

APPENDIX E

SANITATION

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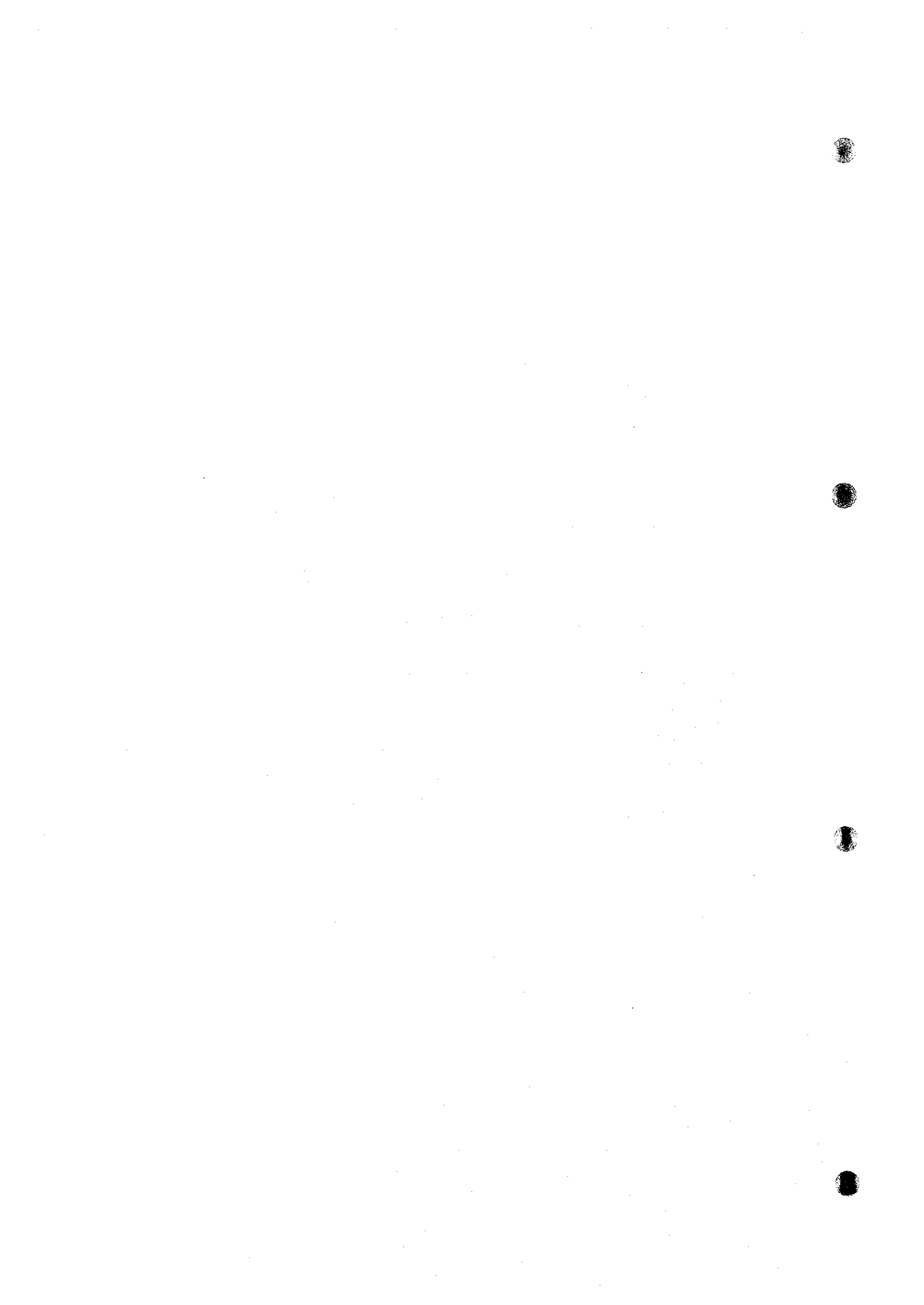


Table 4.1 Segenciti Water Supply and Consumption Pattern

	Domestic water consumption by private house water connection		Commercial water consumption by private connection		Domestic water consumption by public water connection.
	m ³	No. of Customers	m ³	No. of Customers	m ³
Jan-Feb/95	369	7	364	6	
Mar.-Apr.	630	7	626	6	305
May-Jun.	690	10	628	8	309
July-Aug.	652	10	602	8	351
Sep.-Oct.	938	10	872	8	328
Nov.-Dec.	996	11	926	9	322
Total	4,275 43%		4,018 41%		1,615 16%
Jan-Feb/96	1446	30	1152	14	268
Mar.-Apr.	1720	40	1292	15	208
May-Jun.	1148	37	803	15	302
July-Aug.	1734	44	922	18	349
Sep.-Oct.	1914	56	1227	18	317
Nov.-Dec.	1759	60	1151	19	205
Total	9,721 54%		6,547 37%		1,649 9%

Continue ...

Table 4.1 Segenciti Water Supply and Consumption Pattern.

	Domestic water consumption by private house water connection		Commercial water consumption by private connection		Domestic water consumption by public water connection.
	m ³	No. of Customers	m ³	No. of Customers	m ³
Jan-Feb/97	2348	77	1192	20	293
Mar.-Apr.	3134	93	1757	25	374
May-Jun.	2357	98	1244	26	468
July-Aug.	1522	101	949	26	532
Sept.					324
Total	9,361 57%		5,142 31%		1,991 12%

Source: Segenciti WSS

Table 4.2 Domestic Water Consumption and Source of Water Supply

Source of water supply	Household users (%)	Ave. volume of water consumption m ³ /hld/mon		Ave. expenditure for Water Nfa/m ³	Average income Nfa/mon
		m ³ /hld/mon	l/c/d		
Municipality supply					
House connection	3	4	28.73	10	475
Yard connection	10.4	1.76	12.64	8.29	847
Communal Water point	85.1	2.30	16.45	12	474
Private well	0	-	-	-	-
Public well	0	-	-	-	-
River/spring	3	0.24	1.72	-	375
Water tanker	0	-	-	-	-
Water vender	1.5	0.40	2.87	4	808
Rain water	80.6	1.46	10.49	-	512

Source: Socio-economic survey conducted by JICA Study Team Nov. 1997

Table 4.3 Distance of Water Points from Households

Type of water point	Average distance from household			
	< 99m 12.3%	100-199 m 21.1%	200-399 m 22.8%	>400 m 43.9%
River/spring	200-499 m 100%		500-999 m 0%	>1000 m 0%

Table 4.4 Toilet condition and related behaviors

Type of latrines used	Septic tank/cesspool 16.4%	Dry pit 7.5%	Community toilet 1.5%		Open field 74.6%	
Condition of septic tank/cesspool and pit latrine	Clean squatting hole 68.8%	Clean slab 56.3%	Well fitting lid 18.8%	Good ventilation 68.8%	No flies 62.5%	Not filled up 87.5%
Households satisfied with the existing latrines used	29.9%		Average distance of latrine from the nearest water source			367m
Affordable preferences of unsatisfied households	Septic tank/cesspool 74.5%		Dry pit 4.3%	Community toilet 17%	Open field 2.1%	
Households favoring credit system for latrine construction	63.6%		Ave. of maximum repayment a household afford			23Nfa/mon
Type of anal cleansing material used	Stone 35.8%	Water 6%	Paper 86.6%	Twig 0%	Leaves 0%	Nothing 0%

Source: Socio-economic survey conducted by JICA Study Team Nov. 1997

Table 4.5 Conditions of Waste Disposal

Solid waste disposal	Open field 56.7%	Open pit 0%	Covered in pit 0%	Burn 0%	Municipality truck 43.3%
Waste water disposal	Open field 95.5%	Pit 1.5%	Gardening 3%	Drainage system 0%	
Animal waste disposal	Used as fuel 33.3%	Used as fertilizer 33.3%	Thrown in a pit 0%	Open field 33.3%	
Infant excreta disposal	Open field 7.7%	Popo and thrown to the field 73.1%		Popo and put in the toilet 19.2%	

Table 4.6 Segeneiti Schools Present Water and Latrine Facilities Condition

Name of School	Water supply facility		Latrine facility	
	Availability	Remark	Availability	Remark
Segeneiti junior and secondary school.	Yes	Continuously broken by the students	Yes, but not functional	Filled with stone
Kidus Michael elementary school. Non gov't sch.	Yes	Continuos supply from the town's water system	Yes, but bombarded during war	A new one is under construction
Mai Mogdom elementary school	No	Never had	No	Never had
Forto elementary school	No	Never had	No	Never had

