600	0	0	293,000	
	L-2-23	Common Labour	day	5	0	0	35100	0	0	175,500	
Material											
	M-C-45	Non Shrinkage Mortar	m3	1.05	0	18260	73040	0	19,173	76,692	
Total for		1 m3						0	19,173	545,192	
Unit Cost for		1 m3						0	19,173	545,192	

ID No. CW-6-8 | Working Name: Concrete Work for Beam | Calculation Quantity: 10 m3 | Remarks: Utilization of Derrick Crane

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-1	Foreman	day	0.3	0	0	48800	0	0	14,640	
	L-2-2	Operator	day	2.1	0	0	46900	0	0	98,490	
	L-2-23	Common Labour	day	2.5	0	0	35100	0	0	87,750	
Material											
	M-C-8	Ready Mixed Concrete; 400kg/cm2, 25mm (A2)	m3	10.2	0	49000	196000	0	499,800	1,999,200	10x (1+0.02)
Others											
		Small Tools	%	0.3				0	1,499	6,600	
Total for		10 m3						0	501,299	2,206,680	
Unit Cost for		1 m3						0	50,130	220,668	

* 1 : All Rates and Cost are quoted from Japanese Standard.

ID No. CW-6-9 | Working Name: Hole Work for PC Cable | Calculation Quantity: 100 m | Remarks: Cross Direction

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-32	Chief of Bridge	day	0.4	0	0	68300	0	0	27,320	
	L-2-33	Bridge Worker	day	0.8	0	0	58600	0	0	46,880	
	L-2-23	Common Labour	day	1	0	0	35100	0	0	35,100	
Material											
	M-E-14	Steel Pile, Dia.38mm (1.5ch), incl. Coating & Lining	m	100	11475	0	603.94737	1,147,500	0	60,395	
Others											
		Small Tools	%	1				11,475	0	1,697	
Total for		100 m						1,158,975	0	171,392	
Unit Cost for		1 m						11,590	0	1,714	

* 1 : All Rates and Cost are quoted from Japanese Standard.

Table 4.1.9 (3/5) CALCULATION SHEET FOR BRIDGE WORK

ID No. CW-6-10 | Working Name: Stringing Work | Calculation Quantity: 10 cable | Remarks: Type 195ton

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-32	Chief of Bridge	day	1.6	0	0	68300	0	0	109,280	
	L-2-33	Bridge Worker	day	5.6	0	0	58600	0	0	328,160	
	L-2-23	Common Labour	day	4.8	0	0	35100	0	0	168,480	
Material											
		Stringing Material	set	20	307800	51300	153900	6,156,000	1,026,000	3,078,000	
Others											
		Small Tools	%	6				369,360	61,560	221,035	
Total for	10 cable							6,525,360	1,087,560	3,904,955	
Unit Cost for	1 cable							652,536	108,756	390,496	

* 1 : All Rates and Cost are quoted from Japanese Standard.

ID No. CW-6-11 | Working Name: Temporary Placing for Beam | Calculation Quantity: 1 beam | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-32	Chief of Bridge	day	0.5	0	0	68300	0	0	34,150	
	L-2-33	Bridge Worker	day	3.1	0	0	58600	0	0	181,660	
	L-2-23	Common Labour	day	1.9	0	0	35100	0	0	66,690	
Total for	1 beam							0	0	282,500	
Unit Cost for	1 beam							0	0	282,500	

* 1 : All Rates and Cost are quoted from Japanese Standard.

ID No. CW-6-12 | Working Name: Clean-up of Board for Furnishing Beam | Calculation Quantity: 1 beam | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-18	Form Worker	day	0.58	0	0	39000	0	0	22,620	
	L-2-23	Common Labour	day	0.29	0	0	35100	0	0	10,179	
Total for	1 beam							0	0	32,799	
Unit Cost for	1 beam							0	0	32,799	

* 1 : All Rates and Cost are quoted from Japanese Standard.

ID No. CW-6-13 | Working Name: Furnishing, Installing and Removing Board for Furnishing Beam | Calculation Quantity: 10 m | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-32	Chief of Bridge	day	0.6	0	0	68300	0	0	40,980	
	L-2-18	Form Worker	day	2.2	0	0	39000	0	0	85,800	
	L-2-23	Common Labour	day	3.6	0	0	35100	0	0	126,360	
Others											
		Small Tools	%	31				0	0	78,473	
Total for	10 m							0	0	331,613	
Unit Cost for	1 m							0	0	33,161	

* 1 : All Rates and Cost are quoted from Japanese Standard.

ID No. CW-6-14 | Working Name: Installing and Removing Derrick Crane | Calculation Quantity: 1 crane | Remarks: Type : 3ton

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-33	Bridge Worker	day	3.8	0	0	58600	0	0	222,680	
	L-2-4	Electrician	day	1.8	0	0	39000	0	0	70,200	
	L-2-23	Common Labour	day	4.3	0	0	35100	0	0	150,930	
Total for	1 crane							0	0	443,810	
Unit Cost for	1 crane							0	0	443,810	

* 1 : All Rates and Cost are quoted from Japanese Standard.

ID No. CW-6-15 | Working Name: Installing and Removing Railing System for Derrick Crane | Calculation Quantity: 10 m | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-32	Chief of Bridge	day	0.2	0	0	68300	0	0	13,660	
	L-2-33	Bridge Worker	day	0.9	0	0	58600	0	0	52,740	
	L-2-23	Common Labour	day	0.9	0	0	35100	0	0	31,590	
Others											
		Small Tools	%	0.5				0	0	490	
Total for	10 m							0	0	98,480	
Unit Cost for	1 m							0	0	9,848	

* 1 : All Rates and Cost are quoted from Japanese Standard.

Table 4.1.9 (4/5) CALCULATION SHEET FOR BRIDGE WORK

ID No. CW-6-16 | Working Name: Erection of Beam | Calculation Quantity: 300 ton | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-32	Chief of Bridge	day	6.7	0	0	68300	0	0	457,610	
	L-2-33	Bridge Worker	day	40	0	0	58600	0	0	2,344,000	
	L-2-23	Common Labour	day	26.7	0	0	35100	0	0	937,170	
Total for	300 ton							0	0	3,738,780	
Unit Cost for	1 ton							0	0	12,463	

* 1 : All Rates and Cost are quoted from Japanese Standard.

* 2 :

Chief of Bridge: 1 person x 300 ton / 45 ton/day = 6.7

Bridge Worker: 6 person x 300 ton / 45 ton/day = 40

Common Labour: 4 person x 300 ton / 45 ton/day = 26.7

ID No. CW-6-17 | Working Name: Installation and Removal of Equipment for Erection | Calculation Quantity: 1 L.S. | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-74	Truck Crane; 35 ton, Oil Pressure	hourly	6	255716.81	1440	216489.77	1,534,301	8,640	1,298,939	
Labour											
	L-2-32	Chief of Bridge	day	10	0	0	68300	0	0	683,000	
	L-2-33	Bridge Worker	day	55	0	0	58600	0	0	3,223,000	
	L-2-23	Common Labour	day	35	0	0	35100	0	0	1,228,500	
Total for	1 L.S.							1,534,301	8,640	6,433,439	
Unit Cost for	1 L.S.							1,534,301	8,640	6,433,439	

* 1 : All Rates and Cost are quoted from Japanese Standard.

ID No. CW-6-18 | Working Name: Cost of Equipment and Tools | Calculation Quantity: 1 Bridge | Remarks: Application : 20 - 30 m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
		Equipment for Erection	day	20	147,600	29,500	118,100	2,952,000	590,000	2,362,000	
		Equipment for Beam Hanging	day	40	141300	28300	113000	5,652,000	1,132,000	4,520,000	
		Equipment for Horizontal Moving	day	20	246600	49300	197300	4,932,000	986,000	3,946,000	
		Tools for Erection	day	20	47700	9500	38200	954,000	190,000	764,000	
		Equipment of Railing System	m day	2000	190	40	150	380,000	80,000	300,000	
Total for	1 Bridge							14,870,000	2,978,000	11,892,000	
Unit Cost for	1 Bridge							14,870,000	2,978,000	11,892,000	

* 1 : All Rates and Cost are quoted from Japanese Standard.

ID No. CW-6-19 | Working Name: Anchoring for Bridge Work | Calculation Quantity: 1 place | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-32	Chief of Bridge	day	0.2	0	0	68300	0	0	13,660	
	L-2-33	Bridge Worker	day	0.4	0	0	58600	0	0	23,440	
	L-2-23	Common Labour	day	0.9	0	0	35100	0	0	31,590	
Material											
	M-M-5	Wooden Sleeper 13x22x200cm	nos.	3	0	0	125000	0	0	375,000	
	M-E-35	Galvanized Steel Wire	kg	23.7	2850	0	150	67,545	0	3,555	
Total for	1 place							67,545	0	447,245	
Unit Cost for	1 place							67,545	0	447,245	

* 1 : All Rates and Cost are quoted from Japanese Standard.

* 2 : Wire Rope: 15 m x 0.000201 m2 x 7.85 ton/m3 = 23.7 kg

Table 4.1.9 (5/5) CALCULATION SHEET FOR BRIDGE WORK

ID No. CW-6-20 | Working Name: Concrete Work of Beam at A2 by Crane | Calculation Quantity: 10 m3 | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-1	Foreman	day	0.3	0	0	48800	0	0	14,640	
	L-2-17	Concrete Worker	day	2.1	0	0	39000	0	0	81900	
	L-2-23	Common Labour	day	2.5	0	0	35100	0	0	87750	
Material											
	M-C-8	Ready Mixed Concrete; 400kg/cm2, 25mm (A2)	m3	10.2	0	49000	196000	0	499800	1999200	
Others											
	CW-1-45	Curing Work	m3	10	110	0	350	1100	0	3500	Reinforced Concrete
		Miscellaneous	L.S.	1				100	10,000	43,810	Apprx.2% of mentioned above
Total for	10 m3							1,200	509,800	2,230,800	
Unit Cost for	1 m3							120	50980	223080	

Refer to Japanese Standard for All rates
Concrete : 10 x (1+ 0.02) = 10.2m3

ID No. CW-6-21 | Working Name: Concrete Work for Diaphram at Type-A2 by Pump | Calculation Quantity: 10 m3 | Remarks: by Boom, Standard Concreting Volume=75m3

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-36-1	Concrete Pump Truck; 90-110 m3/hr	Time	0.15	45418.325	340	28935.435	6,813	51	4,340	
	A-2-1-36-2	Concrete Pump Truck; 90-110 m3/hr	hourly	0.7	272509.95	2040	173612.61	190,757	1,428	121,529	
Labour											
	L-2-1	Foreman	day	0.3	0	0	48800	0	0	14,640	
	L-2-17	Concrete Worker	day	1.5	0	0	39000	0	0	58,500	
	L-2-23	Common Labour	day	3.9	0	0	35100	0	0	136,890	
Material											
	M-C-8	Ready Mixed Concrete; 400kg/cm2, 25mm (A2)	m3	10.2	0	49000	196000	0	499,800	1,999,200	
Others											
	CW-1-45	Curing Work	m3	10	110	0	350	1,100	0	3,500	Reinforced Concrete
		Miscellaneous	L.S.	1				4,030	10,121	46,801	Apprx.2% of mentioned above
Total for	10 m3							202,700	511,400	2,385,400	
Unit Cost for	1 m3							20,270	51,140	238,540	

Refer to Japanese Standard for All rates
Concrete : 10 x (1+ 0.02) = 10.2m3

ID No. CW-6-22 | Working Name: Concrete Work of Type-B by Pump | Calculation Quantity: 10 m3 | Remarks: by Boom, Standard Concreting Volume=75m3

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-36-1	Concrete Pump Truck; 90-110 m3/hr	Time	0.15	45418.325	340	28935.435	6,813	51	4,340	
	A-2-1-36-2	Concrete Pump Truck; 90-110 m3/hr	hourly	0.7	272509.95	2040	173612.61	190,757	1,428	121,529	
Labour											
	L-2-1	Foreman	day	0.3	0	0	48800	0	0	14,640	
	L-2-17	Concrete Worker	day	1.5	0	0	39000	0	0	58,500	
	L-2-23	Common Labour	day	3.9	0	0	35100	0	0	136,890	
Material											
	M-C-10	Ready Mixed Concrete; 250kg/cm2, 25mm (B)	m3	10.2	0	42000	168000	0	428,400	1,713,600	
Others											
	CW-1-45	Curing Work	m3	10	110	0	350	1,100	0	3,500	Reinforced Concrete
		Miscellaneous	L.S.	1				4,030	8,621	41,101	Apprx.2% of mentioned above
Total for	10 m3							202,700	438,500	2,094,100	
Unit Cost for	1 m3							20,270	43,850	209,410	

Refer to Japanese Standard for All rates
Concrete : 10 x (1+ 0.02) = 10.2m3

Table 4.2.1 SCHEDULE OF TRUCK IN GENERAL NEEDED FOR MOBILIZATION AND DEMOBILIZATION

MOBILIZATION AND DEMOBILIZATION OF SEMARANG RIVER DRAINAGE SYSTEM IMPROVEMENT

Construction Equipment	Capacity/ Specification	Number of Equipment																																	
		2001												2002												2003											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Dump Truck A	4 ton																2								2				1	2					1	2	
Dump Truck B	10 ton													2			4				2				8				8	2						6	
Truck with Crane A	4 ton																1								1				1						1		

MOBILIZATION AND DEMOBILIZATION OF ASIN RIVER DRAINAGE SYSTEM IMPROVEMENT

Construction Equipment	Capacity/ Specification	Number of Equipment																																	
		2001												2002												2003											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Pontoon	100 m3					1						1																								
Barge	100 m3					2						2																								
Tug Boat	15 ton					1						1																								
Dump Truck B	10 ton	2			5	10			9				8				1	15	1	1	2	9	3	1	7				9	4	2	2	2	2	5	2	6
Truck with Crane A	4 ton				4	1					1		4				1	2	1	1		1			3				5	1	1				1	5

MOBILIZATION AND DEMOBILIZATION OF BANDARHARJO DRAINAGE SYSTEM IMPROVEMENT

Construction Equipment	Capacity/ Specification	Number of Equipment																																	
		2001												2002												2003											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Dump Truck B	10 ton	1			1	8	1		1	5		2	5				4	5	1		1	2		5	4				12	1				1		12	
Truck with Crane A	4 ton				1	1											2	1			1	1		2	3					1	1			1			

Mobilization
Demobilization

Table 4.2.2 (1/2) SCHEDULE OF TRAILER NEEDED FOR MOBILIZATION AND DEMOBILIZATION

MOBILIZATION AND DEMOBILIZATION OF SIMONGAN WEIR

Construction Equipment	Capacity/ Specification	Number of Trailer																																	
		2001												2002												2003											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Buldozer B	15 ton													1			1																				
Backhoe/Excavator A	0.20 m3																1								1					1						1	
Backhoe/Excavator B	0.35 m3																												1						1		
Backhoe/Excavator C	0.6 m3													1			1								1					1						1	
Backhoe D (Long Arm)	0.6 m3																1								1				1	1						
Portable Concrete Mixer B	0.2 m3																1								1											
Tamper	60/100 kg																1				1															
Vibrating Roller B	10 ton													1			1												1					1		
Tire Roller	8/12 ton																													1					1	
Motor Grader	2.8 m																												1					1		
Diesel Engine Generator A	35 KVA																												1						1	
Air Compresor A	5.0 m3																								1				1	1					1	
Number of Trailer for Moblization														1			2												3	2						
Number of Trailer for Demoblization																	1								2					1				1	2	1	

Mobilization
Demobilization

MOBILIZATION AND DEMOBILIZATION OF FLOODWAY/GARANG RIVER

Construction Equipment	Capacity/ Specification	Number of Trailer																																	
		2001												2002												2003											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Buldozer A	15 ton	1							1									1			1			1													
Backhoe/Excavator B	0.20 m3				1								1						1						1												
Backhoe/Excavator C	0.35 m3	1			2	2			2		1		2				1	3			1	2			3				3		1				1		2
Clamshell Grubbing	1.0 m3																												1			1					
Giant Breaker	600/800 kg					1						1																									
Truck Crane A	20 ton																			1					1			1		1							
Truck Crane B	25 ton																							1	1						1		1	1		1	
Crawler Crane A	50 ton																														1		1	2			
Crawler Crane C	100 ton																						1	1													
Vibrating Pile Driver A	60 kW				1						1						1				1								1	1					1	1
Vibrating Pile Driver B	90 kW					1							1					1				1			1												
Diesel Pile Hammer	3.5 ton																	1				1							1		1						
Portable Concrete Mixer A	0.20 m3				1								1					1							1				1							1
Tamper	60/100 kg				1								1					1							1				1							1
Vibrating Roller B	10 ton										1	1									1			1						1		1			1	
Tire Roller	8/12 ton										1	1																									
Tandem Roller	8/12 ton										1	1																									
Motor Grader	2.8 m										1	1																		1		1			1	
Asphalt Sprayer	30 lit/min										1	1																							1	1	
Asphalt Finisher	2.4 m										1	1																							1	1	
Deisel Engine Generator A	35 kVA					1					1																										
Air Compressor A	5 m3					1					1								1	1														1		1	
Number of Trailer for Moblization		1			3	3					3						1	5	1	1	2		1	1				1	5	1	1	2		2	3	1	
Number of Trailer for Demoblization									2		2	4	4								1	3		3	6					2		2		1	3	2	5

Table 4.2.2 (2/2) SCHEDULE OF TRAILER NEEDED FOR MOBILIZATION AND DEMOBILIZATION

MOBILIZATION AND DEMOBILIZATION OF FLOODWAY/GARANG RIVER

Construction Equipment	Capacity/ Specification	Number of Trailer																																	
		2001												2002												2003											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Buldozer A	15 ton					1				1											1			1													
Backhoe/Excavator B	0.20 m3	1					1					1																									
Backhoe C	0.35 m3						2			1			2				1	1			1				2				3	1			1		3	
Backhoe D (Long Arm)	0.35 m3																							1													
Truck Crane A	20 ton																				1	1			2	1				1							
Crawler Crane C	100 ton																					1		1	1												
Vibrating Pile Driver A	60 kW				1		1					1	1				1	1						1	1					1				1			
Vibrating Pile Driver B	90 kW																		1			1															
Diesel Pile Hammer	3.5 ton																		1			1															
Portable Concrete Mixer A	0.2 m3					1							1					1						1					1							1	
Tamper	60/100 kg					1							1				1								1				1							1	
Vibrating Roller B	10 ton																				1			1						1		1				1	1
Tire Roller	8/12 ton																													1		1				1	1
Tandem Roller	8/12 ton																													1		1				1	1
Motor Grader	2.8 m																													1		1				1	1
Asphalt Sprayer	30 lit/min																													1	1						
Asphalt Finisher	2.4 m																													1	1						
Air Compressor B	11 m3																								1												
Number of Trailer for Moblization		1			1	2	3					1					2	1	1		2	2		2	1					4	4					2	
Number of Trailer for Demoblization							1			2		1	3					1			1	1		2	5						1	1	2	1		4	2

Mobilization
Demobilization

Table 4.2.3 NUMBER OF TRUCK IN GENERAL TRANSPORTATION FOR MOBILIZATION AND DEMOBILIZATION

MOBILIZATION AND DEMOBILIZATION OF SEMARANG RIVER DRAINAGE SYSTEM IMPROVEMENT

Construction Equipment	Capacity/ Specification	Number of Equipment						Total	
		2001		2002		2003			
		M	D	M	D	M	D	M	D
Dump Truck A	4 ton			2	2	3	3	5	5
Dump Truck B	10 ton			8	8	8	8	16	16
Truck with Crane A	4 ton			1	1	1	1	2	2

MOBILIZATION AND DEMOBILIZATION OF ASIN RIVER DRAIANAGE SYSTEM IMPROVEMENT

Construction Equipment	Capacity/ Specification	Number of Equipment						Total	
		2001		2002		2003			
		M	D	M	D	M	D	M	D
Pontoon	100 m3	1	1					1	1
Barge	100 m3	2	2					2	2
Tug Boat	15 ton	1	1					1	1
Dump Truck B	10 ton	17	17	20	20	17	17	54	54
Truck with Crane A	4 ton	5	5	5	4	6	7	16	16

MOBILIZATION AND DEMOBILIZATION OF BANDARHARJO DRAINAGE SYSTEM IMPROVEMENT

Construction Equipment	Capacity/ Specification	Number of Equipment						Total	
		2001		2002		2003			
		M	D	M	D	M	D	M	D
Dump Truck A	4 ton	12	12	11	11	13	13	36	36
Truck with Crane A	4 ton	3	3	5	4	1	2	9	9

Table 4.2.4 (1/2) NUMBER OF TRAILER TRANSPORTATION FOR MOBILIZATION AND DEMOBILIZATION

MOBILIZATION AND DEMOBILIZATION OF SEMARANG RIVER DRAINAGE SYSTEM IMPROVEMENT

Construction Equipment	Capacity/ Specification	Number of Transportation			Total
		2001	2002	2003	
Buldozer B	15 ton	0	2	0	2
Backhoe/Excavator A	0.20 m3	0	2	2	4
Backhoe/Excavator B	0.35 m3	0	0	2	2
Backhoe/Excavator C	0.60 m3	0	2	2	4
Backhoe D (Long Arm)	0.60 m3	0	2	2	4
Portable Concrete Mixer A	0.5 m3	0	2	0	2
Tamper	60/100 kg	0	2	0	2
Vibrating Roller B	10 ton	0	2	2	4
Tire Roller	40 ton	0	0	2	2
Motor Grader	50 ton	0	0	2	2
Diesel Engine Generator A	125 KVA	0	0	2	2
Air Compresor A	5.0 m3	0	2	2	4
Total Number of Trailer for Mobilization		0	3	5	8
Total Number of Trailer for Demobilization		0	3	5	8

