No.3 Antarut

Information on Existing Water Sources (Aragatsotn)

Study for Improvement of Rural Water Supply and Sewage Systems in RA

No.3 Community Antarut
District Ashtarak
Marz Aragatsotn

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Water Main	40	21	45.0	44	15	53.1	1,792	2.0	3.0	2.0
2	Noramberd spring	40	22	46.1	44	16	0.2	1,974	0.5	2.0	1.0
3											
4											
5											
6											
7											
8											
9											
10											

Notes:

Latitude, Longitude, Atitude:	*Measured at site*
Yield (Min, Max):	*Interviewed to the Community*
Yield (at site):	*Measured / estimated at site in summer of 2007*

Users Acceptnce for water quality	Acceptable
Notes	Antarut community takes 1l/sec from Noramberd spring. Also another water user is taken.
Alternative sources if any	No alternative water sources are available

No.3 Community Antarut
District Ashtarak
Marz Aragatsotn
Sampling date 31/Aug/2007

		Parameters analysed	Units	No.1Pir aghbyur	No.2			Guidelines	
								WHO	Armenia
2	*a*	pH		7.6	6.7			6.5-8	6.0 - 9.0
1	*b*	Temperature	Deg.C	11.2	14.2				
	c	TDS	Mg/L	42	28			1000	1000
1		Al:Aluminum	Mg/L	0.02	0.02			0.10	0.50
2		B:Boron	Mg/L	n.d	n.d			0.70	0.50
3		Cl:Chloride	Mg/L	4	5			250	350
4		Cr:Chrome	Mg/L	<0.01	n.d			0.05	0.05
5		Cu:Copper	Mg/L	n.d	n.d			2	1
6		F:Fluoride	Mg/L	0.10	0.16			1.50	
7		Hardness	Mg/L	85	80			500	700
8		Fe:Iron	Mg/L	0.02	n.d			0.30	0.30
9		Mn:Manganese	Mg/L	n.d	n.d			0.40	0.10
10		Mo:Molibdenum	Mg/L	0.020	<0.02			0.070	0.250
11		Ni:Nickel	Mg/L	n.d	n.d			0.020	0.100
12		Nitrate(NO3+)	Mg/L	1.3	1.3			50.0	45.0
13		SO4:Sulfate	Mg/L	3.0	3.0			250.0	500.0
14		Zn:Zink	Mg/L	n.d	n.d			3.0	5.0
15		As:Arsenic	Mg/L	n.d	n.d			0.0	0.1
16		Ba:Barium	Mg/L	<0.01	<0.01			0.70	0.10
17		Be:Berillium	Mg/L	n.d	n.d			NA	0.00020
18		Cd:Cadmium	Mg/L	0.0005	0.0005			0.0030	0.0010
19		Pb:Lead	Mg/L	0.001	<0.001			0.010	0.030
20		Hg:Mercury	Mg/L	n.d	n.d			0.00100	0.00050
21		Se:Selenium	Mg/L	n.d	n.d			0.010	0.010
22		Sr:Strontium	Mg/L	<0.7	<0.7			NA	7.0
23		CN:Cyanide	Mg/L	n.d	n.d			0.070	0.035
24		Coli form bacteria	bacteria per 100 ml					-	0
25		Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
26		Total bacteria	bacteria per 1 ml					-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.3 Community Antarut
District Ashtarak
Marz Aragatsotn

No.	Month	Date	Total amount of bacteria	Total amount of coliform bacteria	Coliform bacteria tolerant to heat
			nos/1mL	MPN/100mL	nos/100 mL
			Less than 50nos/1mL	Not Identified	Not Identified
	Data N/A				

No. 3 **Marz** Aragatsotn **Community** Antarut

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Difficult	Difficult	
2	Intake	Possible	Difficult	
3	Transmission pipeline	Difficult	Difficult	Pipeline is mostly far from the road
4	Reservoir	Fair	Possible	

2. INTAKE STRUCTURE

No.	Water main	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Water main	40°21'45.0″	44°15'53.1″	1,792	1996	Steel	2.0	Yes
2	Spring	40°22'46.1″	44°16'00.2″	1,974	2000	reinforced concrete	1.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	200	80	Steel	2.0	1986	Little	Yes
2	800	150	Ductile Iron	1.0	1991	Little	Yes
	2,000	100	Steel			Little	Yes
	1,300	80	Steel			Little	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°21'29.6″	44°15'45.1″	1,726	Steel	Circle	h=6m,d=1m	4.5	Yes
2	40°21'28.2″	44°15'43.1″	1,717	reinforced concrete	Circle	h=6m,d=2.5m	60.0	Yes

5. CHLORINATION EQUIPMENT

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	No			

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	770	100	Steel	1985	Medium	Yes
2	570	80	Steel		Medium	Yes
3	560	50	Steel		Medium	Yes

7. PUMP STATION

Existence (Y/N)	Power source	Type	Capacity (l/s)	Pump head (m)	Tank cap. (m3)	House size (m)	Rehabilitation Necessity (Y/N)
No							

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
No				0	

9. DRAINAGE SYSTEM

Existence (Y/N)	Rehabilitation Necessity (Y/N)	Remarks
No	Yes	

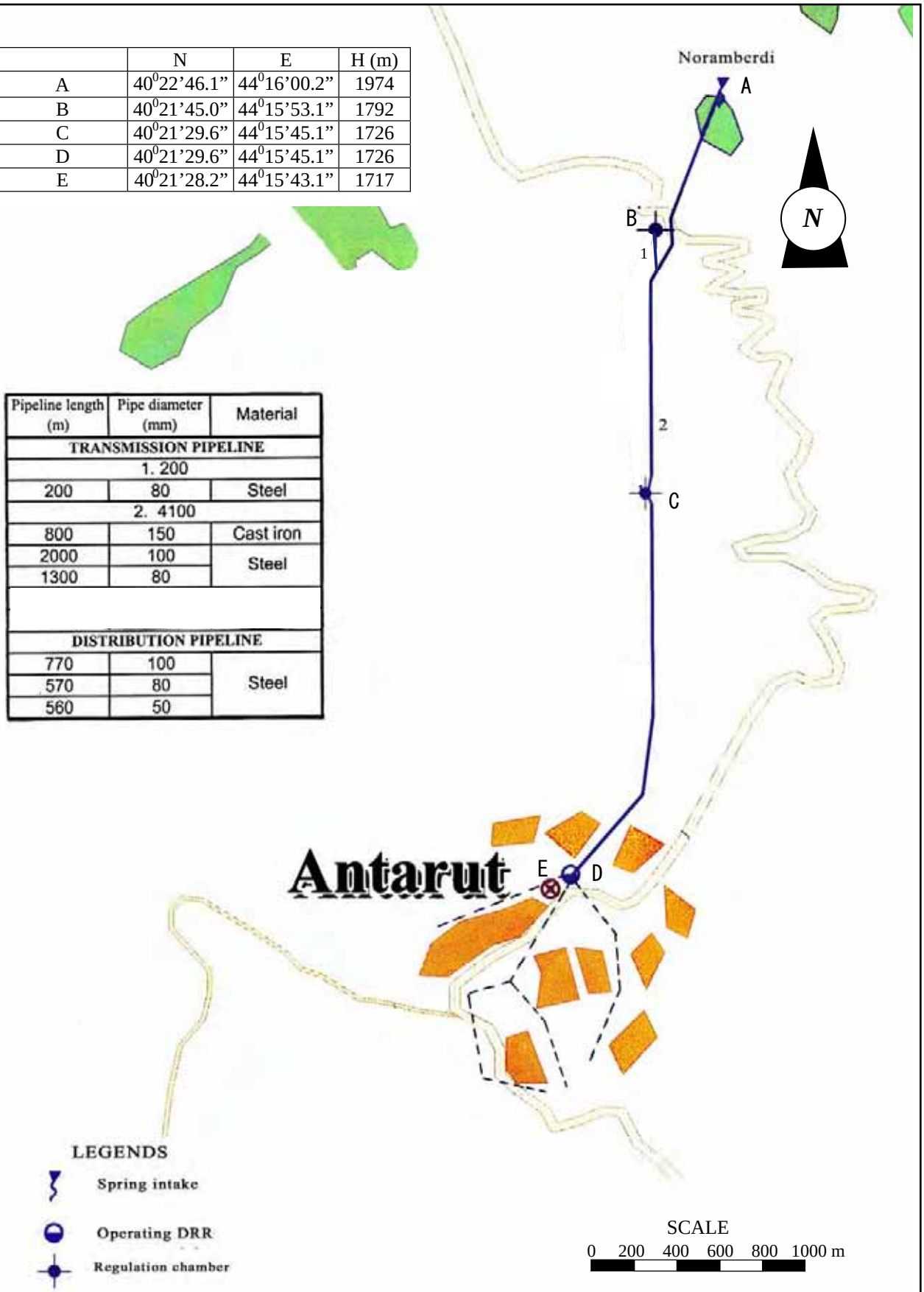
Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Aragatsotn**
Number and Name of Community	**No.3 Antarut**
District	**Ashtarak**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	272
A2	Actual population in 2007	143
A3	Number of households	127
A4.1	Elderly people	15
A4.2	Population in labor force (age from 16 to 62)	75
A4.3	Children	53
A5.1	Pensioners	43
A5.2	Unemployed	0
A5.3	Receiving benefits	15
A6	Average monthly income of household (AMD)	3,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	215
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	600
	Annual Budget of the community 2005, in thousand AMD	700
	Annual Budget of the community 2006, in thousand AMD	1,150
	Annual Budget of the community 2007, in thousand AMD	365
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	100
	Amount spent in drinking water sector 2005, in thousand AMD	50
	Amount spent in drinking water sector 2006, in thousand AMD	200
	Amount spent in drinking water sector 2007, in thousand AMD	50
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned.
C: Socio-Economic Survey		
C1	Major industries of the community:	dairy, meat, fruit
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1-Yes, 2-No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	is not planned
D5	Present condition of the water supply volume of Domestic use	insufficient
D6	Present condition of the water supply volume of Irrigation water	insufficient
D7	Number of house connection to drinking water system	127
D8	How many house connection household set the water meter	0
D9	Number of public taps	0
D10.1	How is the regime of water supply in your community in the dry season?	24 hrs
D10.2	How is the regime of water supply in your community in the wet season?	24 hrs
D11	What time of day water is given?	
D12	Are you pleased with duration of domestic water supply?	mainly pleased
D13	Are hours of water supply convenient?	
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	200
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	500
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flate rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	spring
D20	Are you satisfied with irrigation water supply volume?	is not sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	nobody
E2	Position	-
E3	Telephone	-
E4	Quantity and present condition of the water supply facilities: spring/ intake	10 deteriorated
E5	Quantity and present condition of the water supply facilities:	1 partially repaired
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	absent
E7	Quantity and present condition of the water supply facilities: net/distribution pipes	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	absent
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	residents
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	specialist in the community with fee
E14	How you prepare O&M costs?	donation from residents
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	50,000
	Others(AMD)	0
	Total (AMD)	50,000
E16	Do the residents participate in the O&M works?	manpower, earthwork
E17	What kind of OM method is preferable to you?	resident participation
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	yes
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	yes
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