Table 4.7 Cases of Water and Poor Sanitation Related Diseases in Segeneiti

Description of Disease	1995	1996	1997
Water borne & washed diseases			
Typhoid	12	1	4
Hepatitis	11	18	18
Diarrhea	250	180	220
Amebic Dysentery	260	204	468
Bacillary	90		
Other helmentic	230	255	240
Bacterial skin sgosis			
Scabies	45	262	90
Fungal infection (skin disease)	76	270	219
Trachoma	43	33	45
Asthma	8	50	66
Rickettsial Typhus			
Water basis			
Schistosomaisis	1	2	1
Total	1,026 24%	1,265 25%	1,371 33%
Water related insect vector			
Malaria	429 3%	304 2%	186 1%

Source: Segeneiti hospital

Table 4.8 Conditions of Health

Water related disease cases in the last six months	Ave. number of cases	Ave. number of cases by type of diseases				
	1person/hld	Diarrhea 13 person 20 %	Dysentery 3 person 7 %	Malaria 0 person 0%	Warms 2 person 9.5 %	Scabies 1 person 7.1 %
Ave. medical cost	Diarrhea 18.59 Nfa/case	Dysentery 12.50 Nfa/case	Malaria 0 Nfa/case	Warms 5 Nfa/case	Scabies 10 Nfa/case	
Type of treatment	Self-administered traditional medicine 3%	Self-administered modern medicine 3%	Consult traditional healer 0%	Consult physician 94.0%		
Infants health condition	Households with infant 7.6%	Infants death in the last 10 years 1 person	Child immunization 97.6%			

Source: Socio-economic survey conducted by JICA Study Team Nov. 1997

Table 4.9 Hand Washing Behavior

	Hand washing method					
	with water and soap	With water & ash	With water & mud	with water only	with other material	Nothing
After defecation	59.7%	0%	0%	29.9%	0%	10.4%
Before cooking	16.4%	0%	0%	80.6%	0%	3%
Before eating	13.4%	0%	0%	85.1%	0%	1.5%
After disposal of children stool	54.8%	0%	0%	7.1%	0%	0%
After handling animal dung	9.5%	0%	0%	0%	0%	0%

Source: Socio-economic survey conducted by JICA Study Team Nov. 1997

Table 4.10 Food Handling

Placing utensil	on shelf 58.2%	On floor 0%	over the table 41.8%	Other 0%	
Storage of left over food	Covered 80.6%	Open to flies 0%	No leftover food 6%	Thrown away 10.4%	Other 3%
Washing raw food before eating	Washing vegetable 100%	Washing meat 16.7%	Washing fruit 25%		

Source: Socio-economic survey conducted by JICA Study Team Nov. 1997

Table 4.11 Households Perception of Health and Hygiene

ORS preparation knowledge 94%	Participation on health/hygiene education session 38.8%	Satisfaction on health/hygiene education session 100%		
Participation in community sanitation work 92.5%	Areas of involvement			
	Cash contribution 3%	Material contribution 1.5%	Labor contribution 92.5%	Not willing 3%

Source: Socio-economic survey conducted by JICA Study Team Nov. 1997

APPENDIX F
COST ESTIMATION

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1. Water Supply

Table 1.1 Bill of Quantity

Facility	Item Description	Unit	Year		
			2005	2010	2015
Intake Facility	New borehole	sets	1		
	Existing borehole	sets			1
	Observation borehole	sets			
	Dam	sets			
	(Sub-total)	sets	1	0	1
Well Pump Facility	Submersible pump		SEG-2, 0.240m ³ /min 135.3m, 1set	SEG-2, 0.360m ³ /min 78.9m, 1set	SEG-2, 0.432m ³ /min 87.7m, 1set DW-1, 0.114m ³ /min 70.6m, 1set
	(Sub-total)	sets	1	1	2
	DCIP 200mm	m			
Transmission Pipeline	ditto 150mm	m			
	ditto 125mm	m			
	ditto 100mm	m	4,168.0		
	ditto 80mm	m	1,085.0		
	ditto 60mm	m		1,500.0	400.0
	(Sub-total)	m	5,253.0	1,500.0	400.0
	Centrifugal pump		BP.1, 0.240m ³ /min 96.0m, 1set	BP.1, 0.360m ³ /min 78.9m, 1set BP.1, 0.264m ³ /min 99.3m, 1set BP.2, 0.096m ³ /min 98.7m, 1set	BP.1, 0.432m ³ /min 87.7m, 1set BP.1, 0.276m ³ /min 100.9m, 1set BP.2, 0.156m ³ /min 122.1m, 1set
(Sub-total)	sets	1	3	3	
Pump Pit	Made of RC		15m ³	15m ³ , 2set	
	(Sub-total)	sets	1	2	0
Reservoir	Made of RC		140m ³		
	Made of F R P			50m ³ , h=12.5m	80m ³ , h=12.5m
	Existing				
	(Sub-total)	sets	1	1	1
Distribution Pipeline	P V C 300mm	m			
	ditto 250mm	m			
	ditto 200mm	m			
	ditto 150mm	m			
	ditto 125mm	m	531.0		
	ditto 100mm	m	232.0		44.0
	ditto 75mm	m	954.0	112.0	2,201.0
	ditto 50mm	m	9,365.0	12,262.0	15,527.0
	(Sub-total)	m	11,082.0	12,374.0	17,772.0
Control House	sets	2	1	1	
Communal Water Point	sets	10	5	10	
Individual Connection	sets	525	227	330	
Tempolaty Road	Width 3.0m	m	3,000		400

Table 1.2 (1) Project Cost (2005)

(Nakfa)

Item	Description Dimension	Unit	Quantity	Unit Cost		Cost		Total	
				Local C.	Foreign C.	Local C.	Foreign C.		
I. Construction Cost									
Intake facility	New well	set	1	13,229.04	273,277.16	13,229	273,277	286,506	
	Exsiting well	set		9,275.43	85,317.49	0	0		
	Observation well	set		0.00	0.00	0	0		
	Dam	set							
	(sub total)	set	1			13,229	273,277		
Submersible pump	SEG-2, 0.240m3/min 135.3m	set	1	10,682.06	205,194.98	10,682	205,195	215,877	
	(sub total)		1			10,682	205,195		
Transmission pipeline	D C I P 200mm	m		245.85	842.83	0	0	4,048,390	
	150mm	m		221.01	671.71	0	0		
	125mm	m		214.20	657.79	0	0		
	100mm	m	4,168	207.31	580.60	864,051	2,419,936		
	80mm	m	1,085	204.69	499.83	222,085	542,318		
	60mm	m		203.85	393.40	0	0		
	(sub total)	m	5,253			1,086,137	2,962,253		
Booster pump	BP.1, 0.240m3/min 96.0m	set	1	1,992.02	123,997.15	1,992	123,997	125,989	
	(sub total)		1			1,992	123,997		
Pump pit	RC 15m3	sets	1	62,765.43	38,970.28	62,765	38,970	101,736	
	(sub total)		1			62,765	38,970		
Reservoir	RC 140m3	sets	1	341,399.66	188,160.33	341,400	188,160	529,560	
	FRP								
	(sub total)		1			341,400	188,160		
Distribution pipeline	PVC 300mm	m		289.52	1,221.56	0	0	2,195,794	
	250mm	m		249.89	1,000.89	0	0		
	200mm	m		222.67	622.16	0	0		
	150mm	m		181.05	312.16	0	0		
	125mm	m	531	167.54	203.19	88,961	107,892		
	100mm	m	232	154.76	155.42	35,905	36,058		
	75mm	m	954	140.33	107.09	133,877	102,167		
	50mm	m	9,365	126.50	54.06	1,184,626	506,308		
(sub total)	m	11,082			1,443,369	752,425			
Control house	Type A	sets	0	137,822.18	9,992.65	0	0	471,107	
	Type B	sets	1	195,386.85	10,232.97	195,387	10,233		
	Type C	sets		196,861.35	10,530.98	0	0		
	Type D	sets	1	254,523.76	10,963.56	254,524	10,964		
	(sub total)	sets	2			449,911	21,197		
Comunal water point		sets	10	18,019.46	6,866.40	180,195	68,664	248,859	
Individual connection		set	525	0.00	0.00	0	0	0	
Temporary Road	width3.0m	m	3,000	297.00	0.00	891,000	0	891,000	
Sub-Total						4,480,679	4,634,138	9,114,818	
2. Engineering Fee							911,482	911,482	
3. Administration Cost							182,296	182,296	
4. Physical Contingency							466,298	554,562	1,020,860
Total						5,129,273	6,100,182	11,229,456	
5. Price Contingency							979,773	1,165,232	2,145,006
Grand Total						6,109,047	7,265,415	13,374,461	

Table 1.2 (2) Project Cost (2010)

(Nakfa)