MOBILIZATION AND DEMOBILIZATION OF ASIN RIVER DRAINAGE SYSTEM IMPROVEMENT

Construction Equipment	Capacity/ Specification	Number of Transportation			Total
		2001	2002	2003	
Buldozer A	15 ton	2	3	0	5
Backhoe/Excavator B	0.35 m3	2	2	0	4
Backhoe/Excavator C	0.60 m3	10	10	7	27
Giant Breaker	600/800 kg	0	0	2	2
Clamshell Grabbing	1.0 m3	2	0	0	2
Truck Crane A	20 ton	0	2	2	4
Truck Crane B	25 ton	0	2	4	6
Crawler Crane A	50 ton	0	0	4	4
Crawler Crane C	100 ton	0	2	0	2
Vibratary Pile Driver A	60 kW	2	2	4	8
Vibratary Pile Driver B	90 kW	2	3	0	5
Diesel Pile Hammer	3.5 ton	0	2	2	4
Portable Concrete Mixer A	0.20 m3	2	2	2	6
Tamper	60/100 kg	2	2	2	6
Vibrating Roller B	10 ton	2	2	4	8
Tire Roller	8/12 ton	2	0	0	2
Tandem Roller	8/12 ton	2	0	0	2
Motor Grader	2.8 m	2	0	4	6
Asphalt Sprayer	30 lit/min	2	0	2	4
Asphalt Finisher	2.4 m	2	0	2	4
Diesel Engine Generator A	35 kVA	2	0	0	2
Air Compressor A	5 m3	2	1	3	6
Total Number of Trailer for Mobilization		10	11	16	37
Total Number of Trailer for Demobilization		12	13	15	40

Table 4.2.4 (2/2) NUMBER OF TRAILER TRANSPORTATION FOR MOBILIZATION AND DEMOBILIZATION

MOBILIZATION AND DEMOBILIZATION OF BANDARHARJO
DRAINAGE SYSTEM IMPROVEMENT

Construction Equipment	Capacity/ Specification	Number of Transportation			Total
		2001	2002	2003	
Buldozer A	15 ton	2	2	0	4
Backhoe/Excavator B	0.35 m3	2	0	0	2
Backhoe/Excavator C	0.60 m3	6	5	8	19
Backhoe D (Long Arm)	0.60 m3	0	2	0	2
Truck Crane A	20 ton	0	4	2	6
Crawler Crane C	100 ton	0	2	0	2
Vibratary Pile Driver A	60 kW	4	4	2	10
Vibratary Pile Driver B	90 kW	0	2	0	2
Diesel Pile Hammer	3.5 ton	0	2	0	2
Portable Concrete Mixer A	0.20 m3	2	2	2	6
Tamper	60/100 kg	2	2	2	6
Vibrating Roller B	10 ton	0	2	4	6
Tire Roller	8/12 ton	0	0	4	4
Tandem Roller	8/12 ton	0	0	4	4
Motor Grader	2.8 m	0	0	4	4
Aphalt Sprayer	30 lit/min	0	0	2	2
Asphalt Finisher	2.4 m	0	0	2	2
Air Compressor B	11 m3	0	2	0	2
Total Number of Trailer for Mobilization		8	11	0	29
Total Number of Trailer for Demobilization		7	10	0	28

Table 4.2.5 (1/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name	Calculation Quantity	Remarks
U-P1-Bq-2	Mobilization and Demobilization	1 L.S.	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-69	Trailer; 20 ton	hourly	64	119,879	2,160	102,572	7,672,283	138,240	6,564,587	
	A-2-1-48	Dumptruck; 10 ton	hourly	128	77269	3060	70744.12	9,890,431	391,680	9,055,247	
	A-2-1-80	Truck; 11 ton	hourly	40	96,932	1,560	95,161	3,877,271	62,400	3,806,445	
		Truck with crane; 4 ton, Crane :									
	A-2-1-31	2.9 ton	hourly	16	48669.75	780	47767.65	778,716	12,480	764,282	
	A-2-1-32	Truck with crane; 6 ton	hourly	0	62783.98	912	61243.41	0	0	0	
	A-2-2-37	Pontoon Barge; 100 ton	daily	0	314821.3	0	237790.6	0	0	0	
	A-2-2-41	Drifter Air Type : 150kg class	daily	0	257007.1	0	88827.32	0	0	0	
	A-2-1-84	Tugboat; 15 ton	hourly	0	129433.1	4440	140042.2	0	0	0	
Indirect Cost											
Site Expense			%	15	0.8		0.2	5,161,688	0	1,290,422	
Profit and Overhead Cost			%	10	0.8		0.2	3,957,294	0	989,323	
		Miscellaneous	L.S.					17	0	92	Round Up
Total for	1	L.S.						31,337,700	604,800	22,470,400	
Unit Cost for	1	L.S.						31,337,700	604,800	22,470,400	

* 1 : All Equipment : Land Transportation : 4 hours land trasnportation 24 hours ship transportation
All Equipment : Ship Transportation : Though it takes longer time than land transportation, it asumes that the cost is same.

* 2 : Number of Mobilized and Demobilized Equipment

	Mobilization	Demobilization
Trailer	8	8
Dump Truck 10t	16	16
Ordinary Truck 10t	5	5
Truck with Crane 4 t	2	2
Truck with Crane 6 t		
Pontoon Berge 100 t		
Soil Carriage 100m3		
Tag Boat 15 ton		

ID No.	Working Name	Calculation Quantity	Remarks
U-P1-Bq-4	Temporary Construction Road	1 L.S.	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Material											
		Crushed Stone for Pavement									
	M-B-12	and Concrete	m3	207.5	0	3250	61750	0	674,375	12,813,125	for Excavation
	M-B-13	Solid Soil	m3	944	0	600	11400	0	566,400	10,761,600	for Embankment
		Crushed Stone for Pavement									
	M-B-12	and Concrete	m3	489.7	0	3250	61750	0	1,591,525	30,238,975	for Embankment
Working Base Cost											
	CW-1-46	Excavation A	m3	718.75	2361	39	1711	1,696,969	28,031	1,229,781	for Excavation
		Slope Clearing of Excavation									
	CW-1-12	by Machine	m2	325	4018	66	3760	1,305,850	21,450	1,222,000	for Excavation
	CW-4-1	Temporary Bridge	m2	0	917231.6	19318.14	861665.6	0	0	0	for Embankment
		Spreading and Compaction for									
	CW-1-56	Gravel Pavement	m3	442.5	5117.168	43.2	16431.17	2,264,347	19,116	7,270,791	for Embankment
	CW-1-59	Spreading and Compaction-D	m3	1696.25	1509	19	1473	2,559,641	32,229	2,498,576	for Embankment
Indirect Cost											
Site Expense			%	15	0.8		0.2	9,215,374	0	2,303,843	
Profit and Overhead Cost			%	10	0.8		0.2	7,065,120	0	1,766,280	
		Miscellaneous	L.S.					99	74	28	Round Up
Total for	1	L.S.						24,107,400	2,933,200	70,105,000	
Unit Cost for	1	L.S.						24,107,400	2,933,200	70,105,000	

for Embankment

* 1 : Temporary Road Body Volume (V1) : 0.5 x (5.0 m wide + 6.50 m wide) x 0.5 m high
= 2.875 m3/m (Purchased Soil Volume = 50 % of Total Volume)
Purchased Soil for Road : 1.4375 m3/m / 0.9 loss = 1.6 m3/m

* 2 : Gravel Pavement Volume (V2) : 0.15 m thick x 5.0 m wide = 0.75 m3/m
Purchased Crushed Stone : 0.75 m3/m / 0.9 loss = 0.83 m3/m

* 3 : Temporary Road Length (tl1) : 581 m from Construction Planning roundup 590 m

* 4 : Temporary Bridge Length (tl2) : m from Construction Planning roundup 0 m

for Excavated Road

* 5 : Excavation Volume (V3) : 2.875 m3/1m from Construction Planning

* 6 : Gravel Pavement Volume(V4) : 0.83 m3/1m

* 7 : Slope Clearing : 1.3 m/1m

* 8 : Temporary Road Length (tl3) : 249 m from Construction Planning roundup 250 m

Table 4.2.5 (2/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name	Calculation Quantity	Remarks
U-P1-Bq-5	Contractor's Site Office and Facilities	1 L.S.	

Major Item	ID No.	Description	Unit	Quantity	PF/C	IF/C	L/C	PF/C	IF/C	L/C	Remarks
Direct Cost											
		Install of Office and Others	m2	574	80000	80000	915000	45,920,000	45,920,000	525,210,000	including all facilities
		Removal of Office	%	30				13,776,000	13,776,000	157,563,000	
		Rental of Land	%	10				5,969,600	5,969,600	68,277,300	
Indirect Cost											
Site Expense			%	15	0.8		0.2	105,885,780	0	26,471,445	
Profit and Overhead Cost			%	10	0.8		0.2	81,179,098	0	20,294,775	
		Miscellaneous	L.S.					22	0	81	
Total for	1 L.S.							252,730,500	65,665,600	797,816,600	
Unit Cost for	1 L.S.							252,730,500	65,665,600	797,816,600	

ID No.	Working Name	Calculation Quantity	Remarks
U-P1-Bq-6	Engineer's Site Office and Facilities	1 L.S.	

Major Item	ID No.	Description	Unit	Qua	Remarks

Table 4.2.5 (3/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No. U-P1-Bq-7 | Working Name: Drawings | Calculation Quantity: 1 L.S. | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Labour											
	L-2-34	Cad Operator	day	200	0	0	54700	0	0	10,940,000	
	L-2-35	Draft Man	day	200	0	0	39000	0	0	7,800,000	
Material											
	M-L-15	Drawing Paper (A1)	sheet	100	8000	0	2000	800,000	0	200,000	
	M-L-16	Blue Copy (A1)	sheet	100	0	2500	2500	0	250,000	250,000	
Others											
		Tools	%	20				160,000	50,000	3,838,000	Computer, Plotter, Drafer and etc.
Indirect Cost											
Site Expense			%	15	0.8		0.2	2,914,560	0	728,640	
Profit and Overhead Cost			%	10	0.8		0.2	2,234,496	0	558,624	
		Miscellaneous	L.S.					44	0	36	Round Up
Total for	1 L.S.							6,109,100	300,000	24,315,300	
Unit Cost for	1 L.S.							6,109,100	300,000	24,315,300	

ID No. U-P1-Bq-8 | Working Name: Surveying | Calculation Quantity: 1 L.S. | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
		Drawing Plan of River Scale 1:500	ha	10			112,000	0	0	1,120,000	
		River Cross Section Survey Scale 1:100									
		a. Surveying	section	20			232000	0	0	4,640,000	
		b. Drawing & Processing	section	20			62000	0	0	1,240,000	
Indirect Cost											
Site Expense			%	15	0.8		0.2	840,000	0	210,000	
Profit and Overhead Cost			%	10	0.8		0.2	644,000	0	161,000	
		Miscellaneous	L.S.					0	0	0	Round Up
Total for	1 L.S.							1,484,000	0	7,371,000	
Unit Cost for	1 L.S.							1,484,000	0	7,371,000	

Table 4.2.5 (4/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name	Calculation Quantity	Remarks
U-P1-Bq-11	Clearing of Garbage	1 L.S.	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-54	Dumptruck; 4 ton	hourly	58.62	30203.66	1376	28631.77	1770538.83	80661.12	1678394.57	
	A-2-1-7	Backhoe; 0.6 m3	hourly	7	125542.9	2040	90965.08	878800.353	14280	636755.535	
Labour											
	L-2-1	Foreman	day	1	0	0	48800	0	0	48800	
	L-2-23	Common Labour	day	10	0	0	35100	0	0	351000	
Material											
		Plastic Bag	sheet	100	0	0	1000	0	0	100000	
Indirect Cost											
Site Expense			%	15	0.8		0.2	667107.649	0	166776.912	
Profit and Overhead Cost			%	10	0.8		0.2	511449.197	0	127862.299	
		Miscellaneous	L.S.					4	59	11	Round Up
Total for	1 L.S.							3,827,900	95,000	3,109,600	
Unit Cost for	1 L.S.							3,827,900	95,000	3,109,600	

* 1 : Total Volume of Gabege 565 m3

* 2 : Dump Truck : 565 m3 / 1 ton/m3 / 10 ton truck / 0.8 loss = 70.63 truck round

10 km/rnd / 20 km/hr + 20 mnts(loss)= 0.83 hours

70.63 Truck x 0.83 hours = 58.62 hours

ID No.	Working Name	Calculation Quantity	Remarks
U-P1-Bq-13	Excavation below water level including hauling and treatment of contaminated soil	100 m3	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-48	Dumptruck; 10 ton	hourly	21.89	77269	3060	70744.12	1,691,418	66,983	1,548,589	from Hauling
	A-2-2-2	Stabilizer	hourly	0.683761	743275.5	1092	502607.8	508,223	747	343,663	for Mixing
Labour											
	L-2-1	Foreman	day	0.008686	0	0	48800	0	0	424	for water proof sheet
	L-2-23	Common Labour	day	0.028952	0	0	35100	0	0	1,016	for water proof sheet
	L-2-23	Common Labour	day	6.666667	0	0	35100	0	0	234,000	for Spreading of Concrete
Material											
		Drain Pipe	m	0.173712	108000	0	12000	18,761	0	2,085	for Hauling
		Water Proof Sheet for Disposal Site	m2	47.57788	27000	0	3000	1,284,603	0	142,734	for Disposal Site
		Water Proof Sheet for Dump Truck	sheet	0.347423	0	0	50000	0	0	17,371	for Hauling
	M-B-3	Sand for Mortar (Masonry)	m3	21.74986	0	2250	42750	0	48,937	929,806	for Backfill of Drain
	M-C-1	Portland Cement	kg	7000	0	100	400	0	700,000	2,800,000	for Backfill of Drain
	M-B-5	Cobble Stone	m3	0.496526	0	1850	35150	0	919	17,453	for Backfill of Drain
	M-B-13	Solid Soil	m3	33.42373	0	600	11400	0	20,054	381,030	for Banking
Working Base Cost											
	CW-1-64	Excavation by Backhoe 0.35m3	m3	0.496526	2687.773	45.24	1953.753	1,335	22	970	for Excavation
	CW-1-64	Excavation by Backhoe 0.35m3	m3	0.551695	2687.773	45.24	1953.753	1,483	25	1,078	for Backfill
		Spreading by Swamp									
	CW-1-65	Bulldozer	m3	108	4284.32	54.264	4047.348	462,707	5,861	437,114	for Spreading
	CW-1-5	Spreading A	m3	80.74117	2941	35	2823	237,460	2,826	227,932	for Disposal Site
		Slope Clearing for									
	CW-1-10	Embankment 2	m2	3.420382	3265	54	2660	11,168	185	9,098	for Banking
	CW-1-5	Spreading A	m3	20.26636	2941	35	2823	59,603	709	57,212	for Final Spreading
	CW-1-1	Backfill (Soil) A	m3	30.57788	6076	87	5043	185,791	2,660	154,204	for Banking
		Spreading and Compaction for									
	CW-1-58	Earth Filling	m3	30.57788	2833.803	36.252	2632.618	86,652	1,109	80,500	for Banking
	CW-1-48	Excavation C	m3	100	3943	65	2857	394,300	6,500	285,700	for Dredging
	CW-1-47	Excavation B	m3	1.022583	2951	48	2138	3,018	49	2,186	for Pit
		Concrete Work for Small									
	CW-1-21	Structure : Type-D	m3	0.348871	120	42570	193500	42	14,851	67,507	for Pit
	CW-1-23	Form Work A	m2	0.318471	60	0	44798	19	0	14,267	for Pit
	CW-1-29	Reinforcing Bar Setup 1	t	0.006977	0	3120900	3325100	0	21,776	23,201	for Pit
	CW-1-15	Gravel Bedding	m3	0.056167	0	1360	31260	0	76	1,756	for Pit
	CW-1-2	Backfill (Soil) B	m3	0.132021	7022	103	6326	927	14	835	for Pit
Indirect Cost											
Site Expense			%	15	0.8		0.2	1,634,825	0	408,706	
Profit and Overhead Cost			%	10	0.8		0.2	1,253,366	0	313,341	
		Miscellaneous	L.S.					1	97	22	
Total for	100 m3							7,835,700	894,400	8,503,800	
Unit Cost for	1 m3							78,357	8,944	85,038	See Next Page

Table 4.2.5 (5/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

* 1 :	Dump Truck for Hauling:	107	m3	/	6.5	m3/truck	=	16.46	Truck				
		20	km/rnd /	20	km/hr +	20	mnts(loss)=	1.33	hours				
		16.46	Truck	x	1.33	hours	=	21.89	hours				
	Water Proof Sheet	10	m2/truckx	20	trucks x	3	changes =	600					
	Unit Quantity	600	m2 /	172700	=	0.003474	m3						
* 2 :	Excavation/Backfill by Backhoe 0.35m3 for Drain												
	Dimension of Drain	0.5	m wide x	0.5	m depthx(	490	x	350	)m length				
		x	2	/	100	m pitch	=	857.5	m3				
	Unit excavation/Backfilling Volume	857.5	m3 /	172700	=	0.004965	m3						
	Cobble Stone	0.004965	/	0.9	loss =	0.005517							
* 3 :	Spreading by Swamp Bull	100	m3 x	1.2	(L) x	0.9	(C) =	108	m3				
* 4 :	Banking	52808	m3										
	Unit Volume	52808	/	172700	=	0.305779	m3						
	Soil	(	52808	-	857.5	) /	0.9	loss =	57722.7778	m3			
	Unit Volume	57722.78	/	172700	=	0.334237	m3						
* 5 :	Labor Rate and Cement:	Cement :	70	kg/m3 is necessary									
		Labor :	2	person/party for Spreading at 50kg (1bag) of cement									
		It takes	10	minutes.									
		Hence,	70	kg/m3 /	50	kg/bag x	2	person/party					
		x	10	mimutes /	60	minutes/hour /	7	hours/day					
		=	0.066667	person/m3									
* 6 :	Mixing	$Q = \frac{60 \times q \times E}{Cm}$ (m3/hour)		Cm =(	0.027	x	30	m +					
					0.79	x	3	round =	4.8	minutes			
		q =	3	m wide x	0.2	m depth x	30	m long =	18	m3/time			
		Q =	146.25	m3/hour	Hence,	Tm =	0.00683761	hour/m3					
* 7 :	Final Spreading	500	m x	350	m x	0.2	m depth =	35000	m3				
		35000	m3 /	172700	=	0.202664	m3						
* 8 :	Water Proof Sheet for Disposal Site :	82167	m2 /	172700	m3 =	0.47577881							
	including Drain Pipe and	Foreman :	3	persons x	5	days /	172700	m3 =					8.68558E-05
	Coarse Sand	Common Labor :	10	persons x	5	days /	172700	m3 =					0.000289519
* 9 :	Spreading for Disposal Site :	139440	m2	from Construction Planning /			172700	m3 =	0.8074117				
* 10 :	Slope Clearing :	5907	m2	from Construction Planning /			172700	m3 =	0.03420382				
* 11 :	Drain Pipe :	300	m	from Construction Planning /			172700	m3 =	0.00173712				
* 12 :	Coarse Sand :	37562	m3 (from Construction Planning) /				172700	m3 =	0.21749855				
Reservoir Pit													
* 13 :	Excavation :	1766	m3 (from Construction Planning) /				172700	m3 =	0.01022583				
* 14 :	Concrete :	602.5	m3 (from Construction Planning) /				172700	m3 =	0.00348871				
* 15 :	Formwork :	550	m2 (from Construction Planning) /				172700	m3 =	0.00318471				
* 16 :	Reinforcing Bar :	12050	kg (from Construction Planning) /				172700	m3 =	0.06977417				
* 17 :	Backfilling Gravel :	97	m3 (from Construction Planning) /				172700	m3 =	0.00056167				
* 18 :	Backfilling :	228	m3 (from Construction Planning) /				172700	m3 =	0.00132021				