	N	E	H (m)
A	$40^0$22'46.1"	$44^0$16'00.2"	1974
B	$40^0$21'45.0"	$44^0$15'53.1"	1792
C	$40^0$21'29.6"	$44^0$15'45.1"	1726
D	$40^0$21'29.6"	$44^0$15'45.1"	1726
E	$40^0$21'28.2"	$44^0$15'43.1"	1717

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
1. 200		
200	80	Steel
2. 4100		
800	150	Cast iron
2000	100	Steel
1300	80	
DISTRIBUTION PIPELINE		
770	100	Steel
570	80	
560	50	



LEGENDS

- Spring intake
- Operating DRR
- Regulation chamber
- Not operating DRR
- Transmission pipeline
- Distribution pipeline

SCALE

0 200 400 600 800 1000 m

Aragatsotn Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
03	Antarut	JICA STUDY TEAM 2007

Marz : **Aragatsotn** No.3
Name : **Antanut**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	143	persons	14.3	
	2 Factory	-	nos	0.0	
	3 School (pupils)	215	pupils	2.2	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	7 Livestocks (87lit/household)	127	household	11	
	Sub-total			27.5	
	Unaccouted for water (20%)			5.5	
1	Average Daily Water Demand			33.0	m3/day
2	Maximum Daily Water Demand			39.6	m3/day
3	Maximum Hourly Water Demand			9.7	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	1	1.0	lit/sec		86.4	m3/day
	b Existing pipeline	1	2.0	lit/sec		172.8	m3/day
`	Total					259.2	m3/day
	2 Required reservoir volume					116	m3

C WATER SUPPLY FACILITIES REHABILITATION PLAN

No	Item	Quantity	Unit
	1 Intake		
	1m3	2	nos
	2m3		nos
	3m3		nos
	4m3		nos
	2 Transmission pipe		
	50mm diameter		m
	75mm diameter	1,400	m
	90mm diameter	1,600	m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
	3 Reservoir		
	150m3 capacity	1	nos
	4 Distribution pipe		
	50mm diameter	600	m
	75mm diameter		m
	90mm diameter	600	m
	110mm diameter	800	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
	5 House connection	-	nos
	6 Water meter installation	127	nos
	7 Public tap	2	nos
	8 Chlorination	1	nos
	9 Pumps	-	nos

Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Aragatsotn	
No. 03	Antarut	JICA STUDY TEAM

Marz : **Aragatsotn**
No. : **3**
Name : **Antanut**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	2	nos	367,700	735,400
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					735,400
2	Transmission Pipe					
		50mm		m	5,520	
		75mm	1,400	m	7,160	10,024,000
		90mm	1,600	m	8,040	12,864,000
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					22,888,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3	1	nos	18,804,500	18,804,500
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					18,804,500
4	Distribution Pipe					
		50mm	600	m	5,520	3,312,000
		75mm		m	7,160	
		90mm	600	m	8,040	4,824,000
		110mm	800	m	9,680	7,744,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					15,880,000
5	House Connection			nos	74,000	
6	Water Meter Installation		127	nos	80,000	10,160,000
7	Public Tap		2	nos	90,000	180,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	800	m	3,600	2,880,000
	Total				AMD	72,027,900
					Equivalent to USD	235,755
					Equivalent to JPY	24,872,164
					AMD	USD
	Investment Cost per household		127	HH	567,149	1,856
	Investment Cost per person		143	persons	503,692	1,649

ARAGATSOTN MARZ
Talin District
No 3 Antarut

PROJECTED INCOME STATEMENT **Unit: million AMD**

Description	Unit	Total	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A Water Sales Revenue																																										
Consumption water volume	1000m3/yr		10.0																																							
Unit rate	AMD/m3				40.00	40.00	40.00	41.32	70.00	72.31	74.70	77.16	115.65	119.47	123.41	127.48	131.69	136.03	140.52	145.16	149.95	154.90	160.01	165.29	170.75	176.38	182.20	188.21	194.42	200.84	207.47	214.31	221.39	228.69	236.24	244.04	252.09	260.41	269.00	277.88	287.05	296.52
Sub-total		56.03	0.00	0.00	0.16	0.32	0.36	0.37	0.63	0.65	0.67	0.70	1.04	1.08	1.11	1.15	1.19	1.23	1.27	1.31	1.35	1.40	1.45	1.49	1.54	1.59	1.65	1.70	1.76	1.81	1.87	1.94	2.00	2.07	2.13	2.20	2.28	2.35	2.43	2.51	2.59	2.68
B Operating Costs																																									
1. Staff salary																																									
Inspectors	person				1																																				
Pump operators	person				0																																				
Base Salary	AMD/m/p				20,000	20,660	21,342	22,046	22,774	23,525	24,301	25,103	25,932	26,788	27,672	28,585	29,528	30,502	31,509	32,549	33,623	34,732	35,879	37,063	38,286	39,549	40,854	42,202	43,595	45,034	46,520	48,055	49,641	51,279	52,971	54,719	56,525	58,390	60,317	62,308	64,364	66,488
Sub-total		17.70			0.24	0.25	0.26	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.37	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.51	0.52	0.54	0.56	0.58	0.60	0.62	0.64	0.66	0.68	0.70	0.72	0.75	0.77	0.80
2. Chlorine																																									
Pouring volume	kg/yr				61																																				
Unit rate	AMD/kg				600	620	640	661	683	706	729	753	778	804	830	858	886	915	945	976	1009	1042	1076	1112	1149	1186	1226	1266	1308	1351	1396	1442	1489	1538	1589	1642	1696	1752	1810	1869	1931	1995
Sub-total		2.67			0.02	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.11	0.12	0.12
3. Electricity (for pump)		0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. Maintenance cost		16.07			0.10	0.20	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.29	0.30	0.31	0.32	0.34	0.35	0.36	0.37	0.38	0.39	0.41	0.42	0.44	0.45	0.46	0.48	0.50	0.51	0.53	0.55	0.56	0.58	0.60	0.62	0.64	0.66	0.69	0.71	0.73
Pump repair					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe repair					0.1	0.2	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.29	0.30	0.31	0.32	0.34	0.35	0.36	0.37	0.38	0.39	0.41	0.42	0.44	0.45	0.46	0.48	0.50	0.51	0.53	0.55	0.56	0.58	0.60	0.62	0.64	0.66	0.69	0.71	0.73
5. Pump replacement		0.00																0.00															0.00									
Sub-total		36.44	0.00	0.00	0.36	0.49	0.53	0.54	0.56	0.58	0.60	0.63	0.65	0.66	0.68	0.70	0.72	0.77	0.79	0.81	0.83	0.86	0.89	0.92	0.95	0.98	1.01	1.05	1.08	1.12	1.16	1.20	1.24	1.27	1.32	1.36	1.40	1.45	1.49	1.55	1.60	1.65
C Gross Income (A-B)		19.59	0.00	0.00	-0.20	-0.17	-0.17	-0.17	0.07	0.07	0.07	0.07	0.39	0.42	0.43	0.45	0.47	0.46	0.48	0.50	0.52	0.54	0.56	0.57	0.59	0.61	0.64	0.65	0.68	0.69	0.71	0.74	0.76	0.80	0.81	0.84	0.88	0.90	0.94	0.96	0.99	1.03
D Depreciation cost		68.60						1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96
E Interest paid		22.48	0.02	0.04	0.43	0.83	0.94	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.90	0.87	0.84	0.81	0.78	0.75	0.73	0.70	0.67	0.64	0.61	0.57	0.54	0.51	0.48	0.45	0.42	0.38	0.35	0.32	0.28	0.25	0.21	0.18	0.14	0.11	0.07	0.04
F Net Income		-71.49	-0.02	-0.04	-0.63	-1.00	-1.11	-3.08	-2.84	-2.84	-2.84	-2.84	-2.52	-2.46	-2.43	-2.38	-2.33	-2.31	-2.26	-2.21	-2.17	-2.12	-2.07	-2.03	-1.98	-1.92	-1.86	-1.82	-1.76	-1.72	-1.67	-1.60	-1.55	-1.48	-1.43	-1.37	-1.29	-1.24	-1.16	-1.11	-1.04	-0.97
G Tax and duties		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H Net Income after deduction of TAX		-71.49	-0.02	-0.04	-0.63	-1.00	-1.11	-3.08	-2.84	-2.84	-2.84	-2.84	-2.52	-2.46	-2.43	-2.38	-2.33	-2.31	-2.26	-2.21	-2.17	-2.12	-2.07	-2.03	-1.98	-1.92	-1.86	-1.82	-1.76	-1.72	-1.67	-1.60	-1.55	-1.48	-1.43	-1.37	-1.29	-1.24	-1.16	-1.11	-1.04	-0.97
OM Cost Recovery Ratio (A/B)		154%	0%	0%	45%	66%	68%	69%	113%	112%	112%	111%	160%	164%	163%	164%	165%	160%	161%	162%	163%	163%	163%	162%	162%	162%	163%	162%	163%	162%	161%	162%	161%	163%	161%	162%	163%	162%	163%	162%	162%	162%