Description		Unit	Quantity	Unit Cost		Cost		Total
Item	Dimension			Local C.	Foreign C.	Local C.	Foreign C.	
I. Construction Cost								
Intake facility	New well	set		13,229.04	273,277.16	0	0	0
	Exsiting well	set		9,275.43	85,317.49	0	0	
	Observation well	set		0.00	0.00	0	0	
	Dam	set						
	(sub total)	set	0			0	0	
Submersible pump	SEG-2, 0.360m3/min 78.9m	set	1	10,625.16	194,703.51	10,625	194,704	205,329
	(sub total)		1			10,625	194,704	
Transmission pipeline	D C I P 200mm	m		245.85	842.83	0	0	895,870
	150mm	m		221.01	671.71	0	0	
	125mm	m		214.20	657.79	0	0	
	100mm	m		207.31	580.60	0	0	
	80mm	m		204.69	499.83	0	0	
	60mm	m	1,500	203.85	393.40	305,775	590,095	
	(sub total)	m	1,500			305,775	590,095	
Booster pump	BP'1, 0.360m3/min 78.9m	set	1	1,992.02	121,049.16	1,992	121,049	360,846
	BP.1, 0.264m3/min 99.3m	set	1	1,992.02	121,049.16	1,992	121,049	
	BP.2, 0.096m3/min 98.7m	set	1	1,839.48	112,924.09	1,839	112,924	
	(sub total)		3			5,824	355,022	
Pump pit	RC 15m3	sets	2	62,765.43	38,970.28	125,531	77,941	203,471
	(sub total)		2			125,531	77,941	
Reservoir	Rein forced Concrete	sets						1,404,705
	F R P 50m3,h=12.5m	sets	1	75,553.25	1,329,151.75	75,553	1,329,152	
	(sub total)		1			75,553	1,329,152	
Distribution pipeline	P V C 300mm	m		289.52	1,221.56	0	0	2,241,724
	250mm	m		249.89	1,000.89	0	0	
	200mm	m		222.67	622.16	0	0	
	150mm	m		181.05	312.16	0	0	
	125mm	m	0	167.54	203.19	0	0	
	100mm	m	0	154.76	155.42	0	0	
	75mm	m	112	140.33	107.09	15,717	11,994	
	50mm	m	12,262	126.50	54.06	1,551,082	662,931	
(sub total)	m	12,374			1,566,799	674,925		
Control house	Type A	sets	1	137,822.18	9,992.65	137,822	9,993	147,815
	Type B	sets		195,386.85	10,232.97	0	0	
	Type C	sets		196,861.35	10,530.98	0	0	
	Type D	sets		254,523.76	10,963.56	0	0	
	(sub total)	sets	1			137,822	9,993	
Comunal water point		sets	5	18,019.46	6,866.40	90,097	34,332	124,429
Individual connection		set	227	0.00	0.00	0	0	0
Temporary Road	width3.0m	m		297.00	0.00	0	0	0
Sub-Total						2,318,026	3,266,163	5,584,190
2. Engineering Fee							558,419	558,419
3. Administration Cost							111,684	111,684
4. Physical Contingency							242,971	382,458
Total						2,672,681	4,207,041	6,879,722
5. Price Contingency						1,346,043	2,118,793	3,464,836
Grand Total						4,018,724	6,325,834	10,344,558

Table 1.2 (3) Project Cost (2015)

(Nakfa)

Description		Unit	Quantity	Unit Cost		Cost		
Item	Dimension			Local C.	Foreign C.	Local C.	Foreign C.	Total
1. Construction Cost								
Intake facility	New well	set		13,229.04	273,277.16	0	0	
	Exsiting well	set	1	9,275.43	85,317.49	9,275	85,317	
	Observation well	set		0.00	0.00	0	0	
	Dam	set						
	(sub total)	set	1			9,275	85,317	94,593
Submersible pump	SEG-2, 0.432m ³ /min 87.7m	set	1	10,703.31	228,028.58	10,703	228,029	
	DW-1, 0.114m ³ /min 70.6m		1	10,505.05	143,799.94	10,505	143,800	
	(sub total)		2			21,208	371,829	393,037
Transmission pipeline	D C I P 200mm	m		245.85	842.83	0	0	
	150mm	m		221.01	671.71	0	0	
	125mm	m		214.20	657.79	0	0	
	100mm	m		207.31	580.60	0	0	
	80mm	m		204.69	499.83	0	0	
	60mm	m	400	203.85	393.40	81,540	157,359	
	(sub total)	m	400			81,540	157,359	238,899
Booster pump	BP.1, 0.432m ³ /min 87.7m	set	1	2,190.38	139,828.58	2,190	139,829	
	BP.1, 0.276m ³ /min 100.9m	set	1	1,992.02	121,049.16	1,992	121,049	
	BP.2, 0.156m ³ /min 122.1m	set	1	1,897.86	127,201.49	1,898	127,201	
	(sub total)	sets	3			6,080	388,079	394,159
Pump pit	Rein forced Concrete	sets	0			0	0	
	(sub total)	sets	0			0	0	0
Reservoir	Rein forced Concrete	sets						
	FRP 80m ³ ,h=12.5m	sets	1	95,362.11	1,722,441.65	95,362	1,722,442	
	(sub total)		1			95,362	1,722,442	1,817,804
Distribution pipeline	PVC 300mm	m		289.52	1,221.56	0	0	
	250mm	m		249.89	1,000.89	0	0	
	200mm	m		222.67	622.16	0	0	
	150mm	m		181.05	312.16	0	0	
	125mm	m		167.54	203.19	0	0	
	100mm	m	44	154.76	155.42	6,810	6,839	
	75mm	m	2,201	140.33	107.09	308,872	235,713	
	50mm	m	15,527	126.50	54.06	1,964,088	839,449	
(sub total)	m	17,772			2,279,769	1,082,001	3,361,770	
Control house	Type A	sets	1	137,822.18	9,992.65	137,822	9,993	
	Type B	sets		195,386.85	10,232.97	0	0	
	Type C	sets		196,861.35	10,530.98	0	0	
	Type D	sets	0	254,523.76	10,963.56	0	0	
	(sub total)	sets	1			137,822	9,993	147,815
Comunal water point		sets	10	18,019.46	6,866.40	180,195	68,664	248,859
Individual connection		set	330	0.00	0.00	0	0	0
Temporary Road	width3.0m	m	400	297.00	0.00	118,800	0	118,800
Sub-Total						2,930,052	3,885,683	6,815,735
2. Engineering Fee							681,574	681,574
3. Administration Cost						136,315		136,315
4. Physical Contingency						306,637	456,726	763,362
Total						3,373,004	5,023,982	8,396,986
5. Price Contingency						3,414,142	5,085,257	8,499,399
Grand Total						6,787,146	10,109,239	16,896,385

Table 1.3 O&M Cost

(Nakfa)

Description	2005	2010	2015
1. Personnel cost	149,823	249,670	377,532
2. Electricity & fuel cost	161,885	257,544	347,316
3. Chemical cost	5,830	8,761	13,303
4. Repairing cost	52,012	85,839	127,655
5. Miscellaneous cost	36,955	60,180	86,581
Total	406,504	662,000	952,387

2. Sanitation

Table 2.1 Bill of Quantity for School and Public Latrine

SUMMARY

A. SUPERSTRUCTURE

1 EXCAVATION AND EARTHWORK	6905,00
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B. SUPERSTRUCTURE

1 BRICKWORKS	7060,00
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2 CARPENTARY AND JOINERY	6140,00
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3 METAL WORKS	5200,00
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4 PLASTERING	2038,00
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5 PAINTING	1660,00
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6 SANITARY INSTALLATION	14998,00
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7 SEPTIC TANK	30724,56
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TOTAL	74 725,56
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Table 2.1 (1) Bill of Quantity for School and Public Latrine

ITEM	DESCRIPTION	UNIT	QTY.	U.PRICE Nakfa	TOTAL P. Nakfa
A. SUBSTRUCTURE					
1. EXCAVATION & EARTHWORKS					
1.1	Clear off site to remove top soil to an average depth of 20cm.	m2	50	4	200
1.2	Excavate for trench foundation in ordinary soil to a depth not exceeding 75cm from the stripped ground level.	m3	39	25	975
1.3	Return fill around foundation with good, dry excavated material from site and well ram in layers every 25cm interval.	m3	26	22	572
1.4	Cartaway surplus excavated material to a distance not exceeding 5km from the compound.	m3	13	25	325
1.5	25cm thick basaltic or equivalent stone hardcore and blinded with crushed stone.	m2	179	27	4833
TOTAL CARRIED TO SUMMARY					6905,00 =
B. SUPERSTRUCTURE					
2. BRICK WORKS					
2.1	20cm thick hollow concrete wall bedded on compo-mortar 1:2:9 mix both sides left for plastering.	m2	47	110	5170
2.2	Ditto, but 10cm thick brick wall	m2	27	70	1890
TOTAL CARRIED TO SUMMARY					7060,00 =
3. CARPENTRY AND JOINERY					
3.1	Eucalyptus post for roofing, as shown on the section of section the drawing.	m	34	25	850
3.2	5x3cm zigba wood perlin, on which the C.I.S. is going to be fixed.	m	59	30	1770
3.3	Supply and fix 0.3mm thick C.I.S roofing, to be fixed to the perlin price including lap; roof ridges and washers	m2	44	80	3520
TOTAL CARRIED TO SUMMARY					6140,00 =