Table 4.2.5 (6/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name			Calculation Quantity	Remarks
U-P1-Bq-16	Structural Excavation	U-P3-Bq-21	Structural Excavation	10 m3	
U-P1-Bq-37.1	Structural Excavation	U-P3-Bq-43	Structural Excavation		
U-P2-Bq-20	Structural Excavation	U-P3-Bq-52	Structural Excavation		
U-P2-Bq-37	Structural Excavation	U-P3-Bq-63	Structural Excavation		
U-P2-Bq-61	Structural Excavation	U-P3-Bq-69	Structural Excavation		
U-P2-Bq-72	Structural Excavation	U-P3-Bq-100	Structural Excavation		
U-P2-Bq-125	Structural Excavation	U-P3-Bq-149	Structural Excavation		
U-P2-Bq-150	Structure Excavation	U-P3-Bq-159	Structural Excavation		
U-P2-Bq-163	Structural Excavation	U-P3-Bq-165	Structural Excavation		
U-P2-Bq-171	Structural Excavation	U-P3-Bq-197	Structural Excavation		
U-P2-Bq-178	Structural Excavation	U-P3-Bq-209	Structural Excavation		
U-P2-Bq-196	Structural Excavation	U-P3-Bq-220	Structural Excavation		
U-P2-Bq-253	Structure Excavation	U-P3-Bq-230	Structure Excavation		
U-P2-Bq-261	Structural Excavation	U-P3-Bq-250	Structural Excavation		
U-P2-Bq-270	Structural Excavation	U-P3-Bq-268	Structural Excavation		
U-P2-Bq-305	Structural Excavation	U-P3-Bq-286	Structural Excavation		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-48	Dumptruck; 10 ton	hourly	0.87	77269	3060	70744.12	67,224	2,662	61,547	
Working Base Cost											
	CW-1-5	Spreading A	m3	12	2941	35	2823	35,292	420	33,876	for Reclamation Site
	CW-1-46	Excavation A	m3	4	2361	39	1711	9,444	156	6,844	
	CW-1-47	Excavation B	m3	5	2951	48	2138	14,755	240	10,690	
	CW-1-6	Manpower Excavation	m3	1	0	0	15800	0	0	15,800	
Indirect Cost											
Site Expense			%	15	0.8		0.2	31,074	0	7,769	
Profit and Overhead Cost			%	10	0.8		0.2	23,823	0	5,956	
		Miscellaneous	L.S.					87	22	18	Round Up
Total for	10 m3							181,700	3,500	142,500	
Unit Cost for	1 m3							18,170	350	14,250	

*1 : Soil Volume : 10 m3

*2 : Dump Truck : 10 ton/dump / 1.5 m3/ton = 6.67 m3/dump
10 km/rnd / 40 kn/hr + 20 mnts(loss)= 0.58 hours
10 m3 / 6.67 m3/dump = 1.5 dp/10m3
1.5 dp/10m3 x 0.58 hours = 0.87 hours

*3 : Spreading : 10 m3 x 1.2 = 12 m3

ID No.	Working Name	Calculation Quantity	Remarks
U-P1-Bq-17	Backfill with Selected Soil	10 m3	
U-P1-Bq-40	Backfill with Selected Soil		
U-P2-Bq-38	Backfill with Selected Soil		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Material											
		Sand for Filling and Base									
	M-B-4	Course	m3	2.22	0	1350	25650	0	2,997	56,943	
	M-B-9	Soil for Backfilling	m3	8.89	0	400	7600	0	3,556	67,564	
Working Base Cost											
	CW-1-1	Backfill (Soil) A	m3	4	6076	87	5043	24,304	348	20,172	
	CW-1-2	Backfill (Soil) B	m3	3	7022	103	6326	21,066	309	18,978	
	CW-1-3	Backfill (Soil) C	m3	2	6392	98	6338	12,784	196	12,676	
	CW-1-4	Backfill (Soil) D	m3	2	6038	132	7114	12,076	264	14,228	
Indirect Cost											
Site Expense			%	15	0.8		0.2	32,215	0	8,054	
Profit and Overhead Cost			%	10	0.8		0.2	24,698	0	6,175	
		Miscellaneous	L.S.					56	30	11	Round Up
Total for	10 m3							127,200	7,700	204,800	
Unit Cost for	1 m3							12,720	770	20,480	

*1 : Sand : 2 m3 / 0.9 = 2.22 m3

*2 : Soil : 8 m3 / 0.9 = 8.89 m3

Table 4.2.5 (7/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name			Calculation Quantity	Remarks
U-P1-Bq-18	Chipping on Existing Dike Surface			10 m2	
U-P1-Bq-38	Chipping of Existing Outlet Surface	U-P3-Bq-45	Chipping of Existing Concrete Surface		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Labour											
	L-2-27	Chief of Mason	day	0.38	0	0	58600	0	0	22,268	
	L-2-11	Mason	day	3.8	0	0	39000	0	0	148,200	
Others											
		Small Tool	%	2				0	0	3,409	Graver, Hammer and etc.
Indirect Cost											
Site Expense			%	15	0.8		0.2	20,865	0	5,216	
Profit and Overhead Cost			%	10	0.8		0.2	15,997	0	3,999	
		Miscellaneous	L.S.					38	0	7	Round Up
Total for	10 m2							36,900	0	183,100	
Unit Cost for	1 m2							3,690	0	18,310	

*1 : Manpower ; Chief of Mason : 0.038 man/m2 x 10 m2 = 0.38
Mason : 0.38 man/m2 x 10 m2 = 3.8
Mason : 0.38 person day /m2
*2 : Rate of Mason is quated from Japanese Standard. (P2109)
*3 : Rate of Chieef of Mason is assumption.

ID No.	Working Name			Calculation Quantity	Remarks
U-P1-Bq-19	Sand Bedding	U-P3-Bq-41.1	Sand Bedding	10 m3	
U-P1-Bq-33.1	Sand Bedding	U-P3-Bq-245.1	Sand Bedding		
U-P2-Bq-39	Sand Bedding	U-P3-Bq-262.1	Sand Bedding		
U-P2-Bq-48	Sand Bedding	U-P3-Bq-281.1	Sand Bedding		
U-P2-Bq-86	Sand Bedding				
U-P2-Bq-322	Sand Bedding				

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Labour											
	L-2-23	Common Labour	day	1.5	0	0	35100	0	0	52650	
Material											
	M-B-4	Sand for Filling and Base Course	m3	11	0	1350	25650	0	14850	282150	
Indirect Cost											
Site Expense			%	15	0.8		0.2	41958	0	10489.5	
Profit and Overhead Cost			%	10	0.8		0.2	32167.8	0	8041.95	
		Miscellaneous	L.S.					74	50	69	Round Up
Total for	10 m3							74,200	14,900	353,400	
Unit Cost for	1 m3							7,420	1,490	35,340	

* 1 : Sand : 10 m3 / 0.9 loss = 11
* 2 : Labor Rates are quoted from Japanese Standards.

ID No.	Working Name			Calculation Quantity	Remarks
U-P1-Bq-20	Wet Stone Masonry	U-P3-Bq-28	Wet Stone Masonry	10 m3	
U-P2-Bq-27	Wet Stone Masonry	U-P3-Bq-57	Wet Stone Masonry		
U-P2-Bq-40	Wet Stone Masonry	U-P3-Bq-74	Wet Stone Masonry		
U-P2-Bq-67	Wet Stone Masonry	U-P3-Bq-113	Wet Stone Masonry		
U-P2-Bq-77	Wet Stone Masonry	U-P3-Bq-161	Wet Stone Masonry		
U-P2-Bq-102	Wet Stone Masonry	U-P3-Bq-201	Wet Stone Masonry		
U-P2-Bq-133	Wet Stone Masonry	U-P3-Bq-215	Wet Stone Masonry		
U-P2-Bq-158	Wet Stone Masonry	U-P3-Bq-226	Wet Stone Masonry		
U-P2-Bq-183	Wet Stone Masonry	U-P3-Bq-236	Wet Stone Masonry		
U-P2-Bq-212	Wet Stone Masonry	U-P3-Bq-270	Wet Stone Masonry		
U-P2-Bq-309	Wet Stone Masonry				

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Working Base Cost											
	CW-2-15	Masonry of Crushed Stone, 1cement : 3sand	m3		0	22400	207600	0	0	0	
	CW-2-14	Masonry of Crushed Stone/Riverstone with 1cement : 2 sand	m3	10	0	28800	188500	0	288,000	1,885,000	
Indirect Cost											
Site Expense			%	15	0.8		0.2	260,760	0	65,190	
Profit and Overhead Cost			%	10	0.8		0.2	199,916	0	49,979	
		Miscellaneous	L.S.					24	0	31	Round Up
Total for	10 m3							460,700	288,000	2,000,200	
Unit Cost for	1 m3							46,070	28,800	200,020	

Table 4.2.5 (8/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name	Calculation Quantity	Remarks
U-P1-Bq-21	Joint Filler, 10 mm thick (Elastic Material)	10 m2	
U-P2-Bq-41	Joint Filler, 10mm thick (Elastic Material)		
U-P2-Bq-70	Joint Filler, 10mm thick (Elastic Material)		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Labour											
	L-2-1	Foreman	day	0.05	0	0	48800	0	0	2,440	
	L-2-23	Common Labour	day	0.2	0	0	35100	0	0	7,020	
Material											
	M-G-12	Elastic Joint Filler 10mm thick	m2	11.11	0	8250	19250	0	91,658	213,868	
Others											
		Small Tolls and Material	%	1				0	917	2,233	Glue, Cutter and etc.
Indirect Cost											
Site Expense			%	15	0.8		0.2	38,176	0	9,544	
Profit and Overhead Cost			%	10	0.8		0.2	29,268	0	7,317	
		Miscellaneous	L.S.					55	26	78	Round Up
Total for	10 m2							67,500	92,600	242,500	
Unit Cost for	1 m2							6,750	9,260	24,250	

*1 : Manpower ; Foreman : 1 man/day / 200 m2/day x 10 m2 = 0.05
Common Labor : 4 man/day / 200 m2/day x 10 m2 = 0.2
Common Labor : 1 manpower = 50 m2/day
*2 : Elastic Joint Filler : 10 m2 / 0.9 = 11.11

ID No.	Working Name			Calculation Quantity	Remarks
U-P1-Bq-23	Pointing	U-P3-Bq-29	Pointing	10 m2	
U-P2-Bq-28	Pointing	U-P3-Bq-57.2	Pointing		
U-P2-Bq-42	Pointing	U-P3-Bq-81.1	Pointing		
U-P2-Bq-78	Pointing	U-P3-Bq-113.2	Pointing		
U-P2-Bq-105	Pointing	U-P3-Bq-162	Pointing		
U-P2-Bq-135	Pointing	U-P3-Bq-205	Pointing		
U-P2-Bq-160	Pointing	U-P3-Bq-217.1	Pointing		
U-P2-Bq-184	Pointing	U-P3-Bq-228.1	Pointing		
U-P2-Bq-213	Pointing	U-P3-Bq-238.1	Pointing		
U-P2-Bq-313	Pointing	U-P3-Bq-272	Pointing		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Working Base Cost											
	CW-2-44	Plastering 15mm thickness with 1cement : 2sand	m2	7	0	1200	10000	0	8,400	70,000	
Others											
		Extra Cost for Labor	%	20				0	1,680	14,000	
Indirect Cost											
Site Expense			%	15	0.8		0.2	11,290	0	2,822	
Profit and Overhead Cost			%	10	0.8		0.2	8,655	0	2,164	
		Miscellaneous	L.S.					55	20	14	Round Up
Total for	10 m2							20,000	10,100	89,000	
Unit Cost for	1 m2							2,000	1,010	8,900	

*1 : Pointing 70 % of All Area of Wall

Table 4.2.5 (9/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

U-P1-Bq-33.1 Sand Bedding is equal unit cost with U-P1-Bq-19

ID No.	Working Name	Calculation Quantity	Remarks
U-P1-Bq-33.2	Concrete Block Pavement	10 m2	
U-P2-Bq-49	Concrete Block Pavement	U-P3-Bq-245.2	Concrete Block Pavement
U-P2-Bq-87	Concete Block Pavement	U-P3-Bq-262.2	Concrete Block Pavement
U-P2-Bq-323	Concrete Block Pavement	U-P3-Bq-281.2	Concrete Block Pavement
U-P3-Bq-41.2	Concrete Block Pavement		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-2-112	Masonry of Paving Block	m2	10	0	5700	44800	0	57,000	448,000	for Embankment
Indirect Cost											
Site Expense			%	15	0.8		0.2	60,600	0	15,150	
Profit and Overhead Cost			%	10	0.8		0.2	46,460	0	11,615	
		Miscellaneous	L.S.					40	0	35	Round Up
Total for	10 m2							107,100	57,000	474,800	
Unit Cost for	1 m2							10,710	5,700	47,480	

ID No.	Working Name			Calculation Quantity	Remarks
U-P1-Bq-33.3	Cement Mortar	U-P3-Bq-41.3	Cement Mortar	10 m2	
U-P2-Bq-50	Cement Mortar	U-P3-Bq-245.3	Cement Mortar		
U-P2-Bq-88	Cement Mortar	U-P3-Bq-262.3	Cement Mortar		
U-P2-Bq-324	Cement Mortar	U-P3-Bq-271	Cement Mortar Plastering		
		U-P3-Bq-281.3	Cement Mortar		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-2-44	Plastering 15mm thickness with 1cement : 2sand	m2	10	0	1200	10000	0	12,000	100,000	
Indirect Cost											
Site Expense			%	15	0.8		0.2	13,440	0	3,360	
Profit and Overhead Cost			%	10	0.8		0.2	10,304	0	2,576	
		Miscellaneous	L.S.					56	0	64	Round Up
Total for	10 m2							23,800	12,000	106,000	
Unit Cost for	1 m2							2,380	1,200	10,600	
Unit Cost for	1 m3		6.666667	m2				15,900	8,000	70,700	

ID No.	Working Name			Calculation Quantity	Remarks
				10 m3	
U-P1-Bq-33.4	Concrete Kerb	U-P3-Bq-41.4	Concrete Kerb		
U-P2-Bq-51	Concrete Kerb	U-P3-Bq-245.4	Concrete Kerb		
U-P2-Bq-89	Concrete Kerb	U-P3-Bq-262.4	Concrete Kerb		
		U-P3-Bq-281.4	Concrete Kerb		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-79	Truck Mixer; 4.5 m3	hourly	3.17	77957.88	1560	60651.61	247,126	4,945	192,266	
Working Base Cost											
	CW-1-23	Form Work A	m2	68.67	60	0	44798	4,120	0	3,076,129	
	CW-2-40	Breaking-up the Concrete Form	m2	68.67	0	0	3700	0	0	254,067	
	CW-1-21	Concrete Work for Small Structure : Type-D	m3	10	120	42570	193500	1,200	425,700	1,935,000	
Indirect Cost											
Site Expense			%	15	0.8		0.2	736,866	0	184,217	
Profit and Overhead Cost			%	10	0.8		0.2	564,931	0	141,233	
		Miscellaneous	L.S.					56	55	89	Round Up
Total for	10 m3							1,554,300	430,700	5,783,000	
Unit Cost for	1 m3							155,430	43,070	578,300	

*1 : Assumed Concrete Volume : 1.5 m3

*2 : Total Formwork Area : 10.3 m2

Average Formwork Area : 68.67 m2/unit m3

*3 : Truck Mixer : 10.7 m3 / 4.5 m3/truck = 2.38 Truck

10 km/rnd / 30 km/hr + 60 mnts(loss)= 1.33 hours

2.38 Truck x 1.33 hours = 3.17 hours

Table 4.2.5 (10/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name	Calculation Quantity	Remarks
U-P1-Bq-36	Coffering and Dewatering	1 L.S.	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
	CW-4-7	Sand Bags	nos	300	88.5375	758.9625	4199.663	26,561	227,689	1,259,899	
	CW-4-23	Temporary Dewatering by D160mm	day	1,000	319831.1	15124	234050.7	319,831,082	15,124,000	234,050,683	
Others											
Indirect Cost											
Site Expense			%	15	0.8		0.2	68,462,390	0	17,115,597	
Profit and Overhead Cost			%	10	0.8		0.2	52,487,832	0	13,121,958	
		Miscellaneous	L.S.					34	11	62	
Total for	1 L.S.							440,807,900	15,351,700	265,548,200	
Unit Cost for	1 L.S.							440,807,900	15,351,700	265,548,200	

* 1 : Sand Bags : 300 nos from Construction Planning

* 2 : Drainage Pump Dia.160 : 5 months x 4 days/month x 50 places = 1,000 days/work

ID No.	Working Name	Calculation Quantity	Remarks
U-P1-Bq-36.1	Demolition of existing Concrete	1 L.S.	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-2-35	Pick Hammer	daily	2.32	5716.911	0	2030.087	13,257	0	4,707	
	A-2-1-48	Dumptruck; 10 ton	hourly	1.57	77269	3060	70744.12	121,312	4,804	111,068	
	A-2-2-17	Generator; 15 kVA	daily	0.58	82875	1800	52496.05	48,068	1,044	30,448	
Labour											
	L-2-1	Foreman	day	0.58	0	0	48800	0	0	28,290	
	L-2-10	Drill Worker	day	2.32	0	0	39000	0	0	90,435	
	L-2-23	Common Labour	day	2.32	0	0	35100	0	0	81,391	
Working Base Cost											
	CW-1-54	Excavation I	m3	100	5072	83	3675	507,200	8,300	367,500	
Indirect Cost											
Site Expense			%	15	0.8		0.2	170,139	0	42,535	
Profit and Overhead Cost			%	10	0.8		0.2	113,426	0	28,356	
		Miscellaneous	L.S.					599	852	269	Round Up
Total for	1 L.S.							974,000	15,000	785,000	
Unit Cost for	1 L.S.							974,000	15,000	785,000	

Manpower Composition; Foreman : 1 man/day

Common Labor : 4 man/day

Drill Worker : 4 man/day

* 1 : Demolition Volume = 8 m3

* 2 8m3 x Ta / T x 60 x Composition of Manpower = Foreman 0.58, Drill Worker 2.32, Common 2.32

* 3 8m3 x Tb / 60 = Dump Truck 1.57 hour

* 4 8m3 x Ta / T x 60 = Generator 0.58 days

* 5 : Average Daily Working Time of Generator, Labor, Breaker T = 690 / 100 = 6.9 (hour/day)

* 6 : Working Time by Hand Breaker / 1m3 (Ta) Ta = 60 minutes/m3

* 7 : Working Time by Dump Truck / 1m3 (Tb) Tb = (5 km(one way) x 2 / 30 km/hour + 20 minutes)/ 10 ton truck = 11.75 minutes/m3

* 8 : Working Time by Pick Hammer / 1m3 (Tc) Tc = 60 minutes/m3

U-P1-Bq-38 Chipping of Existing Outlet Surface is equal unit cost with U-P1-Bq-18.

Table 4.2.5 (11/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name	Calculation Quantity	Remarks
U-P1-Bq-39	Concrete, Type C1 including Formwork	10 m3	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost			Cost			Remarks
					PF/C	IF/C	L/C	PF/C	IF/C	L/C	
Direct Cost											
Equipment											
	A-2-1-79	Truck Mixer; 4.5 m3	hourly	3.17	77957.88	1560	60651.61	247,126	4,945	192,266	
Working Base Cost											
	CW-1-23	Form Work A	m2	19.20354	60	0	44798	1,152	0	860,280	
	CW-2-40	Breaking-up the Concrete Form	m2	19.20354	0	0	3700	0	0	71,053	
	CW-1-60	Concrete Work for Type-C by Shoot Hopper	m3	10	120	43660	197860	1,200	436,600	1,978,600	
Indirect Cost											
Site Expense			%	15	0.8		0.2	455,187	0	113,797	
Profit and Overhead Cost			%	10	0.8		0.2	348,976	0	87,244	
		Miscellaneous	L.S.					58	55	60	Round Up
Total for	10 m3							1,053,700	441,600	3,303,300	
Unit Cost for	1 m3							105,370	44,160	330,330	

*1 : Total Concrete Volume : 113 m3

*2 : Total Formwork Area : 217 m2

Average Formwork Area : 19.20354 m2/unit m3

*3 : Dump Truck : 10.7 m3 / 4.5 m3/truck = 2.38 Truck

10 km/rnd / 30 km/hr + 60 mnts(loss)= 1.33 hours

2.38 Truck x 1.33 hours = 3.17 hours

	Cn	Fm
U-P1-Bq-39	53	114

Table 4.2.5 (12/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-2	Mobilization and Demobilization	1 L.S.	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-69	Trailer; 20 ton	hourly	348	119,879	2,160	102,572	41,718,037	751,680	35,694,941	
	A-2-1-48	Dumptruck; 10 ton	hourly	432	77268.9961	3060	70744.1207	33,380,206	1,321,920	30,561,460	
	A-2-1-80	Truck; 11 ton	hourly	0	96,932	1,560	95,161	0	0	0	
		Truck with crane; 4 ton, Crane :									
	A-2-1-31	2.9 ton	hourly	128	48669.7513	780	47767.6478	6,229,728	99,840	6,114,259	
	A-2-1-32	Truck with crane; 6 ton	hourly	0	62783.9792	912	61243.4106	0	0	0	
	A-2-2-37	Pontoon Barge; 100 ton	daily	7	314821.292	0	237790.55	2,203,749	0	1,664,534	
	A-2-2-41	Drifter Air Type : 150kg class	daily	14	257007.057	0	88827.324	3,598,099	0	1,243,583	
	A-2-1-84	Tugboat; 15 ton	hourly	48	129433.062	4440	140042.205	6,212,787	213,120	6,722,026	
Indirect Cost											
Site Expense			%	15	0.8		0.2	21,327,596	0	5,331,899	
Profit and Overhead Cost			%	10	0.8		0.2	16,351,157	0	4,087,789	
		Miscellaneous	L.S.					41	40	9	Round Up
Total for	1 L.S.							131,021,400	2,386,600	91,420,500	
Unit Cost for	1 L.S.							131,021,400	2,386,600	91,420,500	

*1 : All Equipment : Land Transportation : 4 hours land trasnportation. 24 hours ship transportation
All Equipment : Ship Transportation : Though it takes longer time than land transportation, it asumes that the cost is same.