PROJECTED CASH FLOW STATEMENT **Unit: million AMD**

Description	Total	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
SOURCES OF FUNDS																																									
A Internal Cash Generation																																									
1. Net Income	-71.49	-0.02	-0.04	-0.63	-1.00	-1.11	-3.08	-2.84	-2.84	-2.84	-2.84	-2.52	-2.46	-2.43	-2.38	-2.33	-2.31	-2.26	-2.21	-2.17	-2.12	-2.07	-2.03	-1.98	-1.92	-1.86	-1.82	-1.76	-1.72	-1.67	-1.60	-1.55	-1.48	-1.43	-1.37	-1.29	-1.24	-1.16	-1.11	-1.04	-0.97
2. Depreciation cost	68.60	0.00	0.00	0.00	0.00	0.00	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96
3. Interest Paid	22.48	0.02	0.04	0.43	0.83	0.94	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.90	0.87	0.84	0.81	0.78	0.75	0.73	0.70	0.67	0.64	0.61	0.57	0.54	0.51	0.48	0.45	0.42	0.38	0.35	0.32	0.28	0.25	0.21	0.18	0.14	0.11	0.07	0.04
Sub-total	19.59	0.00	0.00	-0.20	-0.17	-0.17	-0.17	0.07	0.07	0.07	0.07	0.39	0.42	0.43	0.45	0.47	0.46	0.48	0.50	0.52	0.54	0.56	0.57	0.59	0.61	0.64	0.65	0.68	0.69	0.71	0.74	0.76	0.80	0.81	0.84	0.88	0.90	0.94	0.96	0.99	1.03
B Finances																																									
1. Project Loan	95.21	2.36	1.67	38.91	39.99	11.64	0.36	0.28																																	
2. Local fund	32.49	0.79	0.56	13.17	13.72	4.04	0.12	0.09																																	
Sub-total	127.70	3.15	2.23	52.08	53.71	15.68	0.48	0.37																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.70	0.00	0.00	0.20	0.17	0.17	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Subsidy for debt services	97.40	0.02	0.04	0.43	0.83	0.94	0.95	0.88	0.88	0.88	0.88	3.30	3.26	3.26	3.24	3.22	3.23	3.21	3.18	3.17	3.15	3.13	3.12	3.10	3.08	3.05	3.04	3.01	3.00	2.98	2.95	2.93	2.89	2.88	2.85	2.81	2.79	2.75	2.73	2.70	2.66
Sub-total	98.10	0.02	0.04	0.63	1.00	1.11	1.12	0.88	0.88	0.88	0.88	3.30	3.26	3.26	3.24	3.22	3.23	3.21	3.18	3.17	3.15	3.13	3.12	3.10	3.08	3.05	3.04	3.01	3.00	2.98	2.95	2.93	2.89	2.88	2.85	2.81	2.79	2.75	2.73	2.70	2.66
Total Cash Inflow	245.39	3.17	2.27	52.51	54.54	16.62	1.43	1.32	0.95	0.95	0.95	3.69	3.68	3.69	3.69	3.69	3.69	3.69	3.68	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69
APPLICATION OF FUNDS																																								
D Project disbursement	127.70	3.15	2.23	52.08	53.71	15.68	0.48	0.37																																	
E Total debt services																																								
1. Loan repayment	95.21											2.74	2.76	2.79	2.82	2.85	2.88	2.91	2.93	2.96	2.99	3.02	3.05	3.08	3.12	3.15	3.18	3.21	3.24	3.27	3.31	3.34	3.37	3.41	3.44	3.48	3.51	3.55	3.58	3.62	3.65
2. Interest paid	22.48	0.02	0.04	0.43	0.83	0.94	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.90	0.87	0.84	0.81	0.78	0.75	0.73	0.70	0.67	0.64	0.61	0.57	0.54	0.51	0.48	0.45	0.42	0.38	0.35	0.32	0.28	0.25	0.21	0.18	0.14	0.11	0.07	0.04
Sub-total	117.69	0.02	0.04	0.43	0.83	0.94	0.95	0.95	0.95	0.95	0.95	3.69	3.68	3.69	3.69	3.69	3.69	3.69	3.68	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69
Total Cash Outflow	245.39	3.17	2.27	52.51	54.54	16.62	1.43	1.32	0.95	0.95	0.95	3.69	3.68	3.69	3.69	3.69	3.69	3.69	3.68	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69
F Net Surplus Cash (A+C2)-E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Project Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	17%	0%	0%	0%	0%	0%	0%	7%	7%	7%	7%	11%	11%	12%	12%	13%	12%	13%	14%	14%	15%	15%	15%	16%	17%	17%	18%	18%	19%	19%	20%	21%	22%	22%	23%	24%	24%	25%	26%	27%	28%
Cost recovery by water fee + subsidy ((A+C2)/E)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

ARAGATSOTN MARZ
Talin District
No 3 Antarut

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	56.03	36.4%
	Subsidy	98.10	63.6%
	Total	154.13	100.0%
2	**Expenditure**		
	OM cost	36.44	23.6%
	Loan repayment	95.21	61.8%
	Interest paid	22.48	14.6%
	Surplus cash	0.00	0.0%
	Total	154.13	100.0%

B. FIRR CALCULATION **Unit: million AMD**

Description	Total	Year																																						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A COST																																								
1. Investment Cost	85.53	2.30	1.64	35.55	35.42	10.03	0.33	0.26																																
2. Operation and Maintenance Cost																																								
Salary	9.12			0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Chlorine	1.49			0.02	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Electricity	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mantenance cost	8.21			0.10	0.19	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Pump replacement																	0.00															0.00									
Sub-total	18.82			0.36	0.46	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Total Outflow	104.35	2.30	1.64	35.91	35.88	10.53	0.83	0.76	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
B BENEFIT																																								
1. Water Tariff	35.06	0.00	0.00	0.16	0.32	0.36	0.37	0.63	0.65	0.67	0.70	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
2. Subsidy	75.90	0.00	0.00	0.20	0.17	0.17	0.17	0.00	0.00	0.00	0.00	2.35	2.34	2.36	2.37	2.38	2.42	2.43	2.43	2.44	2.45	2.46	2.48	2.49	2.51	2.51	2.53	2.53	2.55	2.56	2.57	2.58	2.57	2.60	2.60	2.60	2.61	2.61	2.62	2.63	2.62
Total Inflow	110.96	0.00	0.00	0.36	0.49	0.53	0.54	0.63	0.65	0.67	0.70	3.39	3.38	3.40	3.41	3.42	3.46	3.47	3.47	3.48	3.49	3.50	3.52	3.53	3.55	3.55	3.57	3.57	3.59	3.60	3.61	3.62	3.61	3.64	3.64	3.64	3.65	3.65	3.66	3.67	3.66
NET BENEFIT	6.61	-2.30	-1.64	-35.6	-35.4	-10.0	-0.29	-0.13	0.15	0.17	0.20	2.89	2.88	2.90	2.91	2.92	2.96	2.97	2.97	2.98	2.99	3.00	3.02	3.03	3.05	3.05	3.07	3.07	3.09	3.10	3.11	3.12	3.11	3.14	3.14	3.14	3.15	3.15	3.16	3.17	3.16