Table 2.1 (2) Bill of Quantity for School and Public Latrine

ITEM	DESCRIPTION	UNIT	QTY.	U.PRICE Nakfa	TOTAL P. Nakfa
4. METAL WORKS					
4,1	Metal doors and windows constructed in accordance to detail drawing, including one coat of anti-rust and three coats of oil paint:-				
	Doors				
	a) Type D1 size: 60 x 170	No	10	400	4000
	b) Type D2 size: 100 x 200	No	2	600	1200
					5200,00
5. PLASTERING					
5,1	Apply three coats of plaster in compo-mortar (1:2:9) mix up to fine finish to all internal walls of the latrine units.	m2	61	28	1708
5,2	Ditto but to external wall of the front faces.	m2	11	30	330
					2038,00
6. PAINTING					
6,1	Apply in three coats of oil paint to internal plastered wall surfaces of the latrine units.	m2	61	20	1220
6,2	Ditto but plastic emulsion paint to external wall surfaces.	m2	11	40	440
					1660,00
	TOTAL CARRIED TO SUMMARY				=
7. SANITARY INSTALLATION					
7,1	Supply and install Galvanized steel water supply pipes for cold water distribution from supply line, elevated tanker to all sanitary fixtures according to where shown on the drawings. Complete with the necessary connecting pieces such as bends, unions, nipples, tee, elbow, etc. shall include all the necessary assistance to the installation works, such as chiselling of walls, slabs, floors, etc. and closing them with concrete to normal condition where required. The installation shall be tested at a pressure of 1bar at the expense of the contractor.				
	Dia. ND 15mm (1/2")	ml	13	25	325
	Dia. ND 20mm (3/4")	ml	21	28	588

Table 2.1 (3) Bill of Quantity for School and Public Latrine

ITEM	DESCRIPTION	UNIT	QTY.	U.PRICE Nakfa	TOTAL P. Nakfa
7,2	Supply and install, on water supply lines, gate valves, made of bronze or brass parts complete with rubber gaskets, hand weels unions and other accessories.				
	Dia. ND 15mm	pcs	18	25	450
	Dia. ND 20mm	pcs	2	30	
7,3	Supply and install soil waste and vent pipes in horizontal branches and vertical stacks made of UPVC pipes and fittings. Fittings should include bends, branches, tees, clearout reducers, etc. Unit price shall include all the necessary assistance work to the installation, such as chiselling of walls, slabs, floors, etc. and closing them with concrete. All pipes entering manhole shall be trapped.				
	Dia. ND 50mm	ml	17	55	935
	Dia. ND 100mm	ml	26	95	2470
7,4	Supply and fix on terminals of ventilation pipes, vent caps (cowls), with weathering PP states, sealing gaps b/n the girth of the vent pipe and hole in the roof material.				
	Dia. ND 100mm	pcs	2	65	130
7,5	Supply and fix white vitreous Turkish type W.C. unit with trap and complete with fixing device.	pcs	10	700	7000
7,6	Construct sanitary manholes on domestic sewer lines in 200mm HCB wall plastered from the inside with cement mortar (1:3) on a base of mass concrete slab 100mm thick with proper slope for smooth flow, with reinforced concrete cover.				
	600 x 600mm	pcs	2	800	1600
7,8	Supply and install fiber-glass elevated tank of capacity 1 with vent pipe 25mm, drain pipe and gate valve of diam. 50mm and manhole 60x60cm. cover shall be provided.	pcs	1	1500	1500
					14998,00
	8. SEPTIC TANK				
	Excavation & earthworks				
8,1	Clear off site to remove top soil to an average depth of 20cm.	m2	16	4	64
8,2	Bulk excavation for under ground reservoir excavated in ordinary soil to a depth not exceeding 150cm from the stripped ground level.	m3	109	20	2180
8,3	Return fill around reservoir with good, dry excavated material from site and well ram in layers every 30cm interval.	m3	78	22	1716

Table 2.1 (4) Bill of Quantity for School and Public Latrine

ITEM	DESCRIPTION	UNIT	QTY.	U.PRICE Nakfa	TOTAL P. Nakfa
8,5	Cartaway surplus excavated material to a distance not exceeding 5km from the compound.	m3	31	25	775
8,6	25 cm thick basaltic or equivalent stone hardcore and blinded with crushed stone.	m2	36	27	972
	Concrete works				
	Reinforced concrete in c-25,360kg cement/m3 filled in to formworks and vibrated around rod reinforcement. steel reinforcement and formworks measured separately.				
8,7	In floor slab	m3	4	65	260
8,8	In roof slab	m3	5	100	500
	Steel works				
	Steel reinforcements according to drawing. Price includes cutting ,bending ,placing in position and tying wires.				
8,9	a) Dia.8mm deformed bar	Kg	71	7	511
8,10	b) Dia.12mm deformed bar	Kg	111	7	801
	Formworks				
	Provide cut and fix in position sawn zigba form works :				
8,11	a) Roof slab	m2	25	65	1625
	Walls				
8,12	50 cm thick in trachetic or equivalent stone wall bedded in cement mortar 1:3.	m3	55	290	15950
	Finishing				
8,13	Apply three coats of plastic in cement-mortar (1:3) mix up to	m2	110	37	4070
8,14	Provide and install steel manhole cover of 10mm thick and (60x60)cm size.	pcs	2	500	1000
8,15	Provide and install inlet and outlet pipes with all necessary fittings.	Ls	1	300	300
	TOTAL CARRIED TO SUMMARY				30724,56 =

Table 2.2 Bill of Quantity for Household Flush Latrine

SUMMARY

A. SUPERSTRUCTURE

1 EXCAVATION AND EARTHWORK 551,60

B. SUPERSTRUCTURE

1 BRICKWORKS 690,20

2 CARPENTARY AND JOINERY 440,00

3 METAL WORKS 400,00

4 PLASTERING 276,08

5 PAINTING 197,20

6 SANITARY INSTALLATION 1975,00

7 SEPTIC TANK 5764,28

TOTAL 10 294,36

Table 2.2 (1) Bill of Quantity for Household Flush Latrine

ITEM	DESCRIPTION	UNIT	QTY.	U.PRICE Nakfa	TOTAL P. Nakfa
A. SUBSTRUCTURE					
1. EXCAVATION & EARTHWORKS					
1.1	Clear off site to remove top soil to an average depth of 20cm.	m2	9,60	4	38
1,2	Excavate for trench foundation in ordinary soil to a depth not exceeding 75cm from the stripped ground level.	m3	9,60	25	240
1,3	Return fill around foundation with good, dry excavated material from site and well ram in layers every 25cm interval.	m3	6,40	22	141
1,4	Cartaway surplus excavated material to a distance not exceeding 5km from the compound.	m3	4,00	25	100
1,5	25cm thick basaltic or equivalent stone hardcore and blinded with crushed stone.	m2	1,20	27	32
TOTAL CARRIED TO SUMMARY					551,60
B. SUPERSTRUCTURE					
2. BRICK WORKS					
2,1	10cm thick hollow concrete wall bedded on compo-mortar 1:2:9 mix both sides left for plastering.	m2	9,86	70	690
TOTAL CARRIED TO SUMMARY					690,20
3. CARPENTARY AND JOINERY					
3,1	Eucalyptus post for roofing, as shown on the section of the drawing.	m	8,00	25	200
3,2	5x3cm zigba wood perlin, on which the C.I.S. is going to be fixed.	m	8,00	30	240
3,3	Supply and fix 0.3mm thick C.I.S roofing, to be fixed to the perlin price including laps, roof ridges and washers.	m2	1,80	80	144
TOTAL CARRIED TO SUMMARY					440,00

Table 2.2 (2) Bill of Quantity for Household Flush Latrine

ITEM	DESCRIPTION	UNIT	QTY.	U.PRICE Nakfa	TOTAL P. Nakfa
4. METAL WORKS					
4,1	Metal doors and windows constructed in accordance to detail drawing, including one coat of anti-rust and three coats of oil paint:-				
	Doors				
	a) Type D1 size: 60 x 170	No	1,00	400	400
					400,00
5. PLASTERING					
5,1	Apply three coats of plaster in compo-mortar (1:2:9) mix up to fine finish to all internal walls of the latrine units.	m2	9,86	28	276
					276,08
6. PAINTING					
6,1	Apply in three coats of oil paint to internal plastered wall surfaces of the latrine units.	m2	9,86	20	197
					197,20
TOTAL CARRIED TO SUMMARY					
7. SANITARY INSTALLATION					
7,1	Supply and install Galvanized steel water supply pipes for cold water distribution from supply line, elevated tanker to all sanitary fixtures according to where shown on the drawings. Complete with the necessary connecting pieces such as bends, unions, nipples, tee, elbow, etc. shall include all the necessary assistance to the installation works, such as chiselling of walls, slabs, floors, etc. and closing them with concrete to normal condition where required. The installation shall be tested at a pressure of 1bar at the expense of the contractor.				
	Dia. ND 15mm (1/2")	ml	4,00	25	100
7,2	Supply and install, on water supply lines, gate valves, made of bronze or brass parts complete with rubber gaskets, hand weels unions and other accessories.				
	Dia. ND 15mm	pcs	1,00	25	25