*2 : Number of Mobilized and Demobilized Equipment

	Mobilization	Demobilization
Trailer	37	50
Dump Truck 10t	54	54
Ordinary Truck 10t		
Truck with Crane 4 t	16	16
Truck with Crane 6 t		
Pontoon Berge 100 t	1	1
Soil Carriage 100m3	2	2
Tag Boat 15 ton	1	1

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-4	Contractor's Site Office and Facilities	1 L.S.	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
		Install of Office and Others	m2	1148	80000	80000	915000	91,840,000	91,840,000	1,050,420,000	including all facilities
		Removal of Office	%	30				27,552,000	27,552,000	315,126,000	
		Rental of Land	%	10				11,939,200	11,939,200	136,554,600	
Indirect Cost											
Site Expense			%	15	0.8		0.2	211,771,560	0	52,942,890	
Profit and Overhead Cost			%	10	0.8		0.2	162,358,196	0	40,589,549	
		Miscellaneous	L.S.					44	0	61	
Total for	1 L.S.							505,461,000	131,331,200	1,595,633,100	
Unit Cost for	1 L.S.							505,461,000	131,331,200	1,595,633,100	

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-5	Engineer's Site Office and Facilities	1 L.S.	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
		Install of Office	m2	88	80000	80000	915000	7,040,000	7,040,000	80,520,000	including all facilities
		Removal of Office	%	30				2,112,000	2,112,000	24,156,000	
		Rental of Land	%	10				915,200	915,200	10,467,600	
Indirect Cost											
Site Expense			%	15	0.8		0.2	16,233,360	0	4,058,340	
Profit and Overhead Cost			%	10	0.8		0.2	12,445,576	0	3,111,394	
		Miscellaneous	L.S.					64	0	66	
Total for	1 L.S.							38,746,200	10,067,200	122,313,400	
Unit Cost for	1 L.S.							38,746,200	10,067,200	122,313,400	

Table 4.2.5 (13/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No. U-P2-Bq-6 | Working Name: Drawings | Calculation Quantity: 1 L.S. | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Labour											
	L-2-34	Cad Operator	day	400	0	0	54700	0	0	21,880,000	
	L-2-35	Draft Man	day	400	0	0	39000	0	0	15,600,000	
Material											
	M-L-15	Drawing Paper (A1)	sheet	200	8000	0	2000	1,600,000	0	400,000	
	M-L-16	Blue Copy (A1)	sheet	200	0	2500	2500	0	500,000	500,000	
Others											
		Tools	%	20				320,000	100,000	7,676,000	Computer, Plotter, Drafer and etc.
Indirect Cost											
Site Expense			%	15	0.8		0.2	5,829,120	0	1,457,280	
Profit and Overhead Cost			%	10	0.8		0.2	4,468,992	0	1,117,248	
		Miscellaneous	L.S.					88	0	72	Round Up
Total for	1 L.S.							12,218,200	600,000	48,630,600	
Unit Cost for	1 L.S.							12,218,200	600,000	48,630,600	

ID No. U-P2-Bq-7 | Working Name: Surveying | Calculation Quantity: 1 L.S. | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
		Drawing Plan of River Scale 1:500	ha	10			112,000	0	0	1,120,000	
		River Cross Section Survey Scale 1:100									
		a. Surveying	section	20			232000	0	0	4,640,000	
		b. Drawing & Processing	section	20			62000	0	0	1,240,000	
Indirect Cost											
Site Expense			%	15	0.8		0.2	840,000	0	210,000	
Profit and Overhead Cost			%	10	0.8		0.2	644,000	0	161,000	
		Miscellaneous	L.S.					0	0	0	Round Up
Total for	1 L.S.							1,484,000	0	7,371,000	
Unit Cost for	1 L.S.							1,484,000	0	7,371,000	

Table 4.2.5 (14/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No. U-P2-Bq-9 | Working Name: Demolition of Existing Pumping Stations | Calculation Qu.: L.S. 1 No. | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
		Demolition of Brick Masonry	m3	21.22							
Equipment											
	A-2-2-7	Compressor; 3.5-3.7 m3/min	daily	1.5915	120290.344	4032	92494.8987	191,442	6,417	147,206	
	A-2-2-16	Generator; 125 kVA	daily	1.5915	271912.19	15120	209095.974	432,748	24,063	332,776	
	A-2-2-35	Pick Hammer	daily	3.183	5716.91089	0	2030.08672	18,197	0	6,462	
Labour											
	L-2-1	Foreman	day	2.122	0	0	48800	0	0	103,554	
	L-2-23	Common Labour	day	3.183	0	0	35100	0	0	111,723	
		Demolition of Column Concrete	m3	2.14							
Equipment											
	A-2-1-7	Backhoe; 0.6 m3	hourly	19.7736	125542.908	2040	90965.0765	2,482,435	40,338	1,798,707	
	A-2-2-10	Concrete Breaker; 20 kg	daily	2.8248	9136.07656	0	3181.31237	25,808	0	8,987	
	A-2-2-16	Generator; 125 kVA	daily	1.4124	271912.19	15120	209095.974	384,049	21,355	295,327	
	A-2-2-7	Compressor; 3.5-3.7 m3/min	daily	1.4124	120290.344	4032	92494.8987	169,898	5,695	130,640	
Labour	L-2-1	Foreman	day	0.9416	0	0	48800	0	0	45,950	
	L-2-2	Operator	day	3.103	0	0	46900	0	0	145,531	
	L-2-23	Common Labour	day	2.9104	0	0	35100	0	0	102,155	
Others		Small Tolls	%	2				61,244	1,348	50,546	
		Accumulation & Loading Truck	m3	23.36							
Equipment											
	A-2-1-7	Backhoe; 0.6 m3	hourly	4.672	125542.908	2040	90965.0765	586,536	9,531	424,989	
Labour	L-2-1	Foreman	day	0.4672	0	0	48800	0	0	22,799	
	L-2-23	Common Labour	day	0.7008	0	0	35100	0	0	24,598	
		Dump Truck for garveging:	m3	23.36							
Equipment											
	A-2-1-48	Dumptruck; 10 ton	hourly	10.44192	77,269	3,060	70,744	806,837	31,952	738,704	
		Demolition of Roofing :	m2	92.25							
Equipment											
	A-2-1-75	Truck Crane; 4.9 ton, Oil Pressure	hourly	27.675	55145.8852	720	48324.4743	1,526,162	19,926	1,337,380	
Labour	L-2-1	Foreman	day	4.6125	0	0	48800	0	0	225,090	
	L-2-12	Carpenter	day	4.6125	0	0	39000	0	0	179,888	
	L-2-23	Common Labour	day	9.225	0	0	35100	0	0	323,798	
		Removing pumps	unit	16							
Equipment											
	A-2-1-54	Dumptruck; 4 ton	hourly	32	30,204	1,376	28,632	966,517	44,032	916,217	
	A-2-1-71	Truck Crane; 11(10) ton, Oil Pressure	hourly	48	99321.89	1020	85928.7745	4,767,451	48,960	4,124,581	
Labour	L-2-1	Foreman	day	1.6	0	0	48800	0	0	78,080	
	L-2-23	Common Labour	day	16	0	0	35100	0	0	561,600	
Indirect Cost											
Site Expense			%	15	0.8		0.2	2,989,227	0	747,307	
Profit and Overhead Cost			%	10	0.8		0.2	2,291,741	0	572,935	
		Miscellaneous	L.S.					7	82	72	Round Up
Total for	1 No.							17,700,300	253,700	13,557,600	
Unit Cost for	1 No.							17,700,300	253,700	13,557,600	

* 1 : Demolition of Brick Masonry — unit: 10 m3
Foreman : 1 day; Common Labor : 1.5 day
Pick Hammer : 1.5 day; Air Compresser : 0.75 day
Generator : 0.75 day

* 2 : Demolition of Column Concrete — unit: 10 m3
Foreman : 4.4 day; Common Labor : 13.6 day
Operator : 14.5 day
Concrete Breaker : 13.2 day; Air Compresser : 6.6 day
Backhoe : 92.4 hours; Generator : 6.6 day
Small Tools: 2 % of costs above

* 3 : Accumulation & Loading Truck — unit: 10 m3
Foreman : 0.2 day; Common Labor : 0.3 day
Backhoe : 2 hours

* 4 : Dump Truck for garveging: — unit: 10 m3
10 km/rnd / 30 km/hr + 20 mnts loss = 0.67 hours
10 ton / 1.5 ton/m3 = 6.7 m3/dump
10 m3 / 6.7 m3 x 0.67 hours = 4.47 hours

* 5 : Demolition of Roofing : — unit: 10 m2
Foreman : 0.5 day; Common Labor : 1 day
Carpenter : 0.5 day
Truck Crane : 3 hours

* 6 : Removing pumps — unit: 1 unit
Foreman : 0.1 day; Common Labor : 1 day
Truck Crane : 3 hours; Dump Truck : 2 hours

* 7 : Quantities
Demolition of Brick Masonry : 21.22 m3
Demolition of Column Concrete : 2.14 m3
Accumulation & Loading Truck : 23.36 m3
Dump Truck for garveging : 23.36 m3
Demolition of Roofing : 92.25 m2
Removing pumps : 16 units

Table 4.2.5 (15/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No. U-P2-Bq-10 | Working Name: Felling and Grubbing of existing trees | Calculation Quantity: 1 L.S. | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-48	Dumptruck; 10 ton	hourly	39.11	77,269	3,060	70,744	3,021,990	119,677	2,766,803	
		Truck Crane; 11(10) ton, Oil									
	A-2-1-71	Pressure	hourly	26.4	99321.89	1020	85928.7745	2,622,098	26,928	2,268,520	
	A-2-1-111	Chain Saw	daily	8.8	42825.3589	0	17538.0041	376,863	0	154,334	
Labour											
	L-2-2	Operator	day	8.8	0	0	46900	0	0	412,720	
	L-2-13	Rigger	day	8.8	0	0	39000	0	0	343,200	
	L-2-23	Common Labour	day	8.8	0	0	35100	0	0	308,880	
Others											
		Small Tools and Materials	%	5				301,048	7,330	312,723	
Indirect Cost											
Site Expense			%	15	0.8		0.2	1,565,174	0	391,293	
Profit and Overhead Cost			%	10	0.8		0.2	1,199,966	0	299,992	
		Miscellaneous	L.S.					61	65	36	Round Up
Total for	1 L.S.							9,087,200	154,000	7,258,500	
Unit Cost for	1 L.S.							9,087,200	154,000	7,258,500	

* 1 : Total Number of Palm Trees — 88 trees

* 2 : Working Party — 1 party = 10 trees cutting
Operator 1 with Chain Saw
Rigger 1
Common Labor 1

* 3 : Dump Truck : 10 km/rnd / 30 km/hr + 60 mnts loss = 1.33 hours
88 trees / 3 trees/truck x 1.33 hours = 39.11 hours

* 4 : Truck Crane — 1 day = 3 hours riving

ID No. U-P2-Bq-11 | Working Name: Relocation of Existing Facilities | Calculation Quantity: 10 m3 | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Working Base Cost											
		Relocation of Box Culvert	L.S.	1	1,000,000	0	7,000,000	1,000,000	0	7,000,000	
Indirect Cost											
Site Expense			%	15	0.8		0.2	960,000	0	240,000	
Profit and Overhead Cost			%	10	0.8		0.2	736,000	0	184,000	
		Miscellaneous	L.S.					0	0	0	Round Up
Total for	10 m3							2,696,000	0	7,424,000	
Unit Cost for	1 m3							269,600	0	742,400	

Table 4.2.5 (16/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-14	Coffering and Dewatering	1 L.S.	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Material											
	M-E-31	Steel Sheet Pile (Purchasing)	ton	76.8	5700000	0	300000	437,760,000	0	23,040,000	for Relocation
	M-E-31	Steel Sheet Pile (Purchasing)	ton	144	5700000	0	300000	820,800,000	0	43,200,000	for Improvement
	M-B-9	Soil for Backfilling	m3	289	0	400	7600	0	115,600	2,196,400	for Earth Filling
Working Base Cost											
	CW-1-1	Backfill (Soil) A	m3	289	6076	87	5043	1,755,964	25,143	1,457,427	for Earth Filling
	CW-1-65	Spreading by Swamp Bulldozer	m3	289	4284.3203	54.264	4047.348	1,238,169	15,682	1,169,684	for Earth Filling
	CW-1-48	Excavation C	m3	289	3943	65	2857	1,139,527	18,785	825,673	for Earth Filling
	CW-3-9	Driving In of Steel Sheet Pile (Type-II)	m	1000	9909.0668	76.17755	8578.669	9,909,067	76,178	8,578,669	for Relocation
	CW-3-10	Pulling Out of Steel Sheet Pile (Type-II)	m	1000	9754	67	8548	9,754,000	67,000	8,548,000	for Relocation
	CW-3-9	Driving In of Steel Sheet Pile (Type-II)	m	1875	9909.0668	76.17755	8578.669	18,579,500	142,833	16,085,005	for Improvement
	CW-3-10	Pulling Out of Steel Sheet Pile (Type-II)	m	1875	9754	67	8548	18,288,750	125,625	16,027,500	for Improvement
	CW-4-23	Temporary Dewatering by D160mm	day	210	319831.08	15124	234050.7	67,164,527	3,176,040	49,150,644	for Relocation
	CW-4-23	Temporary Dewatering by D160mm	day	540	319831.08	15124	234050.7	172,708,785	8,166,960	126,387,369	for Improvement
Indirect Cost											
Site Expense			%	15	0.8		0.2	224,123,340	0	56,030,835	
Profit and Overhead Cost			%	10	0.8		0.2	171,827,894	0	42,956,974	
		Miscellaneous	L.S.					77	54	21	
Total for		1 L.S.						1,955,049,600	11,929,900	395,654,200	
Unit Cost for		1 L.S.						1,955,049,600	11,929,900	395,654,200	

Earthfill

* 1 : Volume of Earthfill (V1) : 289 m3 from Construction Planning

Steel Sheet Pile for Relocation of Semarang River

* 2 : Total Length of Driving (L1) : 5 m long x 200 pieces = 1000 m

* 3 : Purchasing Steel Sheet Pile (L2) : 8 m long x 200 pieces x 48 kg/m = 76.8 ton

Steel Sheet Pile for Semarang River Improvement

* 4 : Total Length of Driving (L3) : 5 m long x 375 pieces = 1875 m

* 5 : Purchasing Steel Sheet Pile (L4) : 8 m long x 375 pieces x 48 kg/m = 144 ton

Dewatering for Relocation of Semarang River

* 6 : D160mm 7 month x 30 days/month = 210 days

Dewatering for Semarang River Improvement

* 7 : D160mm 18 month x 30 days/month = 540 days

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-14	Temporary Construction Road	1 L.S.	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Material											
	M-B-13	Solid Soil	m3	2147	0	600	11400	0	1,288,200	24,475,800	for Embankment
	M-B-12	Crushed Stone for Pavement and Concrete	m3	295	0	3250	61750	0	958,750	18,216,250	for Embankment
Working Base Cost											
	CW-1-46	Excavation A	m3	1254	2361	39	1711	2,960,694	48,906	2,145,594	
	CW-1-56	Spreading and Compaction for Gravel Pavement	m3	295	5117.1681	43.2	16431.17	1,509,565	12,744	4,847,194	for Embankment
	CW-1-59	Spreading and Compaction-D	m3	2147	1509	19	1473	3,239,823	40,793	3,162,531	for Embankment
Indirect Cost											
Site Expense			%	15	0.8		0.2	7,548,821	0	1,887,205	
Profit and Overhead Cost			%	10	0.8		0.2	5,787,430	0	1,446,857	
		Miscellaneous	L.S.					68	7	68	Round Up
Total for		1 L.S.						21,046,400	2,349,400	56,181,500	
Unit Cost for		1 L.S.						21,046,400	2,349,400	56,181,500	

for Embankment

* 1 : Temporary Road Body Volume (V1) : 2147 m3 from Construction Planning

* 2 : Gravel Pavement Volume (V2) : 0.15 m thick x 3.0 m wide = 0.45 m3/m

Purchased Crushed Stone : 0.45 m3/m / 0.9 loss = 0.5 m3/m

* 3 : Temporary Road Length (tl1) : 583 m from Construction Planning roundup 590 m

Excavation

* 4 : Excavation Volume (V3) : 1254 m3 from Construction Planning

Table 4.2.5 (17/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No. U-P2-Bq-15 | Working Name: Clearing of Garbage | Calculation Quantity: 1 L.S. | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-54	Dumptruck; 4 ton	hourly	3.32	30203.665	1376	28631.77	100,276	4,568	95,057	
	A-2-1-7	Backhoe; 0.6 m3	hourly	7	125542.91	2040	90965.08	878,800	14,280	636,756	
Labour											
	L-2-1	Foreman	day	1	0	0	48800	0	0	48,800	
	L-2-23	Common Labour	day	10	0	0	35100	0	0	351,000	
Material											
		Plastic Bag	sheet	100	0	0	1000	0	0	100,000	
Indirect Cost											
Site Expense			%	15	0.8		0.2	267,545	0	66,886	
Profit and Overhead Cost			%	10	0.8		0.2	205,117	0	51,279	
		Miscellaneous	L.S.					61	52	21	Round Up
Total for	1 L.S.							1,451,800	18,900	1,349,800	
Unit Cost for	1 L.S.							1,451,800	18,900	1,349,800	

* 1 : Dump Truck : 4 Truck (Assumption)

10 km/rnd / 20 km/hr + 20 mnts(loss)= 0.83 hours

4 Truck x 0.83 hours = 3.32 hours

ID No. U-P2-Bq-17 | Working Name: Common channel excavation including hauling and spoiling | Calculation Quantity: 100 m3 | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-48	Dumptruck; 10 ton	hourly	17.78	77268.996	3060	70744.12	1,373,843	54,407	1,257,830	from Hauling
Working Base Cost											
	CW-1-5	Spreading A	m3	100	2941	35	2823	294,100	3,500	282,300	at the disposal site
	CW-1-47	Excavation B	m3	100	2951	48	2138	295,100	4,800	213,800	for Dredging
Indirect Cost											
Site Expense			%	15	0.8		0.2	453,562	0	113,390	
Profit and Overhead Cost			%	10	0.8		0.2	347,731	0	86,933	
		Miscellaneous	L.S.					65	93	46	
Total for	100 m3							2,764,400	62,800	1,954,300	
Unit Cost for	1 m3							27,644	628	19,543	

* 1 : Dump Truck for Hauling: 107 m3 / 6.5 m3/truck = 16.46 Truck

15 km/rnd / 20 km/hr + 20 mnts(loss)= 1.08 hours

16.46 Truck x 1.08 hours = 17.78 hours

* 7 : Spreading at Disposal Site 100 m3

Table 4.2.5 (18/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-18	Excavation below water level including hauling and treatment of contaminated soil	100 m3	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-84	Tugboat; 15 ton	hourly	1.17	129433.06	4440	140042.2	151,437	5,195	163,849	from Ship
	A-2-2-41	Drifter Air Type : 150kg class	daily	4.99	257007.06	0	88827.32	1,282,465	0	443,248	from Ship
	A-2-2-37	Pontoon Barge; 100 ton	daily	1.17	314821.29	0	237790.6	368,341	0	278,215	from Ship
	A-2-1-7	Backhoe; 0.6 m3	hourly	2.82	125542.91	2040	90965.08	354,031	5,753	256,522	for Transportation
	A-2-1-1	Backhoe; 2 m3 Long Arm	hourly	1.17	512434.99	4440	355749.2	599,549	5,195	416,227	from Ship
Labour											
	L-2-1	Foreman	day	0.008686	0	0	48800	0	0	424	for Disposal Site
	L-2-23	Common Labour	day	0.028952	0	0	35100	0	0	1,016	for Disposal Site
	L-2-1	Foreman	day	0.17	0	0	48800	0	0	8,296	for Excavation by ship
	L-2-23	Common Labour	day	0.34	0	0	35100	0	0	11,934	for Excavation by ship
Equipment											
	A-2-1-48	Dumptruck; 10 ton	hourly	13.66	77268.996	3060	70744.12	1,055,494	41,800	966,365	from Hauling
	A-2-2-2	Stabilizer	hourly	0.683761	743275.52	1092	502607.8	508,223	747	343,663	for Mixing
Labour											
	L-2-23	Common Labour	day	6.666667	0	0	35100	0	0	234,000	for Spreading of Concrete
Material											
		Drain Pipe	m	0.173712	108000	0	12000	18,761	0	2,085	for Hauling
		Water Proof Sheet for Disposal Site	m2	0.008686	27000	0	3000	235	0	26	for Disposal Site
		Water Proof Sheet for Dump Truck	sheet	0.347423	0	0	50000	0	0	17,371	for Hauling
	M-B-3	Sand for Mortar (Masonry)	m3	21.74986	0	2250	42750	0	48,937	929,806	for Backfill of Drain
	M-C-1	Portland Cement	kg	7000	0	100	400	0	700,000	2,800,000	for Backfill of Drain
	M-B-5	Cobble Stone	m3	0.496526	0	1850	35150	0	919	17,453	for Backfill of Drain
	M-B-13	Solid Soil	m3	33.42373	0	600	11400	0	20,054	381,030	for Banking
Working Base Cost											
	CW-1-64	Excavation by Backhoe 0.35m3	m3	0.496526	2687.7729	45.24	1953.753	1,335	22	970	for Excavation
	CW-1-64	Excavation by Backhoe 0.35m3	m3	0.551695	2687.7729	45.24	1953.753	1,483	25	1,078	for Backfill
	CW-1-65	Spreading by Swamp Bulldozer	m3	108	4284.3203	54.264	4047.348	462,707	5,861	437,114	for Spreading
	CW-1-5	Spreading A	m3	80.74117	2941	35	2823	237,460	2,826	227,932	for Disposal Site
	CW-1-10	Slope Clearing for Embankment 2	m2	3.420382	3265	54	2660	11,168	185	9,098	for Final Spreading
	CW-1-5	Spreading A	m3	20.26636	2941	35	2823	59,603	709	57,212	for Final Spreading
	CW-1-1	Backfill (Soil) A	m3	30.57788	6076	87	5043	185,791	2,660	154,204	for Banking
		Spreading and Compaction for Earth									
	CW-1-58	Filling	m3	30.57788	2833.8029	36.252	2632.618	86,652	1,109	80,500	for Banking
	CW-1-47	Excavation B	m3	1.022583	2951	48	2138	3,018	49	2,186	for Pit
		Concrete Work for Small Structure :									
	CW-1-21	Type-D	m3	0.348871	120	42570	193500	42	14,851	67,507	for Pit
	CW-1-23	Form Work A	m2	0.318471	60	0	44798	19	0	14,267	for Pit
	CW-1-29	Reinforcing Bar Setup 1	t	0.006977	0	3120900	3325100	0	21,776	23,201	for Pit
	CW-1-15	Gravel Bedding	m3	0.056167	0	1360	31260	0	76	1,756	for Pit
	CW-1-2	Backfill (Soil) B	m3	0.132021	7022	103	6326	927	14	835	for Pit
Indirect Cost											
Site Expense			%	15	0.8		0.2	1,754,027	0	438,507	
Profit and Overhead Cost			%	10	0.8		0.2	1,344,754	0	336,188	
		Miscellaneous	L.S.					81	38	15	
Total for	100 m3							8,487,600	878,800	9,124,100	
Unit Cost for	1 m3							84,876	8,788	91,241	