FIRR = 0.34%

C. SENSITIVITY ANALYSIS

No.		Description	PV 1.75%	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	1	Capital cost 10% up	-28.63	-2.53	-1.80	-39.1	-38.9	-11.0	-0.32	-0.16	0.15	0.17	0.20	2.89	2.88	2.90	2.91	2.92	2.96	2.97	2.97	2.98	2.99	3.00	3.02	3.03	3.05	3.05	3.07	3.07	3.09	3.10	3.11	3.12	3.11	3.14	3.14	3.14	3.15	3.15	3.16	3.17	3.16
	2	Capital cost 20% up	-36.66	-2.76	-1.97	-42.7	-42.5	-12.0	-0.36	-0.18	0.15	0.17	0.20	2.89	2.88	2.90	2.91	2.92	2.96	2.97	2.97	2.98	2.99	3.00	3.02	3.03	3.05	3.05	3.07	3.07	3.09	3.10	3.11	3.12	3.11	3.14	3.14	3.14	3.15	3.15	3.16	3.17	3.16
2	1	OM cost 10% up	-21.91	-2.30	-1.64	-35.6	-35.4	-10.1	-0.34	-0.18	0.10	0.12	0.15	2.84	2.83	2.85	2.86	2.87	2.91	2.92	2.92	2.93	2.94	2.95	2.97	2.98	3.00	3.00	3.02	3.02	3.04	3.05	3.06	3.07	3.06	3.09	3.09	3.09	3.10	3.10	3.11	3.12	3.11
	2	OM cost 20% up	-23.22	-2.30	-1.64	-35.6	-35.5	-10.1	-0.39	-0.23	0.05	0.07	0.10	2.79	2.78	2.80	2.81	2.82	2.86	2.87	2.87	2.88	2.89	2.90	2.92	2.93	2.95	2.95	2.97	2.97	2.99	3.00	3.01	3.02	3.01	3.04	3.04	3.04	3.05	3.05	3.06	3.07	3.06
3	1	Revenue 10% down	-27.88	-2.30	-1.64	-35.6	-35.4	-10.1	-0.34	-0.19	0.09	0.10	0.13	2.55	2.54	2.56	2.57	2.58	2.61	2.62	2.62	2.63	2.64	2.65	2.67	2.68	2.70	2.70	2.71	2.71	2.73	2.74	2.75	2.76	2.75	2.78	2.78	2.78	2.79	2.79	2.79	2.80	2.79
	2	Revenue 20% down	-35.18	-2.30	-1.64	-35.6	-35.5	-10.1	-0.40	-0.26	0.02	0.04	0.06	2.21	2.20	2.22	2.23	2.24	2.27	2.28	2.28	2.28	2.29	2.30	2.32	2.32	2.34	2.34	2.36	2.36	2.37	2.38	2.39	2.40	2.39	2.41	2.41	2.41	2.42	2.42	2.43	2.44	2.43

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.09%	-46.06	-2.17%
	2	Capital cost 20% up	-0.48%	-17.03	-5.87%
2	1	OM cost 10% up	0.24%	3.92	25.53%
	2	OM cost 20% up	0.15%	13.01	7.69%
3	1	Revenue 10% down	-0.24%	-24.06	-4.16%
	2	Revenue 20% down	-0.89%	-13.84	-7.23%

No.4 Ashnak

Information on Existing Water Sources (Aragatsotn)

Study for Improvement of Rural Water Supply and Sewage Systems in RA

No.4 Community Ashnak
District Talin
Marz Aragatsotn

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	spring	40	24	0.3	44	0	16.9	2,068	5.0	18.0	10.0
2	spring	40	23	57.5	44	0	23.6	2,056	1.5	2.5	2.0
3	spring	40	22	5.3	43	57	37.4	1,709	1.0	3.0	2.0
4	spring	40	22	16.8	43	57	48.6	1,734	1.5	4.0	2.5
5											
6											
7											
8											
9											
10											

Notes:

Latitude, Longitude, Atitude:	*Measured at site*
Yield (Min, Max):	*Interviewed to the Community*
Yield (at site):	*Measured / estimated at site in summer of 2007*

Users Acceptnce for water quality	Acceptable
Notes	The internal network is in deteriorated condition, there are esimated 30% leakages
Alternative sources if any	No alternative water sources are available

No.4 Community Ashnak
District Talin
Marz Aragatsotn
Sampling date 27/Aug/2007

	Parameters analysed	Units	No.1 Chatal aghbyur	No.2			Guidelines	
							WHO	Armenia
a	pH		7.5	7.2			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	9.8	11.5				
c	TDS	Mg/L	82	175			1000	1000
1	Al:Aluminum	Mg/L	0.01	n.d			0.10	0.50
2	B:Boron	Mg/L	n.d	n.d			0.70	0.50
3	Cl:Chloride	Mg/L	4	5			250	350
4	Cr:Chrome	Mg/L	<0.01	n.d			0.05	0.05
5	Cu:Copper	Mg/L	n.d	n.d			2	1
6	F:Fluoride	Mg/L	0.06	0.23			1.50	
7	Hardness	Mg/L	180	200			500	700
8	Fe:Iron	Mg/L	n.d	n.d			0.30	0.30
9	Mn:Manganese	Mg/L	n.d	n.d			0.40	0.10
10	Mo:Molibdenum	Mg/L	<0.02	0.03			0.070	0.250
11	Ni:Nickel	Mg/L	n.d	n.d			0.020	0.100
12	Nitrate(NO3+)	Mg/L	4.9	1.3			50.0	45.0
13	SO4:Sulfate	Mg/L	7.0	5.0			250.0	500.0
14	Zn:Zink	Mg/L	<0.1	n.d			3.0	5.0
15	As:Arsenic	Mg/L	n.d	n.d			0.0	0.1
16	Ba:Barium	Mg/L	<0.1	<0.01			0.70	0.10
17	Be:Berillium	Mg/L	n.d.	n.d			NA	0.00020
18	Cd:Cadmium	Mg/L	0.0002	<0.01			0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001	<0.001			0.010	0.030
20	Hg:Mercury	Mg/L	n.d	n.d			0.00100	0.00050
21	Se:Selenium	Mg/L	<0.001	n.d			0.010	0.010
22	Sr:Strontium	Mg/L	n.d	<0.7			NA	7.0
23	CN:Cyanide	Mg/L	n.d	n.d			0.070	0.035
24	Coli form bacteria	bacteria per 100 ml					-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
26	Total bacteria	bacteria per 1 ml					-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.4 Community Ashnak
District Talin
Marz Aragatsotn

No.	Month	Date	Total amount of bacteria	Total amount of coliform bacteria	Coliform bacteria tolerant to heat
			nos/1mL	MPN/100mL	nos/100 mL
			Less than 50nos/1mL	Not Identified	Not Identified
1	2		166	15.0	Not Identified
2	3		168	15.0	Not Identified
3	4		136	9.0	Not Identified
4	5		167	15.0	Not Identified
5	6		169	15.0	Not Identified
6	7		165	15.0	Not Identified
7	8		18	2.1	Not Identified

No. 4 **Marz** Aragatsotn **Community** Ashnak

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Difficult	Difficult	
2	Intake	Difficult	Difficult	
3	Transmission pipeline	Difficult	Difficult	Pipeline is mostly far from the road
4	Reservoir	Fair	Possible	

2. INTAKE STRUCTURE

No.	Water main	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°24'00.3″	44°00'16.9″	2,068	2006	RC	10.0	No
2	Spring	40°23'57.5″	44°00'23.6″	2,056	2006	RC	2.0	No
3	Spring	40°22'05.3″	43°57'37.4″	1,709	2006	RC	2.0	No
4	Spring	40°22'16.8″	43°57'48.6″	1,734	2006	RC	2.5	No

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	250	150	Steel	10.0	2006	No	No
2	50	80	Steel	2.0		No	No
	50	50	Polyethylene			No	Yes
3	4,650	150	Polyethylene	12.0		No	No
4	800	150	Polyethylene	4.5		No	No
5	3,000	150	Polyethylene	16.5		No	No

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°20'34.0″	43°55'27.0″	1520	reinforced concrete	Rectangular	2x(15x6x3.5	2x300	Yes
2	40°20'34.0″	43°55'27.0″	1520	reinforced concrete	Rectangular	15x5.5x4	300	No

5. CHLORINATION EQUIPMENT

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	Yes	Reservoir	Powder	Once a week

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	13,700	100	Polyethylene	1975	Medium	Yes
2	1,800	150	Polyethylene	1975	Medium	Yes

7. PUMP STATION

Existence (Y/N)	Power source	Type	Capacity (l/s)	Pump head (m)	Tank cap. (m3)	House size (m)	Rehabilitation Necessity (Y/N)
No							