Table 2.2 (3) Bill of Quantity for Household Flush Latrine

ITEM	DESCRIPTION	UNIT	QTY.	U.PRICE Nakfa	TOTAL P. Nakfa
7,3	Supply and install soil waste and vent pipes in horizontal branches and vertical stacks made of UPVC pipes and fittings. Fittings should include bends, branches, tees, clearout reducers, etc. Unit price shall include all the necessary assistance work to the installation, such as chiselling of walls, slabs, floors, etc. and closing them with concrete. All pipes entering manhole shall be trapped. Dia. ND 100mm	ml	3,00	95	285
7,4	Supply and fix on terminals of ventilation pipes, vent caps (cows), with weathering PP states, sealing gaps b/n the girth of the vent pipe and hole in the roof material. Dia. ND 100mm	pcs	1,00	65	65
7,5	Supply and fix white vitreous Turkish type W.C. unit with trap and complete with fixing device.	pcs	1,00	700	700
7,6	Construct sanitary manholes on domestic sewer lines in 200mm HCB wall plastered from the inside with cement mortar (1:3) on a base of mass concrete slab 100mm thick with proper slope for smooth flow, with reinforced concrete cover. 600 x 600mm	pcs	1,00	800	800
					1975,00
8. SEPTIC TANK					
Excavation & earthworks					
8,1	Clear off site to remove top soil to an average depth of 20cm.	m2	5,33	4	21
8,2	Bulk excavation for under ground reservoir excavated in ordinary soil to a depth not exceeding 150cm from the stripped ground level.	m3	36,33	20	727
8,3	Return fill around reservoir with good, dry excavated material from site and well ram in layers every 30cm interval.	m3	26,00	22	572
8,5	Cartaway surplus excavated material to a distance not exceeding 5km from the compound.	m3	10,30	25	258
8,6	25 cm thick basaltic or equivalent stone hardcore and blinded with crushed stone.	m2	12,00	27	324

Table 2.2 (4) Bill of Quantity for Household Flush Latrine

ITEM	DESCRIPTION	UNIT	QTY.	U.PRICE Nakfa	TOTAL P. Nakfa
	Concrete works				
	Reinforced concrete in c-25,360kg cement/m ³ filled in to formworks and vibrated around rod reinforcem. steel reinforcement and formworks measured separately.				
8,7	In floor slab	m ³	1,30	65	85
8,8	In roof slab	m ³	1,70	100	170
	Steel works				
	Steel reinforcements according to drawing. Price includes cutting ,bending ,placing in position and tying wires.				
8,9	a) Dia.8mm deformed bar	Kg	23,70	7	171
8,10	b) Dia.12mm deformed bar	Kg	37,10	7	267
	Formworks				
	Provide cut and fix in position sawn zigba form works :				
8,11	a) Roof slab	m ²	2,70	65	176
	Walls				
8,12	50 cm thick in trachetic or equivalent stone wall bedded in cement mortar 1:3.	m ³	6,00	290	1740
	Finishing				
8,13	Apply three coats of plastic in cement-mortar (1:3) mix up to	m ²	12,30	37	455
8,14	Provide and install steel manhole cover of 10mm thick and (60x60)cm size.	pcs	1,00	500	500
8,15	Provide and install inlet and outlet pipes with all necessary fittings.	Ls	1,00	300	300
	TOTAL CARRIED TO SUMMARY				5764,28

Table 2.3 Bill of Quantity for Double PIT VIP Latrine

Material expenses for double pit VIP

Item No.	Description	Unit	Quantity	Total mount	
				Nfa	Nfa
1	Hollow block (20x20x10)	pos	210	1,5	315
2	Stone	m3	7	20	140
3	Cement	quintel	4	70	280
4	Sand	m3	3,5	40	140
5	Reinforcement bar dia. 10mm	kg	31	6	186
6	Galvanized sheet metal vent pipe w	pcs	2	25	50
7	Door made with GSM complete with wire mesh and lock	pcs	1	110	110
8	Corrigated iron sheet roof	pcs	1	100	100
9	Wooden post for roof support	pcs	1	70	70
				Total	1391

Labour expenses for double pit VIP

Item No.	Description	Total mount	
		Unit rate Nfa	Nfa
1	Pit cover slab	ls	60
2	Door	ls	40
3	Masonry work	ls	100
4	Digging pit-8m3	10/m3	80
Total labour expense			280

Total labour and material cost of Double pit VIP latrine = Nfa 1671/-

Table 2.4 Cost Estimation of Latrine

Item No.	Description	Qty	1998 price Nfa	Total price Nfa	Inflated price Nfa	Total price Nfa
1	School Latrine – PFL					
	- Year 2000 – 2005	3	74,725.56	224,177	83,961.64	251,885
	- Year 2005 – 2010	1	74,725.56	74,726	112,359.61	112,360
	- Year 2010 – 2015	1	74,725.56	74,726	150,362.51	150,363
2	Public latrine – CFL					
	- Year 2000 – 2005	3	74,725.56	224,176.68	83,961.64	251,885
	- Year 2005 – 2010	1	74,725.56	74,725.56	112,359.61	112,360
	- Year 2010 – 2015	1	74,725.56	74,725.56	150,362.51	150,363
3	Household latrine					
	- CFL – Year 2005	363	10,500.00	3,811,500	11,728.65	4,257,450
	- CFL – Year 2010	157	10,500.00	1,648,500	15,695.58	2,464,206
	- CFL – Year 2015	228	10,500.00	2,394,000	21,004.23	4,788,964
	- PFL – Year 2005	329	10,438.46	3,434,253	11,797.80	3,881,476
	- PFL – Year 2010	196	10,438.46	2,045,938	15,788.12	3,094,448
	- PFL – Year 2015	209	10,438.46	2,181,638	21,128.06	4,415,765
	- VIP – Year 2005	522	1,671.00	871,740	1,877.54	980,076
	- VIP – Year 2010	397	1,671.00	663,387	2,512.57	997,490
	- VIP – Year 2015	468	1,671.00	782,028	3,362.38	1,573,594

Table 2.5 Cost Estimation of Public Facility

Item No.	Description	Qty	1998 price Nfa	Total price Nfa	Inflated price Nfa	Total price Nfa
1	Refuse truck (compactor)					
	- Year 2000-2005	1	1,027,586	1,027,586	1,134,596	1,134,596
	- Year 2005-2010	1	1,027,586	1,027,586	1,545,109	1,545,109
	- Year 2010-2015	2	1,027,586	2,055,172	2,067,705	4,135,410
2	Vacuum truck (3,000 lit.)					
	- Year 2000-2005	-	924,828	-	1,039,137	-
	- Year 2005-2010	1	924,828	924,828	1,390,599	1,390,599
	- Year 2010-2015	1	924,828	924,828	1,860,936	1,860,936
3	Refuse collecting bins					
	- Year 2000-2005	100	500	50,000	562	56,200
	- Year 2005-2010	100	500	50,000	752	56,200
	- Year 2010-2015	100	500	50,000	1006	56,200
4	Refuse collecting container (8m ³)					
	- Year 2000-2005	-	59,086	-	66,392	2,221,200
	- Year 2005-2010	25	59,086	1,477,150	88,848	2,221,200
	- Year 2010-2015	25	59,086	1,477,150	118,899	-