* 1 : Dump Truck for Hauling: 107 m3 / 6.5 m3/truck = 16.46 Truck
10 km/rnd / 20 km/hr + 20 mnts(loss)= 0.83 hours
16.46 Truck x 0.83 hours = 13.66 hours
Water Proof Sheet 10 m2/truckx 20 trucks x 3 changes = 600
Unit Quantity 600 m2 / 172700 = 0.003474 m3

* 2 : Excavation/Backfill by Backhoe 0.35m3 for construction of drain
Dimension of Drain 0.5 m wide x 0.5 m depthx(490 x 350)m length
x 2 / 100 m pitch = 857.5 m3
Unit excavation/Backfilling Volume 857.5 m3 / 172700 = 0.004965 m3
Cobble Stone 0.004965 / 0.9 loss = 0.005517

* 3 : Spreading by Swamp Bull 100 m3 x 1.2 (L) x 0.9 (C) = 108 m3

* 4 : Banking 52808 m3 from Construction Planning
Unit Volume 52808 / 172700 = 0.305779 m3
Soil (52808 - 857.5)/ 0.9 loss = 57722.77778 m3
Unit Volume 57722.78 / 172700 = 0.334237 m3

* 5 : Labor Rate and Cement: Cement : 70 kg/m3 is necessary
Labor : 2 person/party for Spreading at 50kg (1bag) of cement
It takes 10 minutes.
Hence, 70 kg/m3 / 50 kg/bag x 2 person/party
x 10 mimutes / 60 minutes/hour / 7 hours/day
= 0.066667 person/m3

* 6 : Mixing $Q = \frac{60 \times q \times E}{Cm}$ (m3/hour) Cm =(0.027 x 30 m +
0.79 x 3 round = 4.8 minutes
q = 3 m wide x 0.2 m depth x 30 m long = 18 m3/time
Q = 146.25 m3/hour Hence, Tm = 0.006837607 hour/m3

* 7 : Final Spreading 500 m x 350 m x 0.2 m depth = 35000 m3
35000 m3 / 172700 = 0.202664 m3

* 8 : Backhoe & Tagboat & Pontoon 1 hour = 3600 q = 1.9 f = 1
Q= 1hour x q x f x E / Cm (m3/hr) E = work efficiency = 0.5 Cm = 40 Q = 85.5
Hence, Driving Time = 100 m3 / 85.5 = 1.17 hour/100m3
= 0.17 day/100m3

* 9 : Backhoe for Transportation 1 hour = 3600 q = 0.59 f = 0.83333333
Q= 1hour x q x f x E / Cm (m3/hr) E = work efficiency = 0.6 Cm = 30 Q = 35.4
Hence, Driving Time = 100 m3 / 35.4 = 2.82 hour/100m3

Table 4.2.5 (19/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

	* 10 :	Soil Carriage Ship:	1.17	hour +	2.82	hour +	1	hour for Moving =	4.99	day/100m3
	* 11 :	Labor Rate :		Foreman :	1	person/party		Hence,	0.17	
				Common Labor :	2	person/party		Hence,	0.34	
	* 9 :	Water Proof Sheet for Disposal Site :		82167 m2 /		172700 m3 =		0.475778807		
		including Drain Pipe and		Foreman :		3 persons x		5 days /	172700 m3 =	8.68558E-05
		Coarse Sand		Common Labor :		10 persons x		5 days /	172700 m3 =	0.000289519
	* 10 :	Spreading for Disposal Site :	139440 m2		from Construction Planning /			172700	m3 =	0.807411697
	* 11 :	Slope Clearing :	5907 m2		from Construction Planning /			172700	m3 =	0.034203822
	* 12 :	Drain Pipe :	300 m		from Construction Planning /			172700	m3 =	0.001737116
	* 13 :	Coarse Sand :	37562 m3	(from Construction Planning) /				172700	m3 =	0.217498552
Reservoir Pit										
	* 14 :	Excavation :	1766 m3	(from Construction Planning) /				172700	m3 =	0.010225825
	* 15 :	Concrete :	602.5 m3	(from Construction Planning) /				172700	m3 =	0.003488709
	* 16 :	Formwork :	550 m2	(from Construction Planning) /				172700	m3 =	0.003184713
	* 17 :	Reinforcing Bar :	12050 kg	(from Construction Planning) /				172700	m3 =	0.069774175
	* 18 :	Backfilling Gravel :	97 m3	(from Construction Planning) /				172700	m3 =	0.000561668
	* 19 :	Backfilling :	228 m3	(from Construction Planning) /				172700	m3 =	0.001320208

U-P2-Bq-20 Structural Excavation is equal unit cost with U-P1-Bq-16.

ID No.	Working Name			Calculation Quantity	Remarks
				100 m3	
U-P2-Bq-21	Backfill with Cobble				
U-P2-Bq-62	Backfill with Cobble	U-P3-Bq-22	Backfill with Cobble		
U-P2-Bq-73	Backfill with Cobble				
U-P2-Bq-306	Backfill with Cobble	U-P3-Bq-198	Backfill with Cobble		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-7	Backhoe; 0.6 m3	hourly	4	125542.91	2040	90965.08	502,172	8,160	363,860	
	A-2-1-88	Vibrating Roller; 0.8-1.1 ton (Hand Guide)	hourly	7	17057.227	144	14790.56	119,401	1,008	103,534	
Labour											
	L-2-23	Common Labour	day	4	0	0	35100	0	0	140,400	
Material											
	M-B-5	Cobble Stone	m3	111.11	0	1850	35150	0	205,554	3,905,517	
Working Base Cost											
	CW-1-8	Tamper Loading	m3	10	1760	60	2600	17,600	600	26,000	
Indirect Cost											
Site Expense			%	15	0.8		0.2	647,257	0	161,814	
Profit and Overhead Cost			%	10	0.8		0.2	496,230	0	124,058	
		Miscellaneous	L.S.					41	79	18	Round Up
Total for	100 m3							1,782,700	215,400	4,825,200	
Unit Cost for	1 m3							17,827	2,154	48,252	

* 1 : Cobble Stone 100 m3 / 0.9 loss = 111.11 m3

* 2 : All ratea are quoted from Japanese Standard.

ID No.	Working Name			Calculation Quantity	Remarks
				10 m3	
U-P2-Bq-22	Backfill with Gravel	U-P3-Bq-23	Backfill with Gravel		
U-P2-Bq-63	Backfill with Gravel	U-P3-Bq-199	Backfill with Gravel		
U-P2-Bq-74	Backfill with Gravel	U-P3-Bq-211	Backfill with Gravel		
U-P2-Bq-307	Backfill with Gravel	U-P3-Bq-222	Backfill with Gravel		
		U-P3-Bq-232	Backfill with Gravel		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Working Base Cost											
	CW-1-16	Backfilling Gravel A	m3	10	0	4060	83560	0	40600	835600	
Indirect Cost											
Site Expense			%	15	0.8		0.2	105,144	0	26,286	
Profit and Overhead Cost			%	10	0.8		0.2	80,610	0	20,153	
		Miscellaneous	L.S.					46	0	61	Round Up
Total for	10 m3							185,800	40,600	882,100	
Unit Cost for	1 m3							18,580	4,060	88,210	

Table 4.2.5 (20/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name			Calculation Quantity	Remarks
				10 m3	
U-P2-Bq-23	Backfill with Sandy Soil				
U-P2-Bq-75	Backfill with Sandy Soil	U-P3-Bq-24	Backfill with Sandy Soil		
U-P2-Bq-95	Backfill with Sandy Soil	U-P3-Bq-53	Backfill with Sandy Soil		
U-P2-Bq-126	Backfill with Sandy Soil	U-P3-Bq-160	Backfill with Sandy Soil		
U-P2-Bq-151	Backfill with Sandy Soil	U-P3-Bq-166	Backfill with Sandy Soil		
U-P2-Bq-254	Backfill with Sandy Soil	U-P3-Bq-200	Backfill with Sandy Soil		
U-P2-Bq-271	Backfill with Sandy Soil	U-P3-Bq-252	Backfill with Sandy Soil		
U-P2-Bq-308	Backfill with Sandy Soil	U-P3-Bq-269	Backfill with Sandy Soil		
		U-P3-Bq-287	Backfill with Sandy Soil		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Material											
	M-B-4	Sand for Filling and Base Course	m3	11.11	0	1350	25650	0	14,999	284,972	
Working Base Cost											
	CW-1-1	Backfill (Soil) A	m3	4	6076	87	5043	24,304	348	20,172	
	CW-1-2	Backfill (Soil) B	m3	3	7022	103	6326	21,066	309	18,978	
	CW-1-3	Backfill (Soil) C	m3	2	6392	98	6338	12,784	196	12,676	
	CW-1-4	Backfill (Soil) D	m3	2	6038	132	7114	12,076	264	14,228	
Indirect Cost											
Site Expense			%	15	0.8		0.2	52,485	0	13,121	
Profit and Overhead Cost			%	10	0.8		0.2	40,238	0	10,060	
		Miscellaneous	L.S.					47	85	94	Round Up
Total for	10 m3							163,000	16,200	374,300	
Unit Cost for	1 m3							16,300	1,620	37,430	

*1 : Sand : 10 m3 / 0.9 = 11.11 m3

*2 : All Rates are quoted from Japanese Standard

ID No.	Working Name	Calculation Quantity	Remarks
		10 m3	
U-P2-Bq-24	Concrete, Type C1 including Formwork		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-79	Truck Mixer; 4.5 m3	hourly	3.17	77957.876	1560	60651.61	247,126	4,945	192,266	
Working Base Cost											
	CW-1-23	Form Work A	m2	54.65	60	0	44798	3,279	0	2,448,171	
	CW-2-40	Breaking-up the Concrete Form	m2	54.65	0	0	3700	0	0	202,202	
	CW-1-60	Concrete Work for Type-C by Shoot Hopper	m3	10	120	43660	197860	1,200	436,600	1,978,600	
Indirect Cost											
Site Expense			%	15	0.8		0.2	661,727	0	165,432	
Profit and Overhead Cost			%	10	0.8		0.2	507,324	0	126,831	
		Miscellaneous	L.S.					44	55	99	Round Up
Total for	10 m3							1,420,700	441,600	5,113,600	
Unit Cost for	1 m3							142,070	44,160	511,360	

*1 : Total Concrete Volume : 228 m3

*2 : Total Formwork Area : 1246 m2

Average Formwork Area : 54.64912 m2/unit m3

*3 : Truck Mixer : 10.7 m3 / 4.5 m3/truck = 2.38 Truck

10 km/rnd / 30 km/hr + 60 mnts(loss)= 1.33 hours

2.38 Truck x 1.33 hours = 3.17 hours

ID	Con	Fm
U-P2-Bq-24	276	2004

ID No.	Working Name	Calculation Quantity	Remarks
		10 m3	
U-P2-Bq-25	Concrete, Type E including Formwork		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-79	Truck Mixer; 4.5 m3	hourly	3.02	77957.876	1560	60651.61	235,433	4,711	183,168	
Working Base Cost											
	CW-1-28	Form Work F	m2	32.65625	0	0	36510	0	0	1,192,280	
	CW-1-22	Concrete Work for Levelling Concrete	m3	10	120	37130	158740	1,200	371,300	1,587,400	
Indirect Cost											
Site Expense			%	15	0.8		0.2	429,059	0	107,265	
Profit and Overhead Cost			%	10	0.8		0.2	328,945	0	82,236	
		Miscellaneous	L.S.					63	89	51	Round Up
Total for	10 m3							994,700	376,100	3,152,400	
Unit Cost for	1 m3							99,470	37,610	315,240	

*1 : Form Work Area : Total Form work area / Concrete Volume = From Work Area m2 / concrete 1m3

209 / 64 = 3.265625 m2/m3

*2 : Dump Truck : 10.2 m3 / 4.5 m3/truck = 2.27 Truck

10 km/rnd / 30 km/hr + 60 mnts(loss)= 1.33 hours

2.27 Truck x 1.33 hours = 3.02 hours

Table 4.2.5 (21/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name	Calculation Quantity	Remarks
		1000 kg	
U-P2-Bq-26	Deformed Reinforcing Bars	U-P3-Bq-27	Deformed Reinforcing Bars
U-P2-Bq-66	Deformed Reinforcing Bars	U-P3-Bq-204	Deformed Reinforcing Bars

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Working Base Cost											
	CW-1-31	Reinforcing Bar Setup 2	t	1	0	2808810	2992590	0	2,808,810	2,992,590	
Indirect Cost											
Site Expense			%	15	0.8		0.2	696,168	0	174,042	
Profit and Overhead Cost			%	10	0.8		0.2	533,729	0	133,432	
		Miscellaneous	L.S.					3	90	36	Round Up
Total for	1000 kg							1,229,900	2,808,900	3,300,100	
Unit Cost for	1 kg							1,230	2,809	3,300	

U-P2-Bq-27 Wet Stone Masonry is equal unit cost with U-P1-Bq-20.

U-P2-Bq-28 Pointing is equal unit cost with U-P1-Bq-23.

ID No.	Working Name			Calculation Quantity	Remarks
				10 m	
U-P2-Bq-29	Weep Hole, Dia.50mm				
U-P2-Bq-68	Weep Hole, Dia.50mm	U-P3-Bq-30	Weep Hole, Dia. 50 mm		
U-P2-Bq-79	Weep Hole, Dia.50mm	U-P3-Bq-57.1	Weep Hole, Dia. 50 mm		
U-P2-Bq-104	Weep Hole, Dia.50mm	U-P3-Bq-81	Weep Hole, Dia. 50 mm		
U-P2-Bq-134	Weep Hole, Dia.50mm	U-P3-Bq-113.1	Weep Hole, Dia. 50 mm		
U-P2-Bq-159	Weep Hole, Dia.50mm	U-P3-Bq-206	Weep Hole, Dia. 50 mm		
U-P2-Bq-188	Weep Hole, Dia.50mm	U-P3-Bq-217	Weep Hole, Dia. 50 mm		
U-P2-Bq-214	Weep Hole, Dia.50mm	U-P3-Bq-228	Weep Hole, Dia. 50 mm		
U-P2-Bq-314	Weep Hole, Dia.50mm	U-P3-Bq-238	Weep Hole, Dia. 50 mm		
		U-P3-Bq-272.1	Weep Hole, Dia. 50 mm		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Labour											
	L-2-1	Foreman	day	3	0	0	48800	0	0	146,400	
	L-2-28	Chief of Concrete Worker	day	0.2	0	0	58600	0	0	11,720	
	L-2-17	Concrete Worker	day	1.75	0	0	39000	0	0	68,250	
	L-2-23	Common Labour	day	3	0	0	35100	0	0	105,300	
Material											
	0	0			0	0	0	0	0	0	
	M-G-4	PVC Pipe, Dia. 50mm	m	11.11	0	2340	5460	0	25,997	60,661	
	M-G-13	Geotextile	m2	0.13	7837.5	0	412.5	1,019	0	54	
Working Base Cost											
Indirect Cost											
Site Expense			%	15	0.8		0.2	50,328	0	12,582	
Profit and Overhead Cost			%	10	0.8		0.2	38,585	0	9,646	
		Miscellaneous	L.S.					68	3	88	Round Up
Total for	10 m							90,000	26,000	414,700	
Unit Cost for	1 m							9,000	2,600	41,470	
Unit Cost for	1 nos							3,147	909	14,500	

	*1	Composition of Manpowers is quoted from Working Cost of PU						
	*2	PVC pipe	1 m	/	0.9	x	10 m	= 11.11
	*3	Palm Fiber	0.01 m2	/	0.75	x	10 m	= 0.13

ID No.	Working Name	Calculation Quantity	Remarks
		12 m	
U-P2-Bq-30	Log Pile, Dia.150 mm, L=3.0m		
U-P2-Bq-103	Log Pile, Dia. 150mm, L=3.0m		
U-P3-Bq-206.1	Log Pile, Dia. 150 mm, L = 3.0 m		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Material											
	M-D-1	Log Pile, Dia. 15cm	m	12	0	0	10000	0	0	120,000	
Working Base Cost											
	CW-3-23	Driving In of Log Pile L=3.0m	piece	4	29500.914	437.433	22371.15	118,004	1,750	89,485	
Indirect Cost											
Site Expense			%	15	0.8		0.2	39,509	0	9,877	
Profit and Overhead Cost			%	10	0.8		0.2	30,290	0	7,572	
		Miscellaneous	L.S.					98	50	66	Round Up
Total for	12 m							187,900	1,800	227,000	
Unit Cost for	1 m							15,658	150	18,917	

Table 4.2.5 (22/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-31	Gabion Mattress t=500mm (Galvanized)	10 m3	
U-P2-Bq-209	Gabion Mattress, t=500 mm (Galvanized)		
U-P2-Bq-281	Gabion Mattress t=500 mm (Galvanized)		
U-P3-Bq-110.1	Gabion Mattress, t=500 mm (Galvanized)		
U-P3-Bq-172.1	Gabion Mattress, t= 500 mm (Galvanized)		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-7	Backhoe; 0.6 m3	hourly	2.7	125542.91	2040	90965.08	338,966	5,508	245,606	
Labour											
	L-2-27	Chief of Mason	day	0.45	0	0	58600	0	0	26,370	
	L-2-11	Mason	day	0.48	0	0	39000	0	0	18,720	
	L-2-23	Common Labour	day	1.7	0	0	35100	0	0	59,670	
Material											
	M-E-68	Gabion Mattress; 2.7mm, 3.0x1.0x0.5m, Galvanized	pcs	15	327037.5	0	17212.5	4,905,563	0	258,188	
	M-B-7	Boulder	m3	10	0	2500	47500	0	25,000	475,000	
Indirect Cost											
Site Expense			%	15	0.8		0.2	763,031	0	190,758	
Profit and Overhead Cost			%	10	0.8		0.2	584,990	0	146,248	
		Miscellaneous	L.S.					51	92	42	Round Up
Total for	10 m3							6,592,600	30,600	1,420,600	
Unit Cost for	1 m3							659,260	3,060	142,060	

*1 All composition numbers are quated from Japanese Standard.