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
4	1975	2006	No	0	Yes

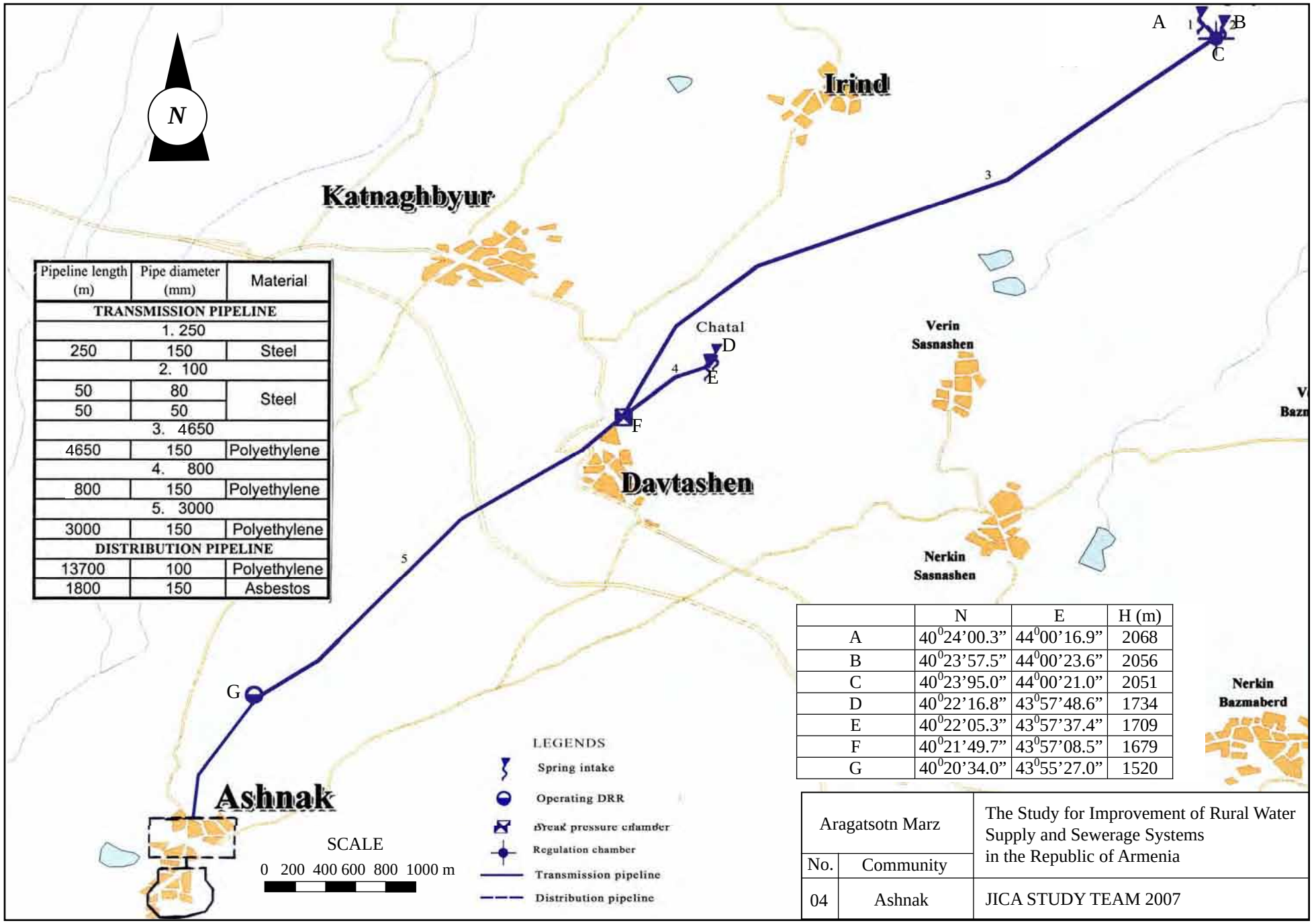
9. DRAINAGE SYSTEM

Existence (Y/N)	Rehabilitation Necessity (Y/N)	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Aragatsotn**
Number and Name of Community	**No.4 Ashnak**
District	**Talin**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	1,450
A2	Actual population in 2007	1,500
A3	Number of households	350
A4.1	Elderly people	420
A4.2	Population in labor force (age from 16 to 62)	752
A4.3	Children	328
A5.1	Pensioners	232
A5.2	Unemployed	3
A5.3	Receiving benefits	42
A6	Average monthly income of household (AMD)	20,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	206
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	2,330
	Annual Budget of the community 2005, in thousand AMD	1,616
	Annual Budget of the community 2006, in thousand AMD	2,240
	Annual Budget of the community 2007, in thousand AMD	1,641
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	0
	Amount spent in drinking water sector 2005, in thousand AMD	0
	Amount spent in drinking water sector 2006, in thousand AMD	0
	Amount spent in drinking water sector 2007, in thousand AMD	300 (IFAD)
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned.
C: Socio-Economic Survey		
C1	Major industries of the community:	dairy, meat, cereals, fruit
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1-Yes, 2-No	yes
D2	Water use permit number	1048
D3	Date of expiry of water use permit	28.03.06-28.03.09
D4	Planned date of obtaining water use permit	
D5	Present condition of the water supply volume of Domestic use	insufficient
D6	Present condition of the water supply volume of Irrigation water	insufficient
D7	Number of house connection to drinking water system	350
D8	How many house connection household set the water meter	0
D9	Number of public taps	3
D10.1	How is the regime of water supply in your community in the dry season?	regularly, 3-4 hrs in 2days
D10.2	How is the regime of water supply in your community in the wet season?	regularly, 3-4 hrsin 2days
D11	What time of day water is given?	in the morning
D12	Are you pleased with duration of domestic water supply?	mainly displeased
D13	Are hours of water supply convenient?	not convenient at all
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	300
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	500
D16	Drinking water monthly water fee per household	400 drams
D17	How often do you usually pay water fees?	each month
D18	Water fee structure 1Flate rate, 2 Having water tariff	flat rate
D19	Where do you acquire the irrigation water?	from Akhuryan reservoir By 3rd degree pumps
D20	Are you satisfied with irrigation water supply volume?	is not sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Azoyan Samvel
E2	Position	water distributor
E3	Telephone	with the help of administration head
E4	Quantity and present condition of the water supply facilities: spring/ intake	4 new
E5	Quantity and present condition of the water supply facilities:	rehabilitated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	2 rehabilitated·, 1-new
E7	Quantity and present condition of the water supply facilities: net/distribution pipes	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	3 rehabilitated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community and residents
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	nobody
E14	How you prepare O&M costs?	collections from residents, community budget
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	450,000
	Repair cost(AMD)	90,000
	Others(AMD)	0
	Total (AMD)	540,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	water fee
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	absent
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
1. 250		
250	150	Steel
2. 100		
50	80	Steel
50	50	
3. 4650		
4650	150	Polyethylene
4. 800		
800	150	Polyethylene
5. 3000		
3000	150	Polyethylene
DISTRIBUTION PIPELINE		
13700	100	Polyethylene
1800	150	Asbestos

	N	E	H (m)
A	$40^0$24’00.3”	$44^0$00’16.9”	2068
B	$40^0$23’57.5”	$44^0$00’23.6”	2056
C	$40^0$23’95.0”	$44^0$00’21.0”	2051
D	$40^0$22’16.8”	$43^0$57’48.6”	1734
E	$40^0$22’05.3”	$43^0$57’37.4”	1709
F	$40^0$21’49.7”	$43^0$57’08.5”	1679
G	$40^0$20’34.0”	$43^0$55’27.0”	1520

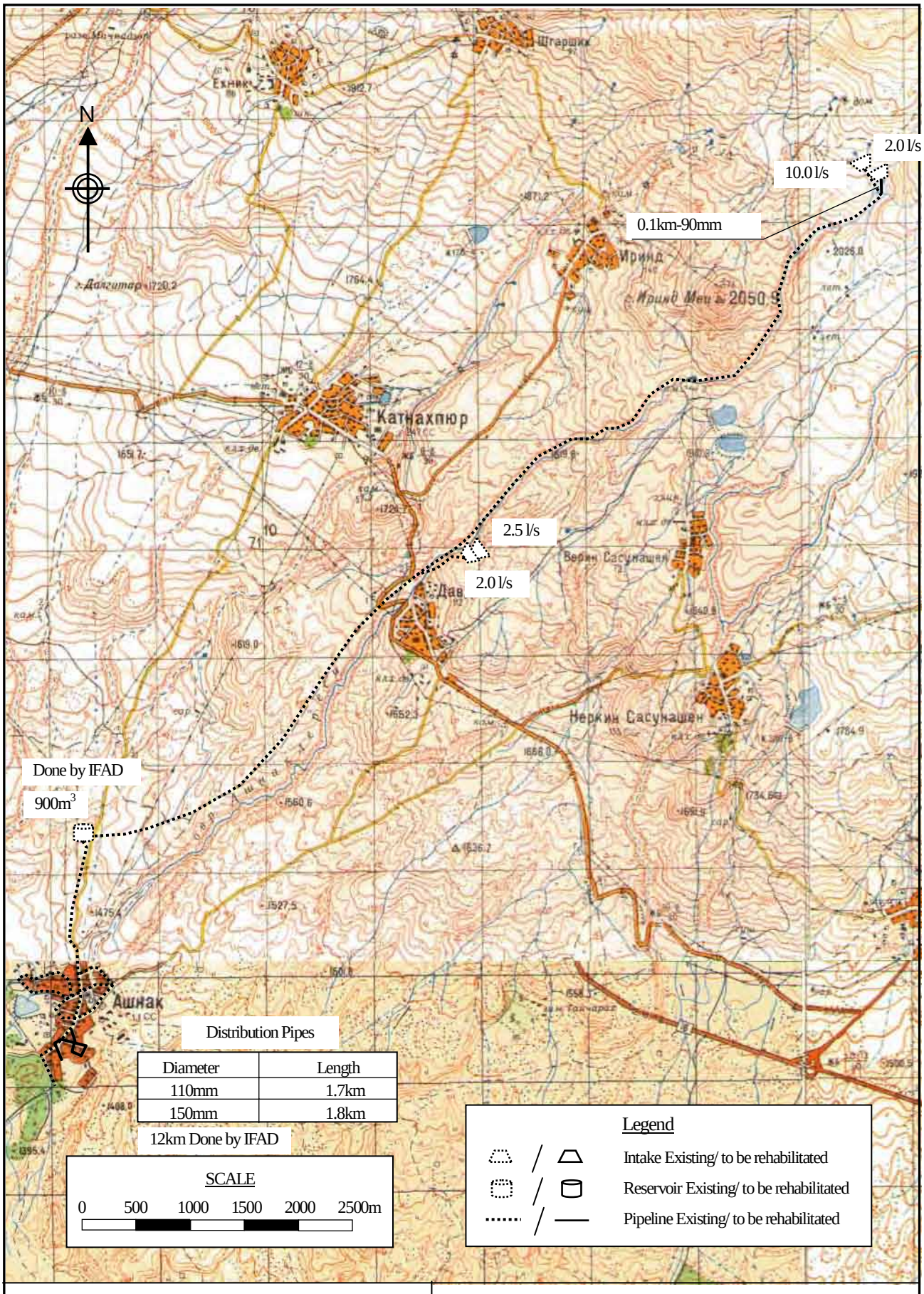
Aragatsotn Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
04	Ashnak	JICA STUDY TEAM 2007