APPENDIX G
FINANCIAL PLAN

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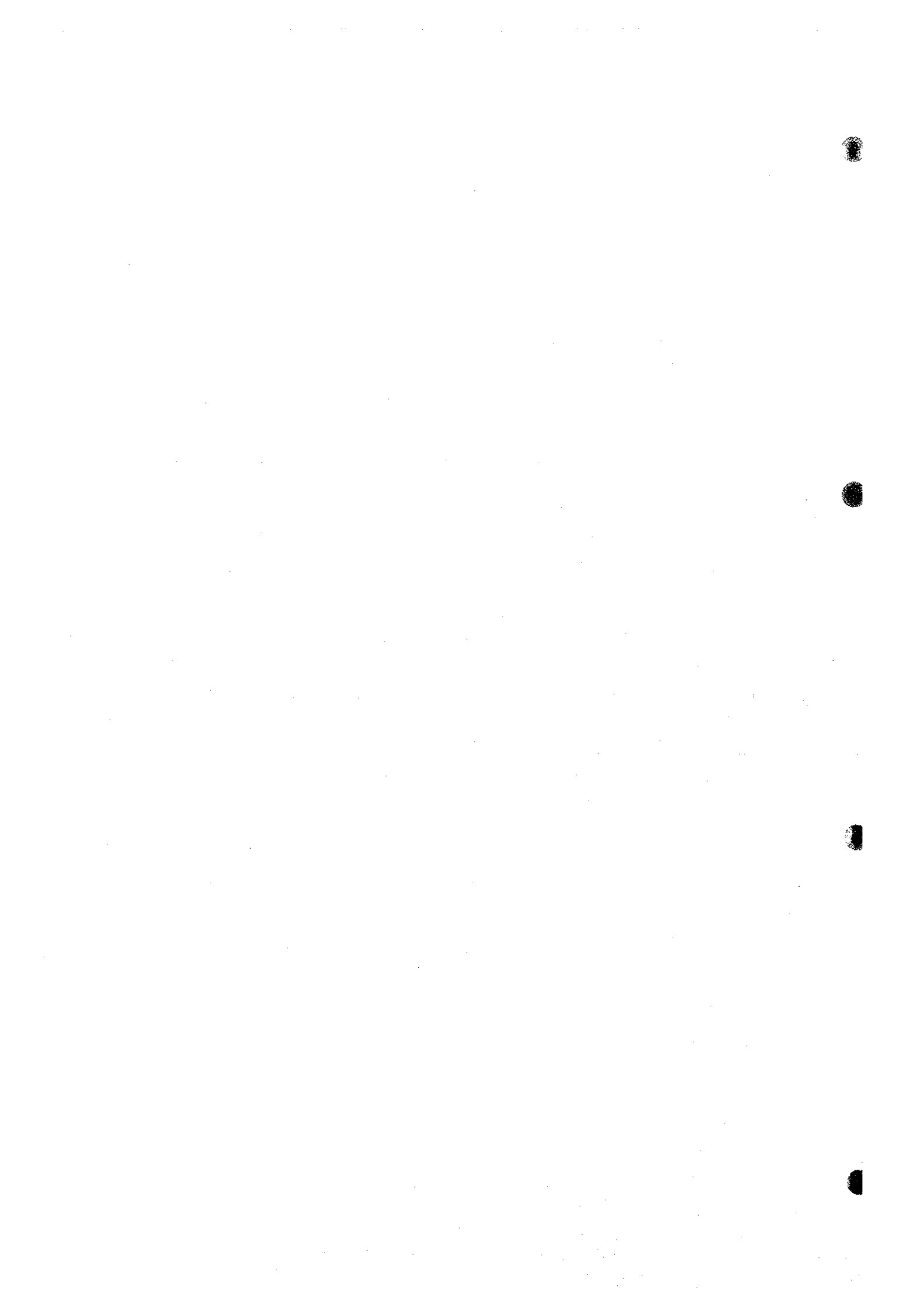


Table 1 Personnel Plan for WSA Segencity

Item	1997	2005	2010	2015
1. Total No. of Personnel				
1) Total production of water (cu. m/day)	41	287	431	654
2) Water production per worker (cu. m/day/worker)	6.8	20	25	30
3) Coefficient	1	1	1.2	1.2
4) No. of personnel	6	14	20	26
5) Additional personnel for sanitation	0	2	3	4
6) Final No. of personnel	6	16	23	30
2. Breakdown of Personnel by Position/Function				
1) Manager	1	1	1	1
2) Customer services	0	0	0	0
3) Internal audit	0	0	0	1
4) Administrative service				
(1) Head	0	1	1	1
(2) General administration section				
Secretaries/typists/clerks	0	0	0	0
Guards	0	2	2	2
Sweepers/janitors	0	0	0	0
Drivers	0	0	0	1
Sub-total	0	2	2	3
(3) Personnel section				
Recruitment/training/remuneration	0	0	0	0
(4) Storage section				
Store keepers	0	1	1	1
Purchase of materials/supplies	0	0	0	0
Sub-total	0	1	1	1
(5) Legal section	0	0	1	1
Total	0	4	5	6
5) Financial service				
(1) Head	0	1	1	1
(2) Budgeting section	0	0	0	1
(3) Accounting section				
Accountants	0	0	1	2
Cashiers/treasurers	0	1	1	1
Sub-total	0	1	2	3
(4) Financial management section				
Financial analysts	0	0	1	1
(5) Operation section				
Meter readers	0	0	0	0
Bill distributors/collectors	0	0	0	0
Water sellers	3	2(+8*)	2(+13*)	2(+23*)
Sub-total	3	0	0	0
Total	3	2	4	6
6) Technical service				
(1) Head	0	1	1	1
(2) Technical records section	0	0	0	0
(3) Operation and maintenance section				
Mechanics	0	0	1	1
Electricians	0	0	0	0
Motor operators	1	2	3	4
Plumbers	1	2	3	4
Sub-total	2	4	7	9
(4) Inspection section				
Water meter technicians	0	0	0	0
Leakage detectors	0	0	0	0
Water quality analysts	0	0	0	0
Sub-total	0	0	0	0
(5) Workshop	0	0	0	0
(6) Works section				
Contracting	0	0	0	0
Designing/drafting	0	0	0	0
Sub-total	0	0	0	0
Total	2	5	8	10
7) Sanitary service				
(1) Head	0	1	1	1
(2) Loan service section	0	1	1	1
(3) Maintenance section				
Technicians	0	0	1	1
Drivers	0	0	0	1
Sub-total	0	0	1	2
Total	0	2	3	4
Grand total	6	14	21	28

Note: 1) Personnel in 1997 include those on temporary/contract basis.

2) * = temporary

3) As need arises, section (3) in 6) technical service may take charge of functions of sections (4) and (5).

Table 2 (1) Financial Statements for Water Supply Facilities in Segensity

(Unit: Nfa thousand)

No.	1	2	3	4	5	6	7	8	9	10
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Income Statement										
Revenue	0	0	592	647	709	778	855	936	1026	1126
Operation and Maintenance	0	0	407	407	407	407	663	663	663	663
Depreciation	0	0	244	244	244	244	414	414	414	414
Payment of Interest	0	0	0	0	0	0	0	0	0	0
Expenditure	0	0	651	651	651	651	1077	1077	1077	1077
Profit before Tax	0	0	-59	-4	58	127	-222	-141	-52	49
Tax	0	0	0	0	0	0	0	0	0	0
Profit after Tax	0	0	-59	-4	58	127	-222	-141	-52	49
Funds Statement										
Profit after Tax	0	0	-59	-4	58	127	-222	-141	-52	49
Loans	0	0	0	0	0	0	0	0	0	0
Government Budget	1003	10227	0	0	614	6265	0	0	0	750
Depreciation	0	0	244	244	244	244	414	414	414	414
Sources	1003	10227	185	240	916	6637	193	273	363	1213
Capital Works	1003	10227	0	0	614	6265	0	0	0	750
Payment of Principal	0	0	0	0	0	0	0	0	0	0
Working Capital	0	0	185	240	302	372	193	273	363	463
Applications	1003	10227	185	240	916	6637	193	273	363	1213
Balance Sheet										
Liabilities	0	0	0	0	0	0	0	0	0	0
Capital	1003	11230	11170	11166	11838	18231	18009	17868	17816	18614
Liabilities and Capital	1003	11230	11170	11166	11838	18231	18009	17868	17816	18614
Current Assets	0	0	185	425	727	1099	1291	1564	1927	2390
Fixed Assets	1003	11230	10985	10741	11111	17132	16718	16303	15889	16224
Assets	1003	11230	11170	11166	11838	18231	18009	17868	17816	18614

Source: JICA

Table 2 (2) Financial Statements for Water Supply Facilities in Segency

(Unit: Nfa thousand)

No.	11	12	13	14	15	16	17	18	19	20
Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Income Statement										
Revenue	1238	1328	1451	1589	1742	1914	1888	1888	1888	1888
Operation and Maintenance	663	952	952	952	952	952	952	952	952	952
Depreciation	414	628	628	628	628	628	628	628	628	628
Payment of Interest	0	0	0	0	0	0	0	0	0	0
Expenditure	1077	1580	1580	1580	1580	1580	1580	1580	1580	1580
Profit before Tax	161	-252	-129	9	163	334	308	308	308	308
Tax	0	0	0	0	0	0	0	0	0	0
Profit after Tax	161	-252	-129	9	163	334	308	308	308	308
Funds Statement										
Profit after Tax	161	-252	-129	9	163	334	308	308	308	308
Loans	0	0	0	0	0	0	0	0	0	0
Government Budget	7648	0	0	0	0	0	0	0	0	0
Depreciation	414	628	628	628	628	628	628	628	628	628
Sources	8223	376	499	637	790	961	936	936	936	936
Capital Works	7648	0	0	0	0	0	421	0	0	0
Payment of Principal	0	0	0	0	0	0	0	0	0	0
Working Capital	575	376	499	637	790	961	514	936	936	936
Applications	8223	376	499	637	790	961	936	936	936	936
Balance Sheet										
Liabilities	0	0	0	0	0	0	0	0	0	0
Capital	26423	26171	26042	26051	26214	26548	26856	27164	27472	27780
Liabilities and Capital	26423	26171	26042	26051	26214	26548	26856	27164	27472	27780
Current Assets	2966	3341	3840	4477	5267	6229	6743	7679	8615	9550
Fixed Assets	23457	22830	22202	21574	20947	20319	20113	19485	18857	18230
Assets	26423	26171	26042	26051	26214	26548	26856	27164	27472	27780