ID No.	Working Name			Calculation Quantity	Remarks
U-P2-Bq-33	Furnishing and Driving PC Sheet Pile (t=220 mm)			10 m	
U-P2-Bq-82	Furnishing and Driving PC Sheet Pile (t=220 mm)	U-P3-Bq-95	Furnishing and Driving PC Sheet Pile (t=220 mm)		
U-P2-Bq-208	Furnishing and Driving PC Sheet Piles (t=220 mm)	U-P3-Bq-110	Furnishing and Driving PC Sheet Pile (t=220 mm)		
U-P2-Bq-316	Furnishing and Driving PC Sheet Pile (t=220 mm)				
U-P3-Bq-32	Furnishing and Driving PC Sheet Pile (t=220 mm)				

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Material											
	M-C-48	Prestressed Concrete Sheet Pile (B=0.5m, t=0.22m)	m	10	190000	0	10000	1,900,000	0	100,000	
Working Base Cost											
	CW-3-11	Driving In of Concrete Sheet Pile (t=22)	m	10	15343	136	12963	153,430	1,360	129,630	
Indirect Cost											
Site Expense			%	15	0.8		0.2	274,130	0	68,533	
Profit and Overhead Cost			%	10	0.8		0.2	210,167	0	52,542	
		Miscellaneous	L.S.					73	40	96	Round Up
Total for	10 m							2,537,800	1,400	350,800	
Unit Cost for	1 m							253,780	140	35,080	

	Length of Sheet Pile	Length of Driving
1	10	10 m
2	0	0 m
3	0	0 m
4	0	0 m
5	0	0 m
6	0	0 m
Total	10	10 m
Ratio	10	10 m

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-34	Concrete, Type C1 including Formwork	10 m3	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-79	Truck Mixer; 4.5 m3	hourly	3.17	77957.876	1560	60651.61	247,126	4,945	192,266	
Working Base Cost											
	CW-1-23	Form Work A	m2	74.36	60	0	44798	4,462	0	3,331,133	
	CW-2-40	Breaking-up the Concrete Form	m2	74.36	0	0	3700	0	0	275,128	
	CW-1-60	Concrete Work for Type-C by Shoot Hopper	m3	10	120	43660	197860	1,200	436,600	1,978,600	
Indirect Cost											
Site Expense			%	15	0.8		0.2	776,575	0	194,144	
Profit and Overhead Cost			%	10	0.8		0.2	595,374	0	148,844	
		Miscellaneous	L.S.					62	55	85	Round Up
Total for	10 m3							1,624,800	441,600	6,120,200	
Unit Cost for	1 m3							162,480	44,160	612,020	

*1 : Total Concrete Volume : 39 m3

*2 : Total Formwork Area : 290 m2
Average Formwork Area : 74.36 m2/unit m3

*3 : Truck Mixer : 10.7 m3 / 4.5 m3/truck = 2.38 Truck
10 km/rnd / 30 km/hr + 60 mnts(loss)= 1.33 hours
2.38 Truck x 1.33 hours = 3.17 hours

Table 4.2.5 (23/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name			Calculation Quantity	Remarks
				1000 kg	
U-P2-Bq-35	Deformed Reinforcing Bars	U-P3-Bq-34	Deformed Reinforcing Bars		
U-P2-Bq-84	Deformed Reinforcing Bars	U-P3-Bq-48	Deformed Reinforcing Bars		
U-P2-Bq-167	Deformed Reinforcing Bars	U-P3-Bq-91	Deformed Reinforcing Bars		
U-P2-Bq-175	Deformed Reinforcing Bars	U-P3-Bq-214	Deformed Reinforcing Bars		
U-P2-Bq-182	Deformed Reinforcing Bars	U-P2-Bq-312	Deformed Reinforcing Bars		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Working Base Cost											
	CW-1-29	Reinforcing Bar Setup 1	t	1	0	3120900	3325100	0	3,120,900	3,325,100	
Indirect Cost											
Site Expense			%	15	0.8		0.2	773,520	0	193,380	
Profit and Overhead Cost			%	10	0.8		0.2	593,032	0	148,258	
		Miscellaneous	L.S.					48	0	62	Round Up
Total for	1000 kg							1,366,600	3,120,900	3,666,800	
Unit Cost for	1 kg							1,367	3,121	3,667	

U-P2-Bq-37	Structural Excavation	is equal unit cost with U-P1-Bq-16.
U-P2-Bq-38	Backfill with Selected Soil	is equal unit cost with U-P1-Bq-17.
U-P2-Bq-39	Sand Bedding	is equal unit cost with U-P1-Bq-19.
U-P2-Bq-40	Wet Stone Masonry	is equal unit cost with U-P1-Bq-20.
U-P2-Bq-41	Joint Filler, 10mm thick (Elastic Material)	is equal unit cost with U-P1-Bq-21.
U-P2-Bq-42	Pointing	is equal unit cost with U-P1-Bq-23.

ID No.	Working Name	Calculation Quantity	Remarks
		10 m3	
U-P2-Bq-44	Stripping of Top Soil		
U-P2-Bq-318	Stripping of Top Soil		
U-P3-Bq-18	Stripping of Top Soil		
U-P3-Bq-240	Stripping of Top Soil		
U-P3-Bq-276	Stripping of Top Soil		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-48	Dumptruck; 10 ton	hourly	0.87	77268.996	3060	70744.12	67,224	2,662	61,547	
Working Base Cost											
	CW-1-46	Excavation A	m3	10	2361	39	1711	23,610	390	17,110	
	CW-1-5	Spreading A	m3	10	2941	35	2823	29,410	350	28,230	
Indirect Cost											
Site Expense			%	15	0.8		0.2	27,664	0	6,916	
Profit and Overhead Cost			%	10	0.8		0.2	21,209	0	5,302	
		Miscellaneous	L.S.					83	98	94	Round Up
Total for	10 m3							169,200	3,500	119,200	
Unit Cost for	1 m3							16,920	350	11,920	

*1 :	Soil Volume :	10 m3					
*2 :	Dump Truck :	10 ton/dump	/	1.5 m3/ton =		6.67 m3/dump	
		10 km/rnd /	40 km/hr +	20 mnts(loss)=		0.58 hours	
		10 m3	/	6.67 m3/dump	=	1.5 dp/10m3	
		1.5 dp/10m3	x	0.58 hours	=	0.87 hours	

ID No.	Working Name			Calculation Quantity	Remarks
				10 m3	
U-P2-Bq-45	Embankment	U-P3-Bq-19	Embankment		
U-P2-Bq-127	Embankment	U-P3-Bq-102	Embankment		
U-P2-Bq-152	Embankment	U-P3-Bq-241	Embankment		
U-P2-Bq-198	Embankment	U-P3-Bq-258	Embankment		
U-P2-Bq-302	Embankment	U-P3-Bq-277	Embankment		
U-P2-Bq-319	Embankment				

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Material											
	M-B-4	Sand for Filling and Base Course	m3	3.33	0	1350	25650	0	4,496	85,415	
	M-B-2	Coarse Aggregate	m3	1.11	0	2600	49400	0	2,886	54,834	
	M-B-9	Soil for Backfilling	m3	6.67	0	400	7600	0	2,668	50,692	
Working Base Cost											
	CW-1-9	Slope Clearing for Embankment 1	m2	50	2674	35	2902	133,700	1,750	145,100	
	CW-1-55	Spreading and Compaction-A	m3	10	1900.3129	22.6272	1938.609	19,003	226	19,386	
Indirect Cost											
Site Expense			%	15	0.8		0.2	62,419	0	15,605	
Profit and Overhead Cost			%	10	0.8		0.2	47,854	0	11,964	
		Miscellaneous	L.S.					24	74	5	Round Up
Total for	10 m3							263,000	12,100	383,000	
Unit Cost for	1 m3							26,300	1,210	38,300	

*1 :	Sand :	3	m3 /	0.9	=	3.33	m3	
*2 :	Aggregate :	1	m3 /	0.9	=	1.11	m3	
*3 :	Soil :	6	m3 /	0.9	=	6.67	m3	
*4 :	Slope Clearing Work :	1000	m2 /	200	m3	x10m3 =	50	m2/m3

Table 4.2.5 (24/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name			Calculation Quantity	Remarks
U-P2-Bq-46	Aggregate Class A	U-P3-Bq-244	Aggregate Class A	10 m3	
U-P2-Bq-90	Aggregate Class A	U-P3-Bq-261	Aggregate Class A		
U-P2-Bq-108	Aggregate Class A	U-P3-Bq-280	Aggregate Class A		
U-P2-Bq-320	Aggregate Class A				

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-96	Wheel Loader; 1.2 m3	hourly	0.78	72,404	1,116	58,629	56,475	870	45,731	
	A-2-1-48	Dumptruck; 10 ton	hourly	0.54	77268.996	3060	70744.12	41,725	1,652	38,202	
	A-2-1-108	Motorgrader; 2.8 m	hourly	0.14	104320.17	0	97031.6	14,605	0	13,584	
	A-2-1-88	Vibrating Roller; 0.8-1.1 ton (Hand Guide)	hourly	0.12	17057.227	144	14790.56	2,047	17	1,775	
	A-2-1-68	Tire Roller; 8-20 ton	hourly	0.04	81684.162	864	82451.15	3,267	35	3,298	
	A-2-1-104	Water Tanker; 4000 litter	hourly	0.03	46827.594	1076	35137.54	1,405	32	1,054	
Labour											
	L-2-1	Foreman	day	0.11	0	0	48800	0	0	5,368	
	L-2-23	Common Labour	day	0.78	0	0	35100	0	0	27,378	
Material											
	M-B-12	Crushed Stone for Pavement and Concrete	m3	12	0	3250	61750	0	39,000	741,000	
Others											
		Small Tools	%	5				5,976	2,080	43,870	
Indirect Cost											
Site Expense			%	15	0.8		0.2	130,854	0	32,713	
Profit and Overhead Cost			%	10	0.8		0.2	100,321	0	25,080	
		Miscellaneous	L.S.					25	13	47	Round Up
Total for	10 m3							356,700	43,700	979,100	
Unit Cost for	1 m3							35,670	4,370	97,910	

Analysis of base course aggregate class A 1 M3, 150 mm thick

No	Working Name	Code	Coeffitien	Unit	Remark
I.					
1	Using Equipment				
2	Work location is on the road length				
3	Existing condition of the road are medium				
4	Average distance from base camp to t	L	3	Km	
5	Thickness of base course	t	0.15	m	
6	Loose factor of the material	Fk	1.2		
7	Effective Hour / day	Tk	7	Hour	
8	Composition of the material				
	-Fine aggregate	Ak	0.64		
	-Coarse aggregate	Ah	0.36		
II.	Material, Equipment and Labor				
1	Material				
	-Fine aggregate = (Ak*1 m3 * Fk)	M03	0.768	m3	
	-Coarse aggregate = (Ak*1 m3 * Fk)	M04	0.432	m3	
			1.2	m3	
2	Equipment				
2.1	Wheel Loader	E15			
	Bucket capacity	V	1.2	m3	
	Bucket factor	Fb	0.9		
	Efficiency factor	Fa	0.83		
	Cycle time				
	- mixing	T1	2.5	minute	
	-Loading	T2	1	minute	
		Ts1	3.5	minute	
	Production capacity (m3/hour) = (V*Fb*Fa*60)/(Fk*Ts1)	Q1	12.80571		
	Equipment coeffitien/m3 = 1/Q1	E15	0.07809	hour	
2.2	Dump Truck				
	Bucket capacity	V	6	m3	
	Efficiency factor	Fa	0.83		
	Average loading speed	v1	30	Km/hour	
	Average empty speed	v2	40	Km/hour	
	Efficiency factor	Fa	0.83		
	Cycle time :				
	Loading time = (L/v1)*60 minute	T1	6	minute	
	Empty time = (L/v2)*60 minute	T2	4.5	minute	
	Others	T3	3	minute	
		Ts2	13.5	minute	
	Production capacity (m3/hour) = (V*Fa*60)/(Fk*Ts2)	Q2	18.44444		
	Equipment coeffitien/m3 = 1/Q1	E15	0.054217		
2.3	Motor Grader	E13			
	Panjang hamparar	Lh	50	m	
	Effective width of	b	2	m	
	Efficiency factor	Fa	0.83		
	Average speed	v	4	km/hour	
	Number of lintasa	n	6	lintasan 3pp	
	Cycle time :				
	perataan satu linta	T1	0.75	minute	
	others	T2	1	minute	
		Ts3	1.75	minute	
	Production capaci = (Lh*b*t*Fa*60)/(n*Ts3)	Q3	71.14285714	m3	
	Equipment coeffit	E13	0.014056225	hour	
2.4	Vibratory Roller	E19			
	Average speed	v	3	km/hour	
	Effective width of	b	1.8	m	
	Number of track	n	8	lintasan	
	Efficiency factor	Fa	0.83		
	Production capaci = (1000v*b*t*Fa)/n	Q4	84.0375	m3	
	Equipment coeffit	E19	0.01189945	hour	
2.5	Pneumatic Tire I	E18			
	Average speed	v	5	km/hour	
	Effective width of	b	1.8	m	
	Number of track	n	4	lintasan	
	Efficiency factor	Fa	0.83		
	Production capaci = (1000v*b*t*Fa)/n	Q5	280.125	m3	
	Equipment coeffit	E18	0.003569835	hour	
2.6	Water Tank Tru	E23			
	Water Tank Volu	V	4	m3	
	Water need/m3 of	Wc	0.07	m3	
	Water tank filling	n	1	times	
	Efficiency factor	Fa	0.83		
	Production capaci = (V*n*Fa)/Wc	Q6	47.42857143	m3	
	Equipment coeffit	E23	0.021084337	hour	
2.7	Light tools				
	Carriage = 3 pieces				
	Shovel = 3 pieces				
	Earth fork = 2 pieces				
2.8	Man Power/ labor				
	The significant pr	Q1	12.80571429	m3/hour	
	Aggregat producti	Qt	89.64	m3	
	Man power				
	-common labour	P	7		
	-foreman	M	1		
	Koefisien tenaga/m3 =				
	-common labour =	L01	0.546630968	hour	
	-foreman =(Tk*M	L03	0.078090138	hour	

Table 4.2.5 (25/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name			Calculation Quantity	Remarks
U-P2-Bq-47	Aggregate Class B	U-P3-Bq-245	Aggregate Class B	10 m3	
U-P2-Bq-91	Aggregate Class B				
U-P2-Bq-109	Aggregate Class B	U-P3-Bq-281	Aggregate Class B		
U-P2-Bq-321	Aggregate Class B				

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-96	Wheel Loader; 1.2 m3	hourly	0.78	72,404	1,116	58,629	56,475	870	45,731	
	A-2-1-48	Dumptruck; 10 ton	hourly	0.54	77268.996	3060	70744.12	41,725	1,652	38,202	
	A-2-1-108	Motorgrader; 2.8 m	hourly	0.11	104320.17	0	97031.6	11,475	0	10,673	
	A-2-1-88	Vibrating Roller; 0.8-1.1 ton (Hand Guide)	hourly	0.09	17057.227	144	14790.56	1,535	13	1,331	
	A-2-1-68	Tire Roller; 8-20 ton	hourly	0.03	81684.162	864	82451.15	2,451	26	2,474	
	A-2-1-104	Water Tanker; 4000 litter	hourly	0.03	46827.594	1076	35137.54	1,405	32	1,054	
Labour											
	L-2-1	Foreman	day	0.11	0	0	48800	0	0	5,368	
	L-2-23	Common Labour	day	0.78	0	0	35100	0	0	27,378	
Material											
	M-B-12	Crushed Stone for Pavement and Concrete	m3	12	0	3250	61750	0	39,000	741,000	
Others											
		Small Tools	%	5				5,753	2,080	43,661	
Indirect Cost											
Site Expense			%	15	0.8		0.2	129,764	0	32,441	
Profit and Overhead Cost			%	10	0.8		0.2	99,486	0	24,871	
		Miscellaneous	L.S.					31	26	16	Round Up
Total for	10 m3							350,100	43,700	974,200	
Unit Cost for	1 m3							35,010	4,370	97,420	

Analysis of sub base course aggregate class B 1 M3 200 mm thick

No	Working Name	Code	Coeffitien	Unit	Remark
I.					
1	Using Equipment				
2	Work location is on the road length				
3	Existing condition of the road are medium				
4	Average distance from base camp to t	L	3	Km	
5	Thickness of sub base course	t	0.2	m	
6	Loose factor of the material	Fk	1.2		
7	Effective Hour / day	Tk	7	Hour	
8	Composition of the material				
	-Fine aggregate	Ak	0.59		
	-Coarse aggregate	Ah	0.41		
II.	Material, Equipment and Labor				
1	**Material**				
	-Fine aggregate = (Ak*1 m3 * Fk)	M03	0.708	m3	
	-Coarse aggregate = (Ak*1 m3 * Fk)	M04	0.492	m3	
			1.2	m3	
2	**Equipment**				
2.1	**Wheel Loader**	E15			
	Bucket capacity	V	1.2	m3	
	Bucket factor	Fb	0.9		
	Efficiency factor	Fa	0.83		
	Cycle time				
	- mixing	T1	2.5	minute	
	-Loading	T2	1	minute	
		Ts1	3.5	minute	
	Production capacity (m3/hour) = (V*Fb*Fa*60)/(Fk*Ts1)	Q1	12.80571		
	Equipment coeffitient/m3 = 1/Q1	E15	0.07809		
2.2	**Dump Truck**				
	Bucket capacity	V	6	m3	
	Efficiency factor	Fa	0.83		
	Average loading speed	v1	30	Km/hour	
	Average empty speed	v2	40	Km/hour	
	Efficiency factor	Fa	0.83		
	Cycle time :				
	Loading time = (L/v1)*60 minute	T1	6	minute	
	Empty time = (L/v2)*60 minute	T2	4.5	minute	
	Others	T3	3	minute	
		Ts2	13.5	minute	
	Production capacity (m3/hour) = (V*Fa*60)/(Fk*Ts2)	Q2	18.44444		
	Equipment coeffitient/m3 = 1/Q1	E15	0.054217		

No	Working Name	Code	Coeffitien	Unit
2.3	**Motor Grader**	E13		
	Panjang hamparar	Lh	50	m
	Effective width of	b	2	m
	Efficiency factor	Fa	0.83	
	Average speed	v	4	km/hour
	Number of lintasa	n	6	lintasan 3pp
	Cycle time :			
	peratasan satu lint	T1	0.75	minute
	others	T2	1	minute
		Ts3	1.75	minute
	Production capaci = (Lh*b*t*Fa*60)/(n*Ts3)	Q3	94.85714286	m3
	Equipment coeffit	E13	0.010542169	hour
2.4	**Vibratory Roller**	E19		
	Average speed	v	3	km/hour
	Effective width of	b	1.8	m
	Number of track	n	8	lintasan
	Efficiency factor	Fa	0.83	
	Production capaci = (1000v*b*t*Fa)/n	Q4	112.05	m3
	Equipment coeffit	E19	0.008924587	hour
2.5	**Pneumatic Tire I**	E18		
	Average speed	v	5	km/hour
	Effective width of	b	1.8	m
	Number of track	n	4	lintasan
	Efficiency factor	Fa	0.75	
	Production capaci = (1000v*b*t*Fa)/n	Q5	337.5	m3
	Equipment coeffit	E18	0.002962963	hour
2.6	**Water Tank Tru**	E23		
	Water Tank Volur	V	4	m3
	Water need/m3 of	Wc	0.07	m3
	Water tank filling/	n	1	times
	Efficiency factor	Fa	0.83	
	Production capaci = (V*n*Fa)/Wc	Q6	47.42857143	m3
	Equipment coeffit	E23	0.021084337	hour
2.7	**Light tools**			
	Carriage = 3 pieces			
	Shovel = 3 pieces			
	Earth fork = 2 pieces			
2.8	**Man Power/ labor**			
	The significant pr	Q1	12.80571429	m3/hour
	Aggregat producti	Qt	89.64	m3
	Man power			
	-common labour	P	7	
	-foreman	M	1	
	Koefisien tenaga/m3 =			
	-common labour =	L01	0.546630968	hour
	-foreman =(Tk*M	L03	0.078090138	hour

Table 4.2.5 (26/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

U-P2-Bq-48 Sand Bedding is equal unit cost with U-P1-Bq-33.1.

U-P2-Bq-49 Concrete Block Pavement is equal unit cost with U-P1-Bq-33.2.

U-P2-Bq-50 Cement Mortar is equal unit cost with U-P1-Bq-33.3.

U-P2-Bq-51 Concrete Kerb is equal unit cost with U-P1-Bq-33.4.