Marz : **Aragatsotn** No.4
Name : **Ashnak**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	1,500	persons	150.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	206	pupils	2.1	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	7 Livestocks (87lit/household)	350	household	30.5	
	Sub-total			182.6	
	Unaccouted for water (20%)			36.5	
1	Average Daily Water Demand			219.1	m3/day
2	Maximum Daily Water Demand			262.9	m3/day
3	Maximum Hourly Water Demand			25.6	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	4	16.5	lit/sec		1425.6	m3/day
`	Total					1425.6	m3/day
	2 Required reservoir volume					308	m3

C	**WATER SUPPLY FACILITIES REHABILITATION PLAN**			
No	Item	Quantity	Unit	
1	Intake			
	1m3		nos	
	2m3		nos	
	3m3		nos	
	4m3		nos	
2	Transmission pipe			
	50mm diameter		m	
	75mm diameter		m	
	90mm diameter	100	m	
	110mm diameter		m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			Done by IFAD
			nos	900m3 construction
4	Distribution pipe			Done by IFAD
	50mm diameter		m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter	1,700	m	12,000m rehabilitation
	150mm diameter	1,800	m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	-	nos	
6	Water meter installation	350	nos	
7	Public tap	4	nos	
8	Chlorination	1	nos	
9	Pumps	-	nos	



Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Aragatsotn	
No. 04	Ashnak	JICA STUDY TEAM

Marz : **Aragatsotn**
No. : **4**
Name : **Ashnak**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3		nos	367,700	
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm	100	m	8,040	804,000
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					804,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					
4	Distribution Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	1,700	m	9,680	16,456,000
		150mm	1,800	m	13,140	23,652,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					40,108,000
5	House Connection			nos	74,000	
6	Water Meter Installation		350	nos	80,000	28,000,000
7	Public Tap		4	nos	90,000	360,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	1,400	m	3,600	5,040,000
	Total				AMD	74,812,000
					Equivalent to USD	244,868
					Equivalent to JPY	25,833,549
					AMD	USD
	Investment Cost per household		350	HH	213,749	700
	Investment Cost per person		1,500	persons	49,875	163

ARAGATSOTN MARZ
Aparan District
No 4 Ashnak

PROJECTED INCOME STATEMENT **Unit: million AMD**

Description	Unit	Total	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A Water Sales Revenue																																										
Consumption water volume	1000m3/yr		66.6																																							
Unit rate	AMD/m3				40.00	40.00	40.00	41.32	70.00	72.31	74.70	77.16	115.65	119.47	123.41	127.48	131.69	136.03	140.52	145.16	149.95	154.90	160.01	165.29	170.75	176.38	182.20	188.21	194.42	200.84	207.47	214.31	221.39	228.69	236.24	244.04	252.09	260.41	269.00	277.88	287.05	296.52
Sub-total		372.05	0.00	0.00	0.98	1.97	2.40	2.48	4.20	4.34	4.48	4.63	6.94	7.17	7.40	7.65	7.90	8.16	8.43	8.71	8.99	9.29	9.60	9.91	10.24	10.58	10.93	11.29	11.66	12.05	12.44	12.86	13.28	13.72	14.17	14.64	15.12	15.62	16.14	16.67	17.22	17.79
B Operating Costs																																									
1. Staff salary																																									
Inspectors	person				1																																				
Pump operators	person				0																																				
Base Salary	AMD/m/p				20,000	20,660	21,342	22,046	22,774	23,525	24,301	25,103	25,932	26,788	27,672	28,585	29,528	30,502	31,509	32,549	33,623	34,732	35,879	37,063	38,286	39,549	40,854	42,202	43,595	45,034	46,520	48,055	49,641	51,279	52,971	54,719	56,525	58,390	60,317	62,308	64,364	66,488
Sub-total		17.70			0.24	0.25	0.26	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.37	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.51	0.52	0.54	0.56	0.58	0.60	0.62	0.64	0.66	0.68	0.70	0.72	0.75	0.77	0.80
2. Chlorine																																									
Pouring volume	kg/yr				400																																				
Unit rate	AMD/kg				600	620	640	661	683	706	729	753	778	804	830	858	886	915	945	976	1009	1042	1076	1112	1149	1186	1226	1266	1308	1351	1396	1442	1489	1538	1589	1642	1696	1752	1810	1869	1931	1995
Sub-total		17.51			0.10	0.21	0.26	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.37	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.51	0.52	0.54	0.56	0.58	0.60	0.62	0.64	0.66	0.68	0.70	0.72	0.75	0.77	0.80
3. Electricity (for pump)		0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. Maintenance cost		62.05			0.35	0.72	0.91	0.94	0.97	1.00	1.03	1.07	1.10	1.14	1.18	1.21	1.25	1.30	1.34	1.38	1.43	1.48	1.52	1.58	1.63	1.68	1.74	1.79	1.85	1.91	1.98	2.04	2.11	2.18	2.25	2.33	2.40	2.48	2.56	2.65	2.74	2.83
Pump repair					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe repair					0.35	0.72	0.91	0.94	0.97	1.00	1.03	1.07	1.10	1.14	1.18	1.21	1.25	1.30	1.34	1.38	1.43	1.48	1.52	1.58	1.63	1.68	1.74	1.79	1.85	1.91	1.98	2.04	2.11	2.18	2.25	2.33	2.40	2.48	2.56	2.65	2.74	2.83
5. Pump replacement		0.00																0.00															0.00									
Sub-total		97.26	0.00	0.00	0.69	1.18	1.43	1.46	1.51	1.56	1.61	1.67	1.72	1.78	1.84	1.89	1.95	2.04	2.10	2.16	2.23	2.32	2.38	2.46	2.55	2.62	2.72	2.81	2.89	2.99	3.10	3.20	3.31	3.42	3.53	3.65	3.76	3.88	4.00	4.15	4.28	4.43
C Gross Income (A-B)		274.79	0.00	0.00	0.29	0.80	0.97	1.02	2.69	2.78	2.87	2.96	5.22	5.39	5.56	5.76	5.95	6.12	6.33	6.55	6.76	6.97	7.22	7.45	7.69	7.96	8.21	8.48	8.77	9.06	9.34	9.66	9.97	10.30	10.64	10.99	11.36	11.74	12.14	12.52	12.94	13.36
D Depreciation cost		71.05						2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03
E Interest paid		23.24	0.02	0.04	0.41	0.80	0.98	0.99	0.99	0.99	0.99	0.99	0.99	0.96	0.93	0.90	0.87	0.84	0.81	0.78	0.75	0.72	0.69	0.66	0.63	0.60	0.56	0.53	0.50	0.46	0.43	0.40	0.36	0.33	0.29	0.26	0.22	0.19	0.15	0.11	0.08	0.04
F Net Income		180.50	-0.02	-0.04	-0.12	0.00	-0.01	-2.00	-0.33	-0.24	-0.15	-0.06	2.20	2.40	2.60	2.83	3.05	3.25	3.49	3.74	3.98	4.22	4.50	4.76	5.03	5.33	5.62	5.92	6.24	6.57	6.88	7.23	7.58	7.94	8.32	8.70	9.11	9.52	9.96	10.38	10.83	11.29
G Tax and duties		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H Net Income after deduction of TAX		180.50	-0.02	-0.04	-0.12	0.00	-0.01	-2.00	-0.33	-0.24	-0.15	-0.06	2.20	2.40	2.60	2.83	3.05	3.25	3.49	3.74	3.98	4.22	4.50	4.76	5.03	5.33	5.62	5.92	6.24	6.57	6.88	7.23	7.58	7.94	8.32	8.70	9.11	9.52	9.96	10.38	10.83	11.29
OM Cost Recovery Ratio (A/B)		383%	0%	0%	142%	168%	168%	170%	278%	278%	278%	277%	403%	403%	402%	405%	405%	400%	401%	403%	403%	400%	403%	403%	402%	404%	402%	402%	403%	403%	401%	402%	401%	401%	401%	401%	402%	403%	404%	402%	402%	402%