Source: JICA

Table 2 (3) Financial Statements for Water Supply Facilities in Segency

(Unit: N/a thousand)

No.	21	22	23	24	25	26	27	28	29	30
Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Income Statement										
Revenue	1888	1888	1888	1888	1888	1888	1888	1888	1888	1888
Operation and Maintenance	952	952	952	952	952	952	952	952	952	952
Depreciation	628	628	628	628	628	628	628	628	628	628
Payment of Interest	0	0	0	0	0	0	0	0	0	0
Expenditure	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580
Profit before Tax	308	308	308	308	308	308	308	308	308	308
Tax	0	0	0	0	0	0	0	0	0	0
Profit after Tax	308	308	308	308	308	308	308	308	308	308
Funds Statement										
Profit after Tax	308	308	308	308	308	308	308	308	308	308
Loans	0	0	0	0	0	0	0	0	0	0
Government Budget	0	0	0	0	0	0	0	0	0	0
Depreciation	628	628	628	628	628	628	628	628	628	628
Sources	936	936	936	936	936	936	936	936	936	936
Capital Works	699	0	0	0	0	970	0	0	0	0
Payment of Principal	0	0	0	0	0	0	0	0	0	0
Working Capital	237	936	936	936	936	-34	936	936	936	936
Applications	936	936	936	936	936	936	936	936	936	936
Balance Sheet										
Liabilities	0	0	0	0	0	0	0	0	0	0
Capital	28088	28396	28704	29012	29320	29628	29937	30245	30553	30861
Liabilities and Capital	28088	28396	28704	29012	29320	29628	29937	30245	30553	30861
Current Assets	9787	10723	11659	12595	13530	13496	14432	15368	16303	17239
Fixed Assets	18301	17673	17045	16418	15790	16132	15504	14877	14249	13622
Assets	28088	28396	28704	29012	29320	29628	29937	30245	30553	30861

Source: JICA

Table 3 Cost Benefit Streams, Segenity (Economic Analysis)

CC=Capital Costs; OM=O/M Costs; CS=Costs; BF=Benefits
 CF=Cash Flow (=BF - CS)

(Unit: Nfa thousand)

NO.	YEAR	CC	OM	CS	BF	CF
1	2000	953	-58	895	0	-895
2	2001	9705	-58	9647	374	-9274
3	2002	0	349	349	543	195
4	2003	0	349	349	761	412
5	2004	589	349	938	1039	101
6	2005	5993	349	6342	1393	-4949
7	2006	0	605	605	1525	920
8	2007	0	605	605	1669	1064
9	2008	0	605	605	1826	1221
10	2009	718	605	1322	1997	675
11	2010	7304	605	7909	2183	-5726
12	2011	0	894	894	2397	1503
13	2012	0	894	894	2630	1736
14	2013	0	894	894	2885	1990
15	2014	0	894	894	3162	2268
16	2015	0	894	894	3465	2571
17	2016	419	894	1313	3465	2152
18	2017	0	894	894	3465	2571
19	2018	0	894	894	3465	2571
20	2019	0	894	894	3465	2571
21	2020	695	894	1589	3465	1876
22	2021	0	894	894	3465	2571
23	2022	0	894	894	3465	2571
24	2023	0	894	894	3465	2571
25	2024	0	894	894	3465	2571
26	2025	965	894	1859	3465	1606
27	2026	0	894	894	3465	2571
28	2027	0	894	894	3465	2571
29	2028	0	894	894	3465	2571
30	2029	0	894	894	3465	2571
31	2030	0	894	894	3465	2571
32	2031	419	894	1313	3465	2152

Table 4 (1) Financial Statements for Water Supply Facilities in Segency

(Unit: Nfa thousand)

No.	1	2	3	4	5	6	7	8	9	10
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Income Statement										
Revenue	0	0	592	647	709	778	727	727	727	727
Operation and Maintenance	0	0	407	407	407	407	407	407	407	407
Depreciation	0	0	244	244	244	244	244	244	244	244
Payment of Interest	0	0	0	0	0	0	0	0	0	0
Expenditure	0	0	651	651	651	651	651	651	651	651
Profit before Tax	0	0	-59	-4	58	127	76	76	76	76
Tax	0	0	0	0	0	0	0	0	0	0
Profit after Tax	0	0	-59	-4	58	127	76	76	76	76
Funds Statement										
Profit after Tax	0	0	-59	-4	58	127	76	76	76	76
Loans	0	0	0	0	0	0	0	0	0	0
Government Budget	1003	10227	0	0	0	0	0	0	0	0
Depreciation	0	0	244	244	244	244	244	244	244	244
Sources	1003	10227	185	240	302	372	320	320	320	320
Capital Works	1003	10227	0	0	0	0	0	0	0	0
Payment of Principal	0	0	0	0	0	0	0	0	0	0
Working Capital	0	0	185	240	302	372	320	320	320	320
Applications	1003	10227	185	240	302	372	320	320	320	320
Balance Sheet										
Liabilities	0	0	0	0	0	0	0	0	0	0
Capital	1003	11230	11170	11166	11224	11351	11428	11504	11580	11656
Liabilities and Capital	1003	11230	11170	11166	11224	11351	11428	11504	11580	11656
Current Assets	0	0	185	425	727	1099	1419	1739	2060	2380
Fixed Assets	1003	11230	10985	10741	10497	10253	10008	9764	9520	9276
Assets	1003	11230	11170	11166	11224	11351	11428	11504	11580	11656

Source: JICA

Table 4 (2) Financial Statements for Water Supply Facilities in Segency

(Unit: Nfa thousand)

No.	11	12	13	14	15	16	17	18	19	20
Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Income Statement										
Revenue	727	727	727	727	727	727	727	727	727	727
Operation and Maintenance	407	407	407	407	407	407	407	407	407	407
Depreciation	244	244	244	244	244	244	244	244	244	244
Payment of Interest	0	0	0	0	0	0	0	0	0	0
Expenditure	651	651	651	651	651	651	651	651	651	651
Profit before Tax	76	76	76	76	76	76	76	76	76	76
Tax	0	0	0	0	0	0	0	0	0	0
Profit after Tax	76	76	76	76	76	76	76	76	76	76
Funds Statement										
Profit after Tax	76	76	76	76	76	76	76	76	76	76
Loans	0	0	0	0	0	0	0	0	0	0
Government Budget	0	0	0	0	0	0	0	0	0	0
Depreciation	244	244	244	244	244	244	244	244	244	244
Sources	320	320	320	320	320	320	320	320	320	320
Capital Works	0	0	0	0	0	0	421	0	0	0
Payment of Principal	0	0	0	0	0	0	0	0	0	0
Working Capital	320	320	320	320	320	320	-101	320	320	320
Applications	320	320	320	320	320	320	320	320	320	320
Balance Sheet										
Liabilities	0	0	0	0	0	0	0	0	0	0
Capital	11732	11808	11884	11960	12036	12112	12189	12265	12341	12417
Liabilities and Capital	11732	11808	11884	11960	12036	12112	12189	12265	12341	12417
Current Assets	2701	3021	3341	3662	3982	4302	4201	4522	4842	5162
Fixed Assets	9031	8787	8543	8299	8054	7810	7987	7743	7499	7254
Assets	11732	11808	11884	11960	12036	12112	12189	12265	12341	12417

Source: JICA

Table 5 Cost Benefit Streams, Segeneity (Economic Analysis)

CC=Capital Costs; OM=O/M Costs; CS=Costs; BF=Benefits
 CF=Cash Flow (=BF - CS)

(Unit: Nfa thousand)

NO.	YEAR	CC	OM	CS	BF	CF
1	2000	953	-58	895	0	-895
2	2001	9705	-58	9647	448	-9199
3	2002	0	349	349	652	303
4	2003	0	349	349	913	564
5	2004	0	349	349	1246	898
6	2005	0	349	349	1671	1323
7	2006	0	349	349	1671	1323
8	2007	0	349	349	1671	1323
9	2008	0	349	349	1671	1323
10	2009	0	349	349	1671	1323
11	2010	0	349	349	1671	1323
12	2011	0	349	349	1671	1323
13	2012	0	349	349	1671	1323
14	2013	0	349	349	1671	1323
15	2014	0	349	349	1671	1323
16	2015	0	349	349	1671	1323
17	2016	419	349	768	1671	904
18	2017	0	349	349	1671	1323
19	2018	0	349	349	1671	1323
20	2019	0	349	349	1671	1323
21	2020	0	349	349	1671	1323
22	2021	0	349	349	1671	1323