ID No.	Working Name			Calculation Quantity	Remarks
U-P2-Bq-52	Sodding	U-P3-Bq-207	Sodding	10 m2	
#REF!	#REF!	U-P3-Bq-245.5	Sodding		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Working Base Cost											
	CW-1-14	Sodding	m2	10	0	0	5761	0	0	57,610	
Indirect Cost											
Site Expense			%	15	0.8		0.2	6,913	0	1,728	
Profit and Overhead Cost			%	10	0.8		0.2	5,300	0	1,325	
		Miscellaneous	L.S.					87	0	37	Round Up
Total for	10 m2							12,300	0	60,700	
Unit Cost for	1 m2							1,230	0	6,070	

Table 4.2.5 (27/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-55	Coffering and Dewatering	1 L.S.	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Material											
	M-B-9	Soil for Backfilling	m3	550.4	0	400	7600	0	220,160	4,183,040	for River Improvement
	M-E-4	Structural Steel(Purchasing), SS41	kg	862.4	5225	0	275	4,506,040	0	237,160	for River Improvement
	M-E-13	Tierod (Purchasing)	kg	900	47500	0	2500	42,750,000	0	2,250,000	for River Improvement
	M-E-78	C-beam (Purchasing), SS41	kg	4848	5225	0	275	25,330,800	0	1,333,200	for River Improvement
	M-E-31	Steel Sheet Pile (Purchasing)	ton	15.36	5700000	0	300000	87,552,000	0	4,608,000	for River Improvement
Working Base Cost											
	CW-4-17	Temporary Double Steel Sheet Pile for Drainage Component	m	80	936106.3	10718.99	818075.7	74,888,506	857,519	65,446,054	for River Improvement
	CW-4-21	Temporary Dewatering by D200mm	day	1080	353884.4	15124	251251.1	382,195,197	16,333,920	271,351,193	for River Improvement
	CW-4-22	Temporary Dewatering by D180mm	day	180	339695.5	15124	244084.3	61,145,198	2,722,320	43,935,167	for River Improvement
	CW-4-23	Temporary Dewatering by D160mm	day	180	319831.1	15124	234050.7	57,569,595	2,722,320	42,129,123	for River Improvement
	CW-4-7	Sand Bags	nos	90	88.5375	758.9625	4199.663	7,968	68,307	377,970	
	CW-3-9	Driving In of Steel Sheet Pile (Type-II)	m	1025	9909.067	76.17755	8578.669	10,156,793	78,082	8,793,136	for Relocation
	CW-3-10	Pulling Out of Steel Sheet Pile (Type-II)	m	1025	9754	67	8548	9,997,850	68,675	8,761,700	for Relocation
	CW-4-23	Temporary Dewatering by D160mm	day	210	319831.1	15124	234050.7	67,164,527	3,176,040	49,150,644	
Indirect Cost											
Site Expense			%	15	0.8		0.2	162,248,184	0	40,562,046	
Profit and Overhead Cost			%	10	0.8		0.2	124,390,275	0	31,097,569	
		Miscellaneous	L.S.					67	57	99	
Total for	1 L.S.							1,109,903,000	26,247,400	574,216,100	
Unit Cost for	1 L.S.							1,109,903,000	26,247,400	574,216,100	

Asin River Improvement

* 1 :	Total Length of Double Steel Sheet Pile :	80 m	from Construction Planning		
* 2 :	Purchasing Soil :	13.76 m3/m x	40 m =	550.4	(reuse ofr 20m of 2nd year and 20m of 3rd year)
* 3 :	Purchasing Structural Steel :	21.56 kg/m x	40 m =	862.4	
* 4 :	Purchasing Tierod :	22.5 kg/m x	40 m =	900	
* 5 :	Purchasing C-beam :	121.2 kg/m x	40 m =	4848	
* 6 :	Purchasing Steel Sheet Pile :	48 kg/m x	20 m x	2 side x	8 m long
		= 15.36 ton			
* 7 :	Dewatering	D200mm	18 months x	30 days x	2 set = 1080
		D180mm	18 months x	5 days x	2 set = 180
		D160mm	18 months x	10 days x	1 set = 180

Bridge Work

* 8 :	Total Number of Sand Bags :	90 nos.	from Construction Planning		
* 9 :	Total Length of Driving (L1) :		5 m long x	205 pieces =	1025 m
* 10 :	Purchasing Steel Sheet Pile (L2) :		0 ton	(No purchasing)	
* 11 :	Dewatering	D160mm	7 months x	30 days x	1 set = 210

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-56	Clearing of Garbage	1 L.S.	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-54	Dumptruck; 4 ton	hourly	0	30203.66	1376	28631.77	0	0	0	
	A-2-1-7	Backhoe; 0.6 m3	hourly	7	125542.9	2040	90965.08	878,800	14,280	636,756	
Labour											
	L-2-1	Foreman	day	1	0	0	48800	0	0	48,800	
	L-2-23	Common Labour	day	10	0	0	35100	0	0	351,000	
Material											
		Plastic Bag	sheet	100	0	0	1000	0	0	100,000	
Indirect Cost											
Site Expense			%	15	0.8		0.2	243,556	0	60,889	
Profit and Overhead Cost			%	10	0.8		0.2	186,727	0	46,682	
		Miscellaneous	L.S.					17	20	74	Round Up
Total for	1 L.S.							1,309,100	14,300	1,244,200	
Unit Cost for	1 L.S.							1,309,100	14,300	1,244,200	

Table 4.2.5 (28/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-57	Demolition of Existing Revetment	1 L.S.	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-7	Backhoe; 0.6 m3	hourly	325.00	125,543	2,040	90,965	40,801,445	663,000	29,563,650	
	A-2-2-35	Pick Hammer	daily	565.22	5716.911	0	2030.087	3,231,297	0	1,147,440	
	A-2-1-48	Dumptruck; 10 ton	hourly	763.75	77269	3060	70744.12	59,014,196	2,337,075	54,030,822	
	A-2-2-17	Generator; 15 kVA	daily	141.30	82875	1800	52496.05	11,710,238	254,340	7,417,692	
Labour											
	L-2-1	Foreman	day	141.30	0	0	48800	0	0	6,895,652	
	L-2-10	Drill Worker	day	565.22	0	0	39000	0	0	22,043,478	
	L-2-23	Common Labour	day	565.22	0	0	35100	0	0	19,839,130	
Working Base Cost											
	CW-1-54	Excavation I	m3	100	5072	83	3675	507,200	8,300	367,500	
Indirect Cost											
Site Expense			%	15	0.8		0.2	31,179,895	0	7,794,974	
Profit and Overhead Cost			%	10	0.8		0.2	20,786,596	0	5,196,649	
		Miscellaneous	L.S.					133	285	12	Round Up
Total for		1 L.S.						167,231,000	3,263,000	154,297,000	
Unit Cost for		1 L.S.						167,231,000	3,263,000	154,297,000	

Manpower Composition; Foreman : 1 man/day
Common Labor : 4 man/day
Drill Worker : 4 man/day

* 1 : Length of Revetment Demolished L = 1200 m x 2 sides = 2400 m

* 2 : Area of Assumed of Revetment A1 = 1.625 m Hence, Volume = 3900 m3

* 3 0.5m3 x $\frac{Ta}{T \times 60}$ x Composition of Manpower = Foreman 141.30, Drill Worker 565.22, Common 565.22

* 4 1m3 x $\frac{Tb}{60}$ = Dump Truck 763.75 hour

* 5 0.5m3 x $\frac{Ta}{T \times 60}$ = Generator 141.30 days

* 6 0.5m3 x $\frac{Tc}{60}$ = Backfoe 325.00 hour

* 7 : Average Daily Working Time of Generator, Labor, Breaker $T = \frac{690}{100} = 6.9$ (hour/day)

Working Time by Hand Breaker / 1m3 (Ta) Ta = 30 minutes/m3

Working Time by Dump Truck / 1m3 (Tb) Tb = (5 km(one way) x 2 / 30 km/hour + 20 minutes) / 10 ton truck = 11.75 minutes/m3

Working Time by Backfoe and Pick Hammer / 1m3 (Tc) Tc = 10 minutes/m3

Table 4.2.5 (29/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-59	Common channel excavation including hauling and treatment of contaminated soil	100 m3	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost			Cost			Remarks
					PF/C	IF/C	L/C	PF/C	IF/C	L/C	
Direct Cost											
Equipment											
	A-2-1-48	Dumptruck; 10 ton	hourly	21.89	77269	3060	70744.12	1,691,418	66,983	1,548,589	from Hauling
	A-2-2-2	Stabilizer	hourly	0.683761	743275.5	1092	502607.8	508,223	747	343,663	for Mixing
Labour											
	L-2-1	Foreman	day	0.008686	0	0	48800	0	0	424	for water proof sheet
	L-2-23	Common Labour	day	0.028952	0	0	35100	0	0	1,016	for water proof sheet
	L-2-23	Common Labour	day	6.666667	0	0	35100	0	0	234,000	for Spreading of Concrete
Material											
		Drain Pipe	m	0.173712	108000	0	12000	18,761	0	2,085	for Hauling
		Water Proof Sheet for Disposal Site	m2	47.57788	27000	0	3000	1,284,603	0	142,734	for Disposal Site
		Water Proof Sheet for Dump Truck	sheet	0.347423	0	0	50000	0	0	17,371	for Hauling
	M-B-3	Sand for Mortar (Masonry)	m3	21.74986	0	2250	42750	0	48,937	929,806	for Backfill of Drain
	M-C-1	Portland Cement	kg	7000	0	100	400	0	700,000	2,800,000	for Backfill of Drain
	M-B-5	Cobble Stone	m3	0.496526	0	1850	35150	0	919	17,453	for Backfill of Drain
	M-B-13	Solid Soil	m3	33.42373	0	600	11400	0	20,054	381,030	for Banking
Working Base Cost											
	CW-1-64	Excavation by Backhoe 0.35m3	m3	0.496526	2687.773	45.24	1953.753	1,335	22	970	for Excavation
	CW-1-64	Excavation by Backhoe 0.35m3	m3	0.551695	2687.773	45.24	1953.753	1,483	25	1,078	for Backfill
	CW-1-65	Spreading by Swamp Bulldozer	m3	108	4284.32	54.264	4047.348	462,707	5,861	437,114	for Spreading
	CW-1-5	Spreading A	m3	80.74117	2941	35	2823	237,460	2,826	227,932	for Disposal Site
	CW-1-10	Slope Clearing for Embankment 2	m2	3.420382	3265	54	2660	11,168	185	9,098	for Disposal Site
	CW-1-5	Spreading A	m3	20.26636	2941	35	2823	59,603	709	57,212	for Final Spreading
	CW-1-1	Backfill (Soil) A	m3	30.57788	6076	87	5043	185,791	2,660	154,204	for Banking
	CW-1-58	Spreading and Compaction for Earth Filling	m3	30.57788	2833.803	36.252	2632.618	86,652	1,109	80,500	for Banking
	CW-1-48	Excavation C	m3	100	3943	65	2857	394,300	6,500	285,700	for Dredging
	CW-1-47	Excavation B	m3	1.022583	2951	48	2138	3,018	49	2,186	for Pit
	CW-1-21	Concrete Work for Small Structure : Type-D	m3	0.348871	120	42570	193500	42	14,851	67,507	for Pit
	CW-1-23	Form Work A	m2	0.318471	60	0	44798	19	0	14,267	for Pit
	CW-1-29	Reinforcing Bar Setup I	t	0.006977	0	3120900	3325100	0	21,776	23,201	for Pit
	CW-1-15	Gravel Bedding	m3	0.056167	0	1360	31260	0	76	1,756	for Pit
	CW-1-2	Backfill (Soil) B	m3	0.132021	7022	103	6326	927	14	835	for Pit
Indirect Cost											
Site Expense			%	15	0.8		0.2	1,634,825	0	408,706	
Profit and Overhead Cost			%	10	0.8		0.2	1,253,366	0	313,341	
		Miscellaneous	L.S.					1	97	22	
Total for	100 m3							7,835,700	894,400	8,503,800	
Unit Cost for	1 m3							78,357	8,944	85,038	

Table 4.2.5 (30/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

* 1 :	Dump Truck for Hauling:	107	m3	/	6.5	m3/truck	=	16.46	Truck								
		20	km/rnd /	20	km/hr +	20	mnts(loss)=	1.33	hours								
		16.46	Truck	x	1.33	hours	=	21.89	hours								
	Water Proof Sheet	10	m2/truckx	20	trucks x	3	changes =	600									
	Unit Quantity	600	m2 /	172700	=	0.003474	m3										
* 2 :	Excavation/Backfill by Backhoe 0.35m3 for construction of drain																
	Dimension of Drain	0.5	m wide x	0.5	m depthx(	490	x	350	)m length								
		x	2	/	100	m pitch	=	857.5	m3								
	Unit excavation/Backfilling Volume	857.5	m3 /	172700	=	0.004965	m3										
	Cobble Stone	0.004965	/	0.9	loss =	0.005517											
* 3 :	Spreading by Swamp Bull	100	m3 x	1.2	(L) x	0.9	(C) =	108	m3								
* 4 :	Banking	52808	m3	from Construction Planning													
	Unit Volume	52808	/	172700	=	0.305779	m3										
	Soil	(	52808	-	857.5	)/	0.9 loss =	57722.77778	m3								
	Unit Volume	57722.78	/	172700	=	0.334237	m3										
* 5 :	Labor Rate and Cement:	Cement :	70	kg/m3 is necessary													
		Labor :	2	person/party for Spreading at 50kg (1bag) of cement													
		It takes	10	minutes.													
		Hence,	70	kg/m3 /	50	kg/bag x	2	person/party									
		x	10	mimutes /	60	minutes/hour /	7	hours/day									
		=	0.066667	person/m3													
* 6 :	Mixing	$Q = \frac{60 \times q \times E}{Cm}$ (m3/hour)		Cm =(	0.027	x	30	m +									
					0.79	x	3	round =	4.8	minutes							
		q =	3	m wide x	0.2	m depth x	30	m long =	18	m3/time							
		Q =	146.25	m3/hour	Hence,	Tm =	0.006837607	hour/m3									
* 7 :	Final Spreading	500	m x	350	m x	0.2	m depth =	35000	m3								
		35000	m3 /	172700	=	0.202664	m3										
* 8 :	Water Proof Sheet for Disposal Site :	82167	m2 /	172700	m3 =	0.475778807											
	including Drain Pipe and	Foreman :	3	persons x	5	days /	172700	m3 =	8.68558E-05								
	Coarse Sand	Common Labor :	10	persons x	5	days /	172700	m3 =	0.000289519								
* 9 :	Spreading for Disposal Site :	139440	m2	from Construction Planning /			172700	m3 =	0.807411697								
* 10 :	Slope Clearing :	5907	m2	from Construction Planning /			172700	m3 =	0.034203822								
* 11 :	Drain Pipe :	300	m	from Construction Planning /			172700	m3 =	0.001737116								
* 12 :	Coarse Sand :	37562	m3 (from Construction Planning) /				172700	m3 =	0.217498552								
Reservoir Pit																	
* 13 :	Excavation :	1766	m3 (from Construction Planning) /				172700	m3 =	0.010225825								
* 14 :	Concrete :	602.5	m3 (from Construction Planning) /				172700	m3 =	0.003488709								
* 15 :	Formwork :	550	m2 (from Construction Planning) /				172700	m3 =	0.003184713								
* 16 :	Reinforcing Bar :	12050	kg (from Construction Planning) /				172700	m3 =	0.069774175								
* 17 :	Backfilling Gravel :	97	m3 (from Construction Planning) /				172700	m3 =	0.000561668								
* 18 :	Backfilling :	228	m3 (from Construction Planning) /				172700	m3 =	0.001320208								

Table 4.2.5 (31/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

U-P2-Bq-61 Structural Excavation is equal unit cost with U-P1-Bq-16.

U-P2-Bq-62 Backfill with Cobble is equal unit cost with U-P2-Bq-21.

U-P2-Bq-63 Backfill with Gravel is equal unit cost with U-P2-Bq-22.

ID No. Working Name Calculation Quantity Remarks

U-P2-Bq-64 Concrete, Type C1 including Formwork 10 m3

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-79	Truck Mixer; 4.5 m3	hourly	3.02	77957.88	1560	60651.61	235,433	4,711	183,168	
Working Base Cost											
	CW-1-23	Form Work A	m2	52.42	60	0	44798	3,145	0	2,348,247	
	CW-2-40	Breaking-up the Concrete Form	m2	52.42	0	0	3700	0	0	193,949	
	CW-1-20	Concrete Work for Reinforced Concrete C1 by Pump	m3	10	20270	41770	183330	202,700	417,700	1,833,300	
Indirect Cost											
Site Expense			%	15	0.8		0.2	650,682	0	162,671	
Profit and Overhead Cost			%	10	0.8		0.2	498,856	0	124,714	
		Miscellaneous	L.S.					83	89	52	Round Up
Total for	10 m3							1,590,900	422,500	4,846,100	
Unit Cost for	1 m3							159,090	42,250	484,610	

*1 : Total Concrete Volume : 1013 m3

*2 : Total Formwork Area : 5310 m2

Average Formwork Area : 52.42 m2/unit m3

*3 : Truck Mixer : 10.2 m3 / 4.5 m3/truck = 2.27 Truck

10 km/rnd / 30 km/hr + 60 mnts(loss)= 1.33 hours

2.27 Truck x 1.33 hours = 3.02 hours

ID No. Working Name Calculation Quantity Remarks

U-P2-Bq-65 Concrete, Type E including Formwork 10 m3

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-79	Truck Mixer; 4.5 m3	hourly	3.02	77957.88	1560	60651.61	235,433	4,711	183,168	
Working Base Cost											
	CW-1-28	Form Work F	m2	29.96528	0	0	36510	0	0	1,094,032	
	CW-1-22	Concrete Work for Levelling Concrete	m3	10	120	37130	158740	1,200	371,300	1,587,400	
Indirect Cost											
Site Expense			%	15	0.8		0.2	417,269	0	104,317	
Profit and Overhead Cost			%	10	0.8		0.2	319,906	0	79,977	
		Miscellaneous	L.S.					91	89	6	Round Up
Total for	10 m3							973,900	376,100	3,048,900	
Unit Cost for	1 m3							97,390	37,610	304,890	

*1 : Form Work Area : Total Form work area / Concrete Volume = From Work Area m2 / concrete 1m3

863 288 2.996528 m2/m3

*2 : Dump Truck : 10.2 m3 / 4.5 m3/truck = 2.27 Truck

10 km/rnd / 30 km/hr + 60 mnts(loss)= 1.33 hours

2.27 Truck x 1.33 hours = 3.02 hours

U-P2-Bq-66 Deformed Reinforcing Bars

U-P2-Bq-67 Wet Stone Masonry is equal unit cost with U-P1-Bq-20.

U-P2-Bq-68 Weep Hole, Dia 50mm is equal unit cost with U-P2-Bq-29.

Table 4.2.5 (32/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-69	Log Pile, Dia. 150mm, L=4m	12 m	
U-P2-Bq-80	Log Pile, Dia. 150mm, L=4m		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost			Cost			Remarks
					PF/C	IF/C	L/C	PF/C	IF/C	L/C	
Direct Cost											
Material											
	M-D-1	Log Pile, Dia. 15cm	m	12	0	0	10000	0	0	120,000	
Working Base Cost											
	CW-3-24	Driving In of Log Pile L=4.0m	piece	3	33998.99	504.1296	25782.13	101,997	1,512	77,346	
Indirect Cost											
Site Expense			%	15	0.8		0.2	36,103	0	9,026	
Profit and Overhead Cost			%	10	0.8		0.2	27,679	0	6,920	
		Miscellaneous	L.S.					22	88	8	Round Up
Total for		12 m						165,800	1,600	213,300	
Unit Cost for		1 m						13,817	133	17,775	

U-P2-Bq-70	Joint Filler, 10mm thick (Elastic Material)	is equal unit cost with U-P2-Bq-21.
U-P2-Bq-72	Structural Excavation	is equal unit cost with U-P1-Bq-16.
U-P2-Bq-73	Backfill with Cobble	is equal unit cost with U-P2-Bq-21.
U-P2-Bq-74	Backfill with Gravel	is equal unit cost with U-P2-Bq-22.
U-P2-Bq-75	Backfill with Sandy Soil	is equal unit cost with U-P2-Bq-23.

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-76	Concrete, Type E including Formwork	10 m3	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost			Cost			Remarks
					PF/C	IF/C	L/C	PF/C	IF/C	L/C	
Direct Cost											
Equipment											
	A-2-1-79	Truck Mixer; 4.5 m3	hourly	3.02	77957.88	1560	60651.61	235,433	4,711	183,168	
Working Base Cost											
	CW-1-28	Form Work F	m2	6.728972	0	0	36510	0	0	245,675	
	CW-1-22	Concrete Work for Levelling Concrete	m3	10	120	37130	158740	1,200	371,300	1,587,400	
Indirect Cost											
Site Expense			%	15	0.8		0.2	315,466	0	78,867	
Profit and Overhead Cost			%	10	0.8		0.2	241,858	0	60,464	
		Miscellaneous	L.S.					43	89	26	Round Up
Total for		10 m3						794,000	376,100	2,155,600	
Unit Cost for		1 m3						79,400	37,610	215,560	

*1 : Form Work Area : Total Form work area 432 / Concrete Volume 642 = From Work Area m2 / concrete 1m3 0.672897 m2/m3

*2 : Dump Truck : 10.2 m3 / 4.5 m3/truck = 2.27 Truck
10 km/rnd / 30 km/hr + 60 mnts(loss)= 1.33 hours
2.27 Truck x 1.33 hours = 3.02 hours

U-P2-Bq-77	Wet Stone Masonry	is equal unit cost with U-P1-Bq-20.
U-P2-Bq-78	Pointing	is equal unit cost with U-P1-Bq-23.
U-P2-Bq-79	Weep Hole, Dia.50mm	is equal unit cost with U-P2-Bq-29.
U-P2-Bq-82	Furnishing and Driving PC Sheet Pile (t=220 mm)	is equal unit cost with U-P2-Bq-33.

Table 4.2.5 (33/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No. U-P2-Bq-83 | Working Name: Concrete, Type C1 including Formwork | Calculation Quantity: 10 m3 | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-79	Truck Mixer; 4.5 m3	hourly	3.17	77957.88	1560	60651.61	247,126	4,945	192,266	
Working Base Cost											
	CW-1-23	Form Work A	m2	71.43	60	0	44798	4,286	0	3,199,857	
	CW-2-40	Breaking-up the Concrete Form	m2	71.43	0	0	3700	0	0	264,286	
	CW-1-60	Concrete Work for Type-C by Shoot Hopper	m3	10	120	43660	197860	1,200	436,600	1,978,600	
Indirect Cost											
Site Expense			%	15	0.8		0.2	759,500	0	189,875	
Profit and Overhead Cost			%	10	0.8		0.2	582,283	0	145,571	
		Miscellaneous	L.S.					5	55	46	Round Up
Total for	10 m3							1,594,400	441,600	5,970,500	
Unit Cost for	1 m3							159,440	44,160	597,050	

*1 : Total Concrete Volume : 14 m3
*2 : Total Formwork Area : 100 m2
Average Formwork Area : 71.43 m2/unit m3
*3 : Truck Mixer : 10.7 m3 / 4.5 m3/truck = 2.38 Truck
10 km/rnd / 30 km/hr + 60 mnts(loss)= 1.33 hours
2.38 Truck x 1.33 hours = 3.17 hours

U-P2-Bq-84 Deformed Reinforcing Bars — is equal unit cost with U-P2-Bq-35.