PROJECTED CASH FLOW STATEMENT **Unit: million AMD**

Description	Total	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
SOURCES OF FUNDS																																									
A Internal Cash Generation																																									
1. Net Income	180.50	-0.02	-0.04	-0.12	0.00	-0.01	-2.00	-0.33	-0.24	-0.15	-0.06	2.20	2.40	2.60	2.83	3.05	3.25	3.49	3.74	3.98	4.22	4.50	4.76	5.03	5.33	5.62	5.92	6.24	6.57	6.88	7.23	7.58	7.94	8.32	8.70	9.11	9.52	9.96	10.38	10.83	11.29
2. Depreciation cost	71.05	0.00	0.00	0.00	0.00	0.00	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03
3. Interest Paid	23.24	0.02	0.04	0.41	0.80	0.98	0.99	0.99	0.99	0.99	0.99	0.99	0.96	0.93	0.90	0.87	0.84	0.81	0.78	0.75	0.72	0.69	0.66	0.63	0.60	0.56	0.53	0.50	0.46	0.43	0.40	0.36	0.33	0.29	0.26	0.22	0.19	0.15	0.11	0.08	0.04
Sub-total	274.79	0.00	0.00	0.29	0.80	0.97	1.02	2.69	2.78	2.87	2.96	5.22	5.39	5.56	5.76	5.95	6.12	6.33	6.55	6.76	6.97	7.22	7.45	7.69	7.96	8.21	8.48	8.77	9.06	9.34	9.66	9.97	10.30	10.64	10.99	11.36	11.74	12.14	12.52	12.94	13.36
B Finances																																									
1. Project Loan	98.76	2.36	1.67	37.72	38.77	17.60	0.36	0.28																																	
2. Local fund	33.75	0.79	0.56	12.77	13.31	6.11	0.12	0.09																																	
Sub-total	132.51	3.15	2.23	50.49	52.08	23.71	0.48	0.37																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Subsidy for debt services	0.19	0.02	0.04	0.12	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	0.19	0.02	0.04	0.12	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Cash Inflow	407.49	3.17	2.27	50.90	52.88	24.69	1.50	3.06	2.78	2.87	2.96	5.22	5.39	5.56	5.76	5.95	6.12	6.33	6.55	6.76	6.97	7.22	7.45	7.69	7.96	8.21	8.48	8.77	9.06	9.34	9.66	9.97	10.30	10.64	10.99	11.36	11.74	12.14	12.52	12.94	13.36
APPLICATION OF FUNDS																																								
D Project disbursement	132.51	3.15	2.23	50.49	52.08	23.71	0.48	0.37																																	
E Total debt services																																								
1. Loan repayment	98.76											2.84	2.87	2.90	2.93	2.95	2.98	3.01	3.04	3.07	3.11	3.14	3.17	3.20	3.23	3.26	3.30	3.33	3.36	3.40	3.43	3.46	3.50	3.53	3.57	3.61	3.64	3.68	3.71	3.75	3.79
2. Interest paid	23.24	0.02	0.04	0.41	0.80	0.98	0.99	0.99	0.99	0.99	0.99	0.99	0.96	0.93	0.90	0.87	0.84	0.81	0.78	0.75	0.72	0.69	0.66	0.63	0.60	0.56	0.53	0.50	0.46	0.43	0.40	0.36	0.33	0.29	0.26	0.22	0.19	0.15	0.11	0.08	0.04
Sub-total	122.00	0.02	0.04	0.41	0.80	0.98	0.99	0.99	0.99	0.99	0.99	3.83	3.83	3.83	3.83	3.82	3.82	3.82	3.82	3.82	3.83	3.83	3.83	3.83	3.83	3.82	3.83	3.83	3.82	3.83	3.83	3.82	3.83	3.82	3.83	3.83	3.83	3.83	3.82	3.83	3.83
Total Cash Outflow	254.51	3.17	2.27	50.90	52.88	24.69	1.47	1.36	0.99	0.99	0.99	3.83	3.83	3.83	3.83	3.82	3.82	3.82	3.82	3.82	3.83	3.83	3.83	3.83	3.83	3.82	3.83	3.83	3.82	3.83	3.83	3.82	3.83	3.82	3.83	3.83	3.83	3.83	3.82	3.83	3.83
F Net Surplus Cash (A+C2)-E	152.98	0.00	0.00	0.00	0.00	0.00	0.03	1.70	1.79	1.88	1.97	1.39	1.56	1.73	1.93	2.13	2.30	2.51	2.73	2.94	3.14	3.39	3.62	3.86	4.13	4.39	4.65	4.94	5.24	5.51	5.83	6.15	6.47	6.82	7.16	7.53	7.91	8.31	8.70	9.11	9.53
Project Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	225%	0%	0%	71%	99%	99%	103%	272%	281%	290%	299%	136%	141%	145%	150%	156%	160%	166%	171%	177%	182%	189%	195%	201%	208%	215%	221%	229%	237%	244%	252%	261%	269%	279%	287%	297%	307%	317%	328%	338%	349%
Cost recovery by water fee + subsidy ((A+C2)/E)	225%	100%	100%	100%	100%	100%	103%	272%	281%	290%	299%	136%	141%	145%	150%	156%	160%	166%	171%	177%	182%	189%	195%	201%	208%	215%	221%	229%	237%	244%	252%	261%	269%	279%	287%	297%	307%	317%	328%	338%	349%

ARAGATSOTN MARZ
Aparan District
No 4 Ashnak

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	372.05	99.9%
	Subsidy	0.19	0.1%
	Total	372.24	100.0%
2	**Expenditure**		
	OM cost	97.26	26.1%
	Loan repayment	98.76	26.5%
	Interest paid	23.24	6.2%
	Surplus cash	152.98	41.1%
	Total	372.24	100.0%

B. FIRR CALCULATION **Unit: million AMD**

Description	Total	Year																																						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A COST																																								
1. Investment Cost	88.49	2.30	1.64	34.47	34.35	15.14	0.33	0.26																																
2. Operation and Maintenance Cost																																								
Salary	9.12			0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Chlorine	9.30			0.10	0.20	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Electricity	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mantenance cost	31.65			0.35	0.70	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Pump replacement																	0.00															0.00									
Sub-total	50.07			0.69	1.14	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
Total Outflow	138.56	2.30	1.64	35.16	35.49	16.48	1.67	1.60	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
B BENEFIT																																								
1. Water Tariff	233.68	0.00	0.00	0.98	1.97	2.40	2.48	4.20	4.34	4.48	4.63	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94
2. Subsidy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Inflow	233.68	0.00	0.00	0.98	1.97	2.40	2.48	4.20	4.34	4.48	4.63	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94
NET BENEFIT	95.12	-2.30	-1.64	-34.2	-33.5	-14.1	0.81	2.60	3.00	3.14	3.29	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60

FIRR = 4.03%

C. SENSITIVITY ANALYSIS

No.		Description	PV 1.75%	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	1	Capital cost 10% up	31.48	-2.53	-1.80	-37.6	-37.0	-15.6	0.78	2.57	3.00	3.14	3.29	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60
	2	Capital cost 20% up	23.18	-2.76	-1.97	-41.1	-40.4	-17.1	0.74	2.55	3.00	3.14	3.29	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60
2	1	OM cost 10% up	36.30	-2.30	-1.64	-34.2	-33.6	-14.2	0.68	2.47	2.87	3.01	3.16	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47
	2	OM cost 20% up	32.81	-2.30	-1.64	-34.3	-33.7	-14.3	0.54	2.33	2.73	2.87	3.02	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
3	1	Revenue 10% down	24.02	-2.30	-1.64	-34.3	-33.7	-14.3	0.56	2.18	2.57	2.69	2.83	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91
	2	Revenue 20% down	8.25	-2.30	-1.64	-34.4	-33.9	-14.6	0.31	1.76	2.13	2.24	2.36	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	3.44%	1.69	59.05%
	2	Capital cost 20% up	2.93%	3.75	26.66%
2	1	OM cost 10% up	3.84%	0.49	203.06%
	2	OM cost 20% up	3.65%	1.04	96.07%
3	1	Revenue 10% down	3.18%	2.64	37.82%
	2	Revenue 20% down	2.27%	7.76	12.89%

No.5 Avan+Khnusik

Information on Existing Water Sources (Aragatsotn)

Study for Improvement of Rural Water Supply and Sewage Systems in RA

No.5 Community Avan+Khnusik
District Ashtarak
Marz Aragatsotn

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Kapuyt (blue) sp.	40	20	4.5	44	8	44.0	1,686	8.0	50.0	22.0
2	Mets (big) sp.	40	20	6.7	44	9	59.4	1,698	2.0	30.0	4.5
3	Verin (upper) sp.	40	20	10.5	44	10	4.7	1,703	1.0	4.0	2.0
4	Khnusic sp.	40	20	41.4	44	11	58.0	1,874	3.0	15.0	10.0
5											
6											
7											
8											
9											
10											

Notes:

Latitude, Longitude, Atitude:	*Measured at site*
Yield (Min, Max):	*Interviewed to the Community*
Yield (at site):	*Measured / estimated at site in summer of 2007*

Users Acceptnce for water quality	Acceptable
Notes	The 3 springs (No.1-3) are located within the Community. Communities of Kosh and Ujan (both not included in the study) are also fed from "Kapuyt" spring. In total the community can take water from springs 25l/sec water.
Alternative sources if any	In Knusik spring area there is one prospective spring.

No.5 Community Avan+Khnusik
District Ashtarak
Marz Aragatsotn
Sampling date 18/Aug/2007

	Parameters analysed	Units	No.1 Khnusiki aghbyur	No.2 Mets aghbyur	No.3 Verin aghbyur	No.4 Kapuyt aghbyur	Guidelines	
							WHO	Armenia
a	pH		7.5	7.5	7.5	7.6	6.5-8	6.0 - 9.0
b	Temperature	Deg.C	11.2	9.9	10.1	10		
c	TDS	Mg/L	45	88	89	58	1000	1000
1	Al:Aluminum	Mg/L	0.02	0.02	0.01	0.02	0.10	0.50
2	B:Boron	Mg/L	n.d	n.d	n.d	n.d	0.70	0.50
3	Cl:Chloride	Mg/L	4	6	6	5	250	350
4	Cr:Chrome	Mg/L	0.01	0.01	0.01	0.01	0.05	0.05
5	Cu:Copper	Mg/L	n.d	n.d	n.d	n.d	2	1
6	F:Fluoride	Mg/L	0.12	0.26	0.14	0.12	1.50	
7	Hardness	Mg/L	90	200	200	135	500	700
8	Fe:Iron	Mg/L	n.d	n.d	n.d	n.d	0.30	0.30
9	Mn:Manganese	Mg/L	n.d	n.d	n.d	n.d	0.40	0.10
10	Mo:Molibdenum	Mg/L	0.030	0.020	<0.02	0.020	0.070	0.250
11	Ni:Nickel	Mg/L	n.d	n.d	n.d	n.d	0.020	0.100
12	Nitrate(NO3+)	Mg/L	0.9	1.3	0.9	0.9	50.0	45.0
13	SO4:Sulfate	Mg/L	4.0	4.0	6.0	4.0	250.0	500.0
14	Zn:Zink	Mg/L	n.d	n.d	n.d	n.d	3.0	5.0
15	As:Arsenic	Mg/L	n.d	n.d	n.d	n.d	0.0	0.1
16	Ba:Barium	Mg/L	0.01	<0.01	0.01	<0.01	0.70	0.10
17	Be:Berillium	Mg/L	n.d	n.d	n.d	n.d	NA	0.00020
18	Cd:Cadmium	Mg/L	n.d	n.d	n.d	n.d	0.0030	0.0010
19	Pb:Lead	Mg/L	0.001	0.001	0.001	0.001	0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002	<0.0002	<0.0002	<0.0002	0.00100	0.00050
21	Se:Selenium	Mg/L	n.d	n.d	n.d	n.d	0.010	0.010
22	Sr:Strontium	Mg/L	n.d	<0.7	<0.7	n.d	NA	7.0
23	CN:Cyanide	Mg/L	n.d	n.d	n.d	n.d	0.070	0.035
24	Coli form bacteria	bacteria per 100 ml	n.d				-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml	n.d				0	0
26	Total bacteria	bacteria per 1 ml	n.d				-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.5 Community Avan+Khnusik
District Ashtarak
Marz Aragatsotn