APPENDIX H
ENVIRONMENT

List of Tables

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Table H-2 Scooping Check List(Segeneity).....	H-2

Table H-1 Screening Check List (Segeneity)

Environment Item		Contents	Evaluation		Remarks	
Social Environment						
1	Resettlement	Exchange of land onwership and/or residential rights due to occupation of land	Yes	<input type="radio"/> No	Not available	Small structure
2	Economic activity	Loss of productive land, change in economic structure	Yes	<input type="radio"/> No	Not available	Small structure
3	Transportation, Living environment	Traffic congestion, accident and subsequent effect on school, hospital etc.	Yes	<input type="radio"/> No	Not available	Small structure
4	Regional segregation	Due to transportation hinderance	Yes	<input type="radio"/> No	Not available	Small structure
5	Historical ruins, cultural heritage	Damage to cultural heritage and its loss	Yes	<input type="radio"/> No	Not available	Does not exist near the town
6	Water right, right of common	Effect on right of fishery, irrigation, water right	Yes	<input type="radio"/> No	Not available	Use of GW of shallow layer
7	Sanitation	Deteriorated sanitation due to garbage and harmful insect outbreak	Yes	<input type="radio"/> No	Not available	Not relevant
8	Industrial and Solid waste	Construction waste, waste dumps, mud, solid waste	Yes	<input type="radio"/> No	Not available	No big construction
9	Disaster (Risk)	Increased hazardous land subsidence, landslides, accidents	Yes	<input type="radio"/> No	Not available	Small construction in flat area
Natural Environment						
10	Topography, geology	Change in topography, geological features by digging, soil piling	Yes	<input type="radio"/> No	Not available	No big construction
11	Soil erosion	Top soil erosion by rain after creating new land reclamation, cutting down trees	Yes	<input type="radio"/> No	Not available	Not be a causative factor
12	Groundwater	Depletion of GW level and pollution due to excessive pumping	<input checked="" type="radio"/> Yes	<input type="radio"/> No	Not available	There is a possibility of depletion
13	Lake, river regime	Change in flow amount and quality due to reclamation and drainage	Yes	<input type="radio"/> No	Not available	Not in the vicinity
14	Beach, coast	Shoreline erosion due to reclamation or change in tidal current	Yes	<input type="radio"/> No	Not available	Activities in the inland
15	Fauna and Flora	Disturbance in breeding, extinction due to change in living condition	Yes	<input type="radio"/> No	Not available	No report of Red book species
16	Meteorology	Change in temperature, rainfall, wind due to large scale construction or building	Yes	<input type="radio"/> No	Not available	Not relevant
17	Landscape	Destruction of harmony due to changed topography or buildings	Yes	<input type="radio"/> No	Not available	No big construction
Pollution						
18	Air pollution	Exhaust, poisonous gas from automobile, factory	Yes	<input type="radio"/> No	Not available	Not relevant
19	Water pollution	Flow of muddy water, oil from boring activities	Yes	<input type="radio"/> No	Not available	Boring dia is small and low depth
20	Soil contamination	Pollution due to flow of poisonous meterial and drainage	Yes	<input type="radio"/> No	Not available	Not relevant
21	Noise, vibration	Due to drilling and Water lifting	Yes	<input type="radio"/> No	Not available	No house in vicinity
22	Landsubsidence	Lowering of WL due to over extraction of water	Yes	<input type="radio"/> No	Not available	W.R.Z./Quarternary aquifer are thin
23	Offensive odor	Exhaust, Odor substance	Yes	<input type="radio"/> No	Not available	Not relevant
Total Evaluation:		Is EIA necessary for this project ?	Necessary <input type="radio"/> Unnecessary <input checked="" type="radio"/>		Influencial items are minimum	

Note: W.R.Z. = Weathered Rock Zone

Table H-2 Scooping Check List (Segeneity)

Environment Item		Evaluation	Remarks
Social Environment			
1	Resettlement	D	Small structure
2	Economic activity	D	Small structure
3	Transpotation, Living environment	D	Small structure
4	Regional segregation	D	Small structure
5	Historical ruins, Cultural heritage	D	Small structure
6	Water right, Right of common	D	GW development(no complaint so far)
7	Sanitation	D	The Project will improve the condition
8	Solid waste	D	No large scale construction
9	Disaster (Risk)	D	Small scale of construction in flat area
Natural Environment			
10	Topograpy, Geology	D	No large scale construction
11	Soil erosion	D	Not relevant
12	Groundwater	B	There is a possibility of depletion
13	Lake, River regime	D	Not relevant(GW development)
14	Beach, Coast	D	Not relevant(GW development in inland)
15	Fauna, Flora	D	No large scale construction activities
16	Meteorology	D	Not relevant
17	Landscape	D	No large scale construction activities
Pollution			
18	Air pollution	D	Not relevant
19	Water pollution	D	Not expected due to small drilling activities
20	Soil contamination	D	Not relevant
21	Noise, Vibration	D	Negligible(no houses close to the drilling site)
22	Land subsidence	D	Not expected
23	Offensive odor	D	Not relevant

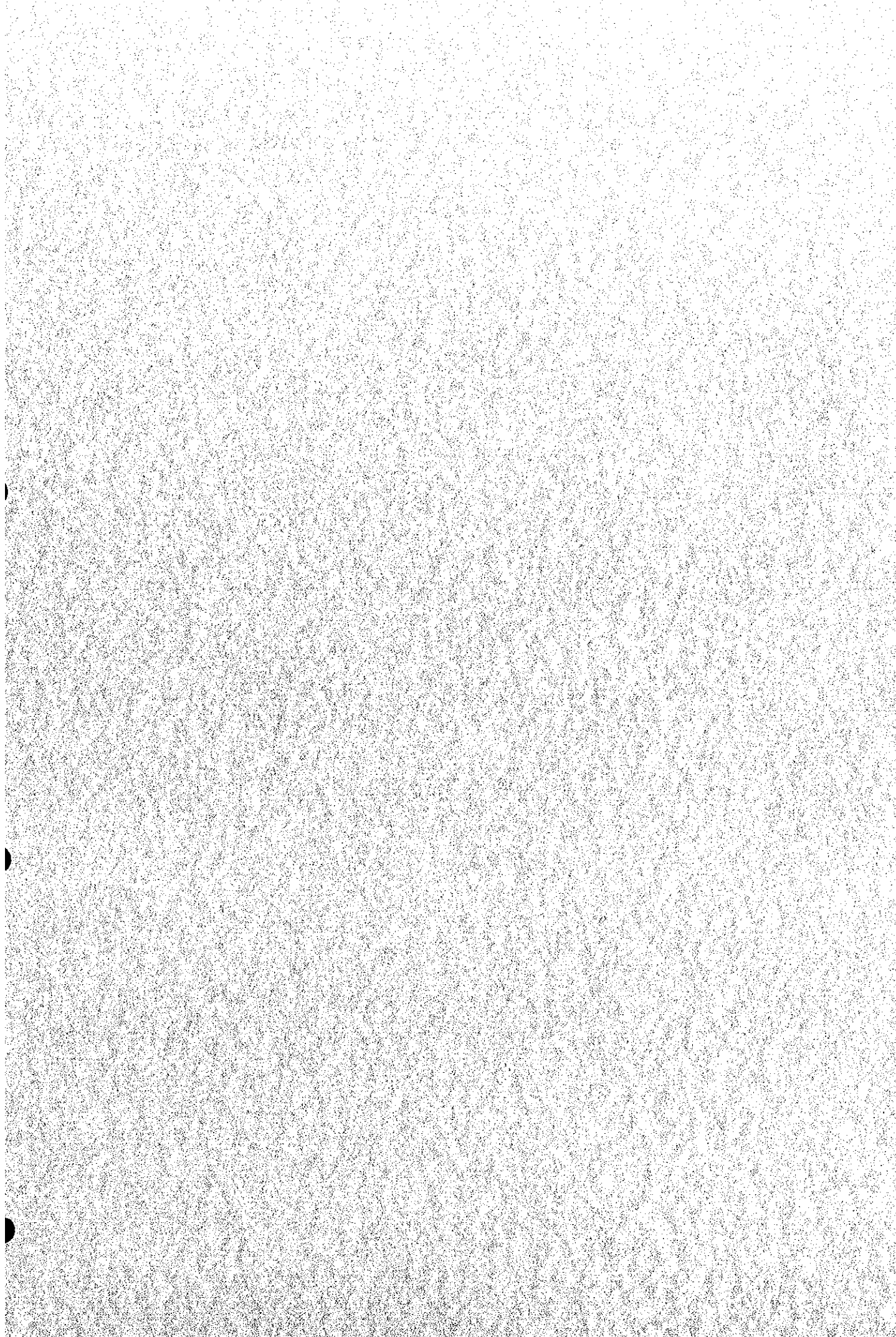
Note: Evaluation Level

A: Much impact

B: Some impact

C: Not known (Further investigation is necessary)

D: No impact



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