U-P2-Bq-86 Sand Bedding — is equal unit cost with U-P1-Bq-19.

U-P2-Bq-87 Concete Block Pavement

U-P2-Bq-88 Cement Mortar

U-P2-Bq-89 Concrete Kerb — is equal unit cost with U-P1-Bq-33.4.

U-P2-Bq-90 Aggregate Class A — is equal unit cost with U-P1-Bq-32.

U-P2-Bq-91 Aggregate Class B — is equal unit cost with U-P1-Bq-33.

ID No. U-P2-Bq-93 | Working Name: Coffering and Dewatering | Calculation Quantity: 1 L.S. | Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Material											
	M-E-31	Steel Sheet Pile (Purchasing)	ton	6.912	5700000	0	300000	39,398,400	0	2,073,600	
Working Base Cost											
	CW-4-7	Sand Bags	nos	462	88.5375	758.9625	4199.663	40,904	350,641	1,940,244	
	CW-3-9	Driving In of Steel Sheet Pile (Type-II)	m	90	9909.067	76.17755	8578.669	891,816	6,856	772,080	
	CW-3-10	Pulling Out of Steel Sheet Pile (Type-II)	m	90	9754	67	8548	877,860	6,030	769,320	
	CW-4-23	Temporary Dewatering by D160mm	day	50	319831.1	15124	234050.7	15,991,554	756,200	11,702,534	
Indirect Cost											
Site Expense			%	15	0.8		0.2	9,069,365	0	2,267,341	
Profit and Overhead Cost			%	10	0.8		0.2	6,953,180	0	1,738,295	
		Miscellaneous	L.S.					21	73	85	
Total for	1 L.S.							73,223,100	1,119,800	21,263,500	
Unit Cost for	1 L.S.							73,223,100	1,119,800	21,263,500	

Sand bag
*1 : Total number of Sand Bags : 462 nos. from Construction Planning
Steel Sheet Pile
*2 : Total Length of Driving (L1) : 5 m long x 18 pieces = 90 m
*3 : Purchasing Steel Sheet Pile (L2) 8 m long x 18 pieces x 48 kg/m = 6.912 ton
Dewatering for Relocation of Semarang River
*4 : D160mm 5 monthes x 10 days/month = 50 days

Table 4.2.5 (34/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-94	Structural Excavation with Shoring	3 m	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Material											
	M-E-9	H-beam (Purchasing), SS41	kg	297	5225	0	275	1,551,825	0	81,675	
	M-E-31	Steel Sheet Pile (Purchasing)	ton	1.08	5700000	0	300000	6,156,000	0	324,000	
Equipment											
	A-2-1-48	Dumptruck; 10 ton	hourly	3.36	77269	3060	70744.12	259,624	10,282	237,700	
Working Base Cost											
	CW-1-5	Spreading A	m3	27	2941	35	2823	79,407	945	76,221	for Reclamation Site
	CW-1-46	Excavation A	m3	33.75	2361	39	1711	79,684	1,316	57,746	
	CW-1-47	Excavation B	m3	33.75	2951	48	2138	99,596	1,620	72,158	
	CW-1-6	Manpower Excavation	m3	1	0	0	15800	0	0	15,800	
	CW-3-17	Wale Work-B (Temporary)	ton	1.485	558950	3200	581050	830,041	4,752	862,859	
	CW-3-9	Driving In of Steel Sheet Pile (Type-II)	m	45	9909.067	76.17755	8578.669	445,908	3,428	386,040	
	CW-3-10	Pulling Out of Steel Sheet Pile (Type-II)	m	45	9754	67	8548	438,930	3,015	384,660	
Indirect Cost											
Site Expense			%	15	0.8		0.2	1,495,828	0	373,957	
Profit and Overhead Cost			%	10	0.8		0.2	1,146,801	0	286,700	
		Miscellaneous	L.S.					56	42	83	Round Up
Total for	3 m							12,583,700	25,400	3,159,600	
Unit Cost for	1 m							4,194,567	8,467	1,053,200	
Unit Cost for	1 m3							186,425	376	46,809	

* 1 :	Calculation Length :	3 m						
* 2 :	Excavation Volume :	5 m width x	4.5 m high x	3 m long =	67.5 m3			
* 3 :	Backfill Volume :	67.5 m3 -	9 m3 x	3 m long =	40.5 m3			
* 4 :	Soil Waste Volume :	67.5 m3 -	40.5 m3 =	27 m3				
* 5 :	Dump Truck :	10 ton/dump	/	1.5 m3/ton =	6.67 m3/dump			
		15 km/rnd /	30 km/hr +	20 mnts(loss)=	0.83 hours			
		27 m3	/	6.67 m3/dump	=	4.05 dp/10m3		
		4.05 dp/10m3	x	0.83 hours	=	3.36 hours		
* 6 :	Spreading :	27 m3						
* 7 :	Steel Sheet Pile :	48 kg/m x	15 m long x	3 m dstnc /	0.4 m wide			
	=	48 kg/m x	45 m in total	=	5400 kg			
		5.4 ton /	5 times =	1.08 ton				
* 8 :	Steel in General :	11 m length in total	x	135 kg/m3 =	1485 kg			
		1485 kg /	5 times =	297 kg				

U-P2-Bq-95 Backfill with Sandy Soil is equal unit cost with U-P2-Bq-23.

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-96	Concrete, Type C1 including Formwork, Scaffolding, and Falsework	10 m3	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-79	Truck Mixer; 4.5 m3	hourly	3.02	77957.88	1560	60651.61	235,433	4,711	183,168	
Working Base Cost											
	CW-1-24	Form Work B	m2	29.19	10030	75	52910	292,787	2,189	1,544,501	
	CW-2-40	Breaking-up the Concrete Form	m2	29.19	0	0	3700	0	0	108,007	
	CW-1-42	Tublar Scaffold for Re-Con IV	m2	19.80789	24970	70	23610	494,603	1,387	467,664	
	CW-1-44	Frame Support	m3	14.00404	11370	50	22310	159,226	700	312,430	
	CW-1-20	Concrete Work for Reinforced Concrete C1 by Pump	m3	10	20270	41770	183330	202,700	417,700	1,833,300	
Indirect Cost											
Site Expense			%	15	0.8		0.2	751,261	0	187,815	
Profit and Overhead Cost			%	10	0.8		0.2	575,967	0	143,992	
		Miscellaneous	L.S.					24	13	23	Round Up
Total for	10 m3							2,712,000	426,700	4,780,900	
Unit Cost for	1 m3							271,200	42,670	478,090	

*1 :	Total Concrete Volume :	989 m3				
*2 :	Total Scaffolding Area :	1959 m2	Total Supporting Volume :	1385 m3		
	Average Scaffolding Area :	19.80789 m2/unit m3	Average Supporting Volume :	14.00404449 m3/unit m3		
	Total Formwork Area :	2887 m2				
	Average Formwork Area :	29.19110 m2/unit m3				
*3 :	Truck Mixer :	10.2 m3	/	4.5 m3/truck	=	2.27 Truck
		10 km/rnd /	30 km/hr +	60 mnts(loss)=		1.33 hours
		2.27 Truck	x	1.33 hours	=	3.02 hours

Table 4.2.5 (35/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-97	Concrete, Type E including Formwork	10 m3	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-79	Truck Mixer; 4.5 m3	hourly	3.02	77957.88	1560	60651.61	235,433	4,711	183,168	
Working Base Cost											
	CW-1-28	Form Work F	m2	5.652174	0	0	36510	0	0	206,361	
	CW-1-22	Concrete Work for Levelling Concrete	m3	10	120	37130	158740	1,200	371,300	1,587,400	
Indirect Cost											
Site Expense			%	15	0.8		0.2	310,749	0	77,687	
Profit and Overhead Cost			%	10	0.8		0.2	238,241	0	59,560	
		Miscellaneous	L.S.					78	89	24	Round Up
Total for	10 m3							785,700	376,100	2,114,200	
Unit Cost for	1 m3							78,570	37,610	211,420	

*1 : Form Work Area : Total Form work area 52 / Concrete Volume 92 = From Work Area m2 / concrete 1m3 0.565217 m2/m3

*2 : Dump Truck : 10.2 m3 / 4.5 m3/truck = 2.27 Truck

10 km/rnd / 30 km/hr + 60 mnts(loss)= 1.33 hours

2.27 Truck x 1.33 hours = 3.02 hours

ID No.	Working Name	Calculation Quantity	Remarks
		1000 kg	

U-P2-Bq-98	Deformed Reinforcing Bars	U-P3-Bq-105	Deformed Reinforcing Bars
U-P2-Bq-115	Deformed Reinforcing Bars	U-P3-Bq-255	Deformed Reinforcing Bars
U-P2-Bq-132	Deformed Reinforcing Bars	U-P3-Bq-290	Deformed Reinforcing Bars
U-P2-Bq-141	Deformed Reinforcing Bars		
U-P2-Bq-157	Deformed Reinforcing Bars		
U-P2-Bq-202	Deformed Reinforcing Bars		
U-P2-Bq-244	Deformed Reinforcing Bars		
U-P2-Bq-259	Deformed Reinforcing Bars		
U-P2-Bq-275	Deformed Reinforcing Bars		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Working Base Cost											
	CW-1-32	Reinforcing Bar Setup by using Crane 2	t	1	123300	2809800	3097935	123,300	2,809,800	3,097,935	
Indirect Cost											
Site Expense			%	15	0.8		0.2	723,724	0	180,931	
Profit and Overhead Cost			%	10	0.8		0.2	554,855	0	138,714	
		Miscellaneous	L.S.					21	0	20	Round Up
Total for	1000 kg							1,401,900	2,809,800	3,417,600	
Unit Cost for	1 kg							1,402	2,810	3,418	

ID No.	Working Name			Calculation Quantity	Remarks
				100 m	
U-P2-Bq-99	Water Stop, 200 mm wide	U-P3-Bq-106	Water Stop, 200 mm wide		
U-P2-Bq-203	Water Stop, 200 mm wide	U-P3-Bq-170	Water Stop, 200 mm wide		
U-P2-Bq-276	Water Stop, 200 mm wide	U-P3-Bq-256	Water Stop 200 mm wide		
		U-P3-Bq-273	Water Stop, 200 mm wide		
		U-P3-Bq-291	Water Stop, 200 mm wide		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Direct Cost											
Labour											
	L-2-1	Foreman	day	0.25	0	0	48800	0	0	12,200	
	L-2-6	Welder	day	0.25	0	0	39000	0	0	9,750	
	L-2-23	Common Labour	day	1	0	0	35100	0	0	35,100	
Material											
	M-G-14	Waterstop; B=200mm	m	105.26	47500	0	2500	4,999,850	0	263,150	
Others											
		Small Tools	%	1				0	0	0	Welder Machine and etc.
Indirect Cost											
Site Expense			%	15	0.8		0.2	638,406	0	159,602	
Profit and Overhead Cost			%	10	0.8		0.2	489,445	0	122,361	
		Miscellaneous	L.S.					99	0	37	Round Up
Total for	100 m							6,127,800	0	602,200	
Unit Cost for	1 m							61,278	0	6,022	

*1 : Manpower ; Foreman : 1 man/day / 400 m/day x 100 m = 0.25

Common Labor : 4 man/day / 400 m/day x 100 m = 1

Welder : 1 man/day / 400 m/day x 100 m = 0.25

Common Labor : 1 manpower = 100 m/day

*2 : Water Stop : 100 m / 0.95 = 105.26

Table 4.2.5 (36/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-100	Gravel Bedding	10 m3	
U-P2-Bq-186	Gravel Bedding		
U-P3-Bq-79	Gravel Bedding		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost			Cost			Remarks
					PF/C	IF/C	L/C	PF/C	IF/C	L/C	
Direct Cost											
Working Base Cost											
	CW-1-15	Gravel Bedding	m3	10	0	1360	31260	0	13,600	312,600	
Indirect Cost											
Site Expense			%	15	0.8		0.2	39,144	0	9,786	
Profit and Overhead Cost			%	10	0.8		0.2	30,010	0	7,503	
		Miscellaneous	L.S.					46	0	11	Round Up
Total for		10 m3						69,200	13,600	329,900	
Unit Cost for		1 m3						6,920	1,360	32,990	

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-101	Cobble Stone		
U-P2-Bq-187	Cobble Stone	10 m3	
U-P3-Bq-80	Cobble Stone		
U-P3-Bq-211.1	Cobble Stone		
U-P3-Bq-222.1	Cobble Stone		
U-P3-Bq-232.1	Cobble Stone		
U-P3-Bq-269.1	Cobble Stone		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost			Cost			Remarks
					PF/C	IF/C	L/C	PF/C	IF/C	L/C	
Direct Cost											
Equipment											
	A-2-1-7	Backhoe; 0.6 m3	hourly	0.31	125542.9	2040	90965.08	38,918	632	28,199	
Labour											
	L-2-1	Foreman	day	0.05	0	0	48800	0	0	2,440	
	L-2-23	Common Labour	day	0.2	0	0	35100	0	0	7,020	
Material											
	M-B-5	Cobble Stone	m3	11.11	0	1850	35150	0	20,554	390,517	
Indirect Cost											
Site Expense			%	15	0.8		0.2	58,594	0	14,648	
Profit and Overhead Cost			%	10	0.8		0.2	44,922	0	11,230	
		Miscellaneous	L.S.					66	14	45	Round Up
Total for		10 m3						142,500	21,200	454,100	
Unit Cost for		1 m3						14,250	2,120	45,410	

*1 : Manpower ; Foreman : 1 man/day / 200 m3/day x 10 m2 = 0.05
Common Labor : 4 man/day / 200 m3/day x 10 m2 = 0.2
Common Labor : 1 manpower = 50 m3/day

*2 : Backhoe : $\frac{3600 \times q \times f \times E}{Cm}$

f : 0.9 q : 0.59 E : 0.5 Cm : 30

Hence, Volume = 31.86 m3/hour

U-P2-Bq-102	Wet Stone Masonry	is equal unit cost with U-P1-Bq-20.
U-P2-Bq-103	Log Pile, Dia. 150mm, L=3.0m	
U-P2-Bq-104	Weep Hole, Dia.50mm	is equal unit cost with U-P2-Bq-29.
U-P2-Bq-105	Pointing	

Table 4.2.5 (37/119) CALCULATION SHEET FOR UNIT COST OF EACH PAYMENT ITEM OF THREE PACKAGES

ID No.	Working Name	Calculation Quantity	Remarks
U-P2-Bq-106	Asphalt Concrete	10 m2	
U-P2-Bq-117	Asphalt concrete		
U-P2-Bq-143	Asphalt Concrete		
U-P2-Bq-246	Asphalt Concrete		

Major Item	ID No.	Description	Unit	Quantity	Unit Cost FE/C	Unit Cost IE/C	Unit Cost L/C	Cost FE/C	Cost IE/C	Cost L/C	Remarks
Direct Cost											
Equipment											
	A-2-1-96	Wheel Loader; 1.2 m3	hourly	0.02	72,404	1,116	58,629	1,448	22	1,173	
	A-2-2-16	Generator; 125 kVA	daily	0.01	271912.2	15120	209096	2,719	151	2,091	
	A-2-1-55	Dumptruck; 8 ton	hourly	0.15	58770.27	2200	53720.55	8,816	330	8,058	
	A-2-2-63	Asphalt Finisher 2.4m	hourly	0.03	170054.4	0	150540.1	5,102	0	4,516	
	A-2-1-68	Tire Roller; 8-20 ton	hourly	0.02	81684.16	864	82451.15	1,634	17	1,649	
Labour											
	L-2-1	Foreman	day	0.01	0	0	48800	0	0	488	
	L-2-22	Asphalt Wolker	day	0.06	0	0	35100	0	0	2,106	
Material											
	M-B-2	Coarse Aggregate	m3	0.420406	0	2600	49400	0	1,093	20,768	
	M-B-1	Fine Aggregate (washed sand)	m3	0.185625	0	2100	39900	0	390	7,406	
		Filler	kg	60.01875	0	0	135.35	0	0	8,124	lessthan0.075mm
	M-C-4	Asphalt	kg	82.6875	0	450	1050	0	37,209	86,822	
Others											
		Small Tools	%	5				986	1,961	7,160	
Indirect Cost											
Site Expense			%	15	0.8		0.2	25,469	0	6,367	
Profit and Overhead Cost			%	10	0.8		0.2	19,526	0	4,881	
		Miscellaneous	L.S.					1	26	91	Round Up
Total for	10 m2							65,700	41,200	161,700	
Unit Cost for	1 m2							6,570	4,120	16,170	
Unit Cost for	1 ton (1.23ton including 10%loss)			75.17045				874	548	2,151	

Analysis of surface course (AC) 1 M2, 50 mm thick

No	Working Name	Code	Coeffitien	Unit	Remark
I.					
	1 Using equipment				
	2 Work location is on the road length				
	3 Existing condition of the road are medium				
	4 Average distance from base cam	L	1	Km	
	5 Thickness of surface course (AC	t	0.05	m	
	6 Effective Hour / day	Tk	7	Hour	
	7 Loss factor of the material				
	-Aggregate	Fh1	1.1		
	-Asphalt	Fh2	1.05		
	8 Composition of the material				
	-Fine aggregate 30 -50 %	FA	0.27		
	-Coarse aggregate 39 - 59 %	CA	0.6115		
	-Filler fraction 4.5 - 7.5 %	FF	0.0485		
	Asphalt minimum 6.7 %	As	0.07		
	9 Unit Weight of Material				
	-AC	D1	2.25	ton/m3	
	-Coarse aggregate & Fine aggre	D2	1.8	ton/m3	
	-Filler fraction	D3	2	ton/m3	
	-Asphalt	D4	1.03	ton/m3	
II.	Material, equipment, and labour				
	1 Material				ton
	Coarse aggregate = (CA*(D1*t	M03	0.042041	m3	0.075673
	Fine aggregate = (FA*(D1*t m3	M04	0.018563	m3	0.033413
	Filler = (FF*(D1*t m3)*Fh1)	M05	6.001875	kg	0.006002
	Asphalt = (AS*(D1*t m3)*Fh2)	M10	8.26875	kg	0.008269
					0.123356
	2 Equipment				
	2.1 Wheel Loader	E15			
	Bucket capacity	V	1.2	m3	
	Bucket factor	Fb	0.9		
	Efficiency factor	Fa	0.83		
	Cycle time				
	- Loading	T1	1.5	minute	
	-Others	T2	0.5	minute	
		Ts1	2	minute	
	Production capacity (m2/hour) = (D2*V*Fb*Fa*60)/(D1*t*Ts1)	Q1	430.272	m2	
	Equipment coeffitient/m2 = 1/Q1	E15	0.002324	hour	
	2.2 Asphalt Mixing Plant	E01			
	Production capacity	V	30	ton/hour	
	Efficiency factor	Fa	0.83		
	Production capacity /hour =V*F	Q2	221.3333	m2	
	Equipment coeffitient/m2 = 1/Q	E01	0.004518	hour	
	2.3 Generator Set	E12			
	Production capacity = AMP	Q3	221.3333	m2	
	Equipment coeffitient/m2 = 1/Q	E01	0.004518	hour	

Working Name	Code	Coeffitien	Unit
2.4 Dump Truck	E09		
Bucket capacity	V	4	m3
Efficiency factor	Fa	0.83	
Average loading sp	v1	30	Km/hour
Average empty sp	v2	40	Km/hour
AMP capacity/Bat	Q2b	0.5	ton
Time to prepare 1	Tb	1	minute
Cycle time :			
Loading time = (VT	T1	8	minute
Transportation tir	T2	2	minute
Waiting+dumping	T3	15	minute
Turning back time	T4	1.5	minute
	Ts2	26.5	minute
Production capacit = (V*Fa*60)/(D1*Ts2*t)	Q4	66.81761006	m2
Equipment coeffiti	E09	0.014966114	hour
2.5 Asphalt Finisher	E02		
Production capacit	V	40	ton/hour
Efficiency factor	Fa	0.83	
Production capacit	Q5	295.1111111	m2
Equipment coeffiti	E02	0.003388554	hour
2.6 Tandem Roller	E17		
Average speed	v	2.5	km/hour
Effective width of	b	1.8	m
Number of track	n	4	track
Efficiency factor	Fa	0.83	
Production capacit = (1000v*b*(*Fa)/(n*t)	Q6	933.75	m2
Equipment coeffiti	E19	0.00107095	hour
2.7 Pneumatic Tire R	E18		
Average speed	v	3.5	km/hour
Effective width of	b	1.8	m
Number of track	n	8	track
Efficiency factor	Fa	0.83	
Production capacit = (1000v*b*t*Fa)/(n*t)	Q7	653.625	m2
Equipment coeffiti	E14	0.001529929	hour
2.8 Light Tools			
Pole			
Carriage			
Shovel			
Earth fork			
Control stick for pavement thickness			
2.9 Man Power/ labour			
The Significant Pr	Q1	221.3333333	m2/hour
AC production/da	Qt	1549.333333	m2
Man Power			
-Common Labor	P	10	
-Foreman	M	1	
Man Power Coefficient			
-Common Labor	L01	0.045180723	
-Foreman	L03	0.004518072	hour