No.	Month	Date	Total amount of bacteria	Total amount of coliform bacteria	Coliform bacteria tolerant to heat
			nos/1mL	MPN/100mL	nos/100 mL
			Less than 50nos/1mL	Not Identified	Not Identified
1	2		8-24	0.9-3.9	Not Identified
2	3		106-172	24.0	Not Identified
3	4		12-15	0.9-2.0	Not Identified
4	5	3	8-14	0.70-1.4	Not Identified
5	5	22	12-18	1.1-15	Not Identified
6	6	13	10-14	0.7-0.9	Not Identified
7	6	13	6-14	0.7-0.9	Not Identified
8	8		16-18	0.6-0.7	Not Identified

No. 5 **Marz** Aragatsotn **Community** Avan + Khnusik

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Fair	Possible	
2	Intake	Fair	Possible	
3	Intake	Fair	Possible	
4	Intake	Possible	Possible	
5	Transmission pipeline	Difficult	Unknown	Pipeline is mostly far from the road
6	Reservoir	Fair	Possible	
	Water main			

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°20'04.5″	44°09'44.0″	1,686	2000	Masonry	22.0	Yes
2	Spring	40°20'06.7″	44°09'59.4″	1,698	1946	Masonry	4.5	No
3	Spring	40°20'10.5″	44°10'04.7″	1,703	1921	Concrete	2.0	No
4	Spring	40°20'41.4″	44°11'58.0″	1,874	1967	Concrete	10.0	No

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	4,000	150	Steel	5.6	1967	Medium	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°20'21.0″	40°10'21.5″	1,778	reinforced concrete	Rectangular	6x6x3	100	Yes

5. CHLORINATION EQUIPMENT

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	No			

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	4,000	50	Steel	1970	Medium	Yes
2	3,000	80	Steel	1970	Medium	Yes
3	1,000	100	Steel	1970	Little	Yes
4	5,000	200	Steel	1970	Little	Yes

7. PUMP STATION

Existence (Y/N)	Power source	Type	Capacity (l/s)	Pump head (m)	Tank cap. (m3)	House size (m)	Rehabilitation Necessity (Y/N)
No							

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
7	1946	1970	Yes	90	Yes

9. DRAINAGE SYSTEM

Existence (Y/N)	Rehabilitation Necessity (Y/N)	Remarks
No	Yes	

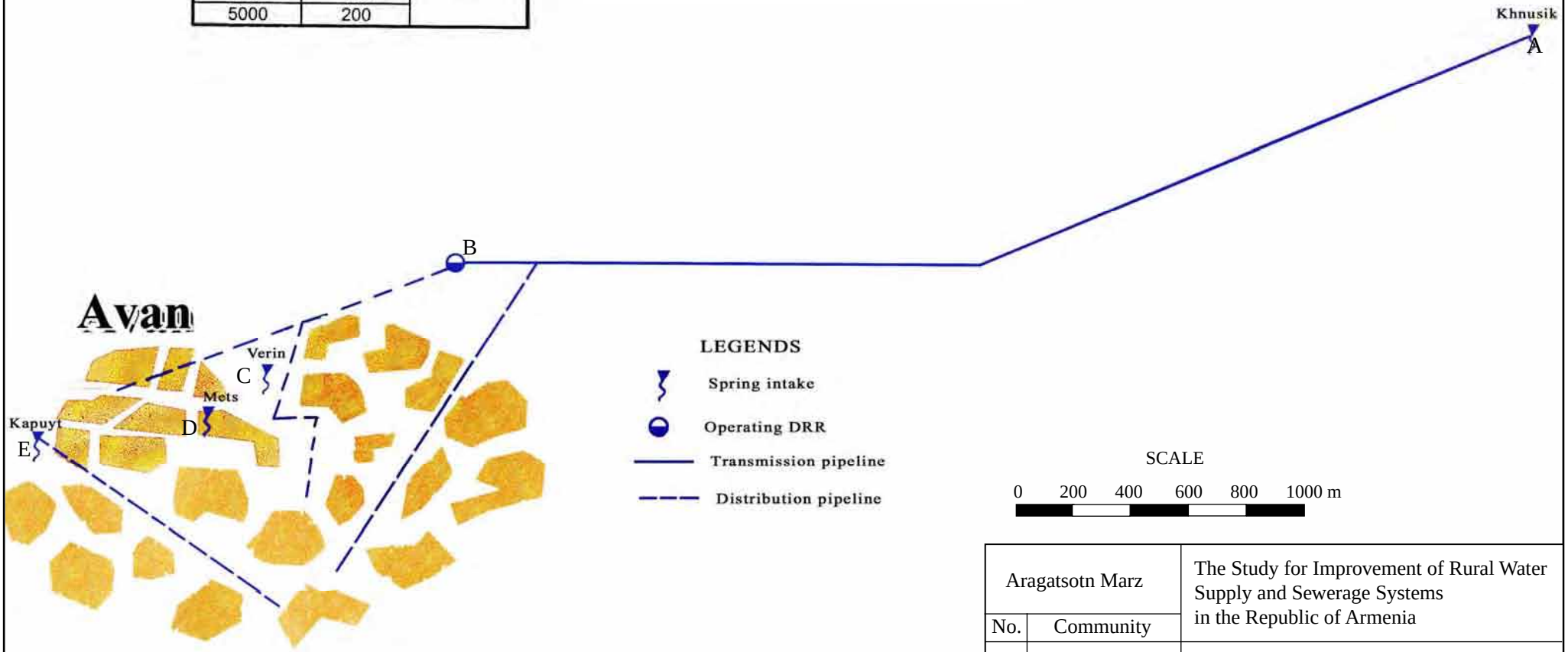
Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	Aragatsotn
Number and Name of Community	No.5 Avan+Khnusik
District	Ashtarak

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	950
A2	Actual population in 2007	987
A3	Number of households	185
A4.1	Elderly people	97
A4.2	Population in labor force (age from 16 to 62)	670
A4.3	Children	220
A5.1	Pensioners	102
A5.2	Unemployed	30
A5.3	Receiving benefits	60
A6	Average monthly income of household (AMD)	15,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	168
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	200
	Annual Budget of the community 2005, in thousand AMD	470
	Annual Budget of the community 2006, in thousand AMD	1,300
	Annual Budget of the community 2007, in thousand AMD	400
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	180
	Amount spent in drinking water sector 2005, in thousand AMD	180
	Amount spent in drinking water sector 2006, in thousand AMD	240
	Amount spent in drinking water sector 2007, in thousand AMD	120
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned.
C: Socio-Economic Survey		
C1	Major industries of the community:	dairy, meat, fruit
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1-Yes, 2-No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	2007
D5	Present condition of the water supply volume of Domestic use	insufficient
D6	Present condition of the water supply volume of Irrigation water	almost sufficient
D7	Number of house connection to drinking water system	90
D8	How many house connection household set the water meter	0
D9	Number of public taps	7
D10.1	How is the regime of water supply in your community in the dry season?	1district-24 hrs, in others no water at all
D10.2	How is the regime of water supply in your community in the wet season?	1district-24 hrs, in others no water at all
D11	What time of day water is given?	-
D12	Are you pleased with duration of domestic water supply?	mainly displeased
D13	Are hours of water supply convenient?	inconvenient
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	1,000
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	do not know
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flate rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	Amberd pipeline
D20	Are you satisfied with irrigation water supply volume?	is not sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Harutyunyan Dzulvern
E2	Position	water supply 2nd class specialist
E3	Telephone	with the help of administration head
E4	Quantity and present condition of the water supply facilities: spring/ intake	2- deteriorated
E5	Quantity and present condition of the water supply facilities:	1- deteriorated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	do not have
E7	Quantity and present condition of the water supply facilities: net/distribution pipes	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	deteriorated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community and residents
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	administration
E14	How you prepare O&M costs?	50% residents 50% community
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	240,000
	Repair cost(AMD)	200,000
	Others(AMD)	0
	Total (AMD)	440,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	difficult to answer
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	present
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	absent
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
4000	150	Steel
DISTRIBUTION PIPELINE		
4000	50	Steel
3000	80	
1000	100	
5000	200	

	N	E	H (m)
A	$40^0$20’41.4”	$44^0$11’58.0”	1874
B	$40^0$20’21.0”	$44^0$10’21.5”	1778
C	$40^0$20’10.5”	$44^0$10’04.7”	1703
D	$40^0$20’06.7”	$44^0$09’59.4”	1698
E	$40^0$20’04.5”	$44^0$09’44.0”	1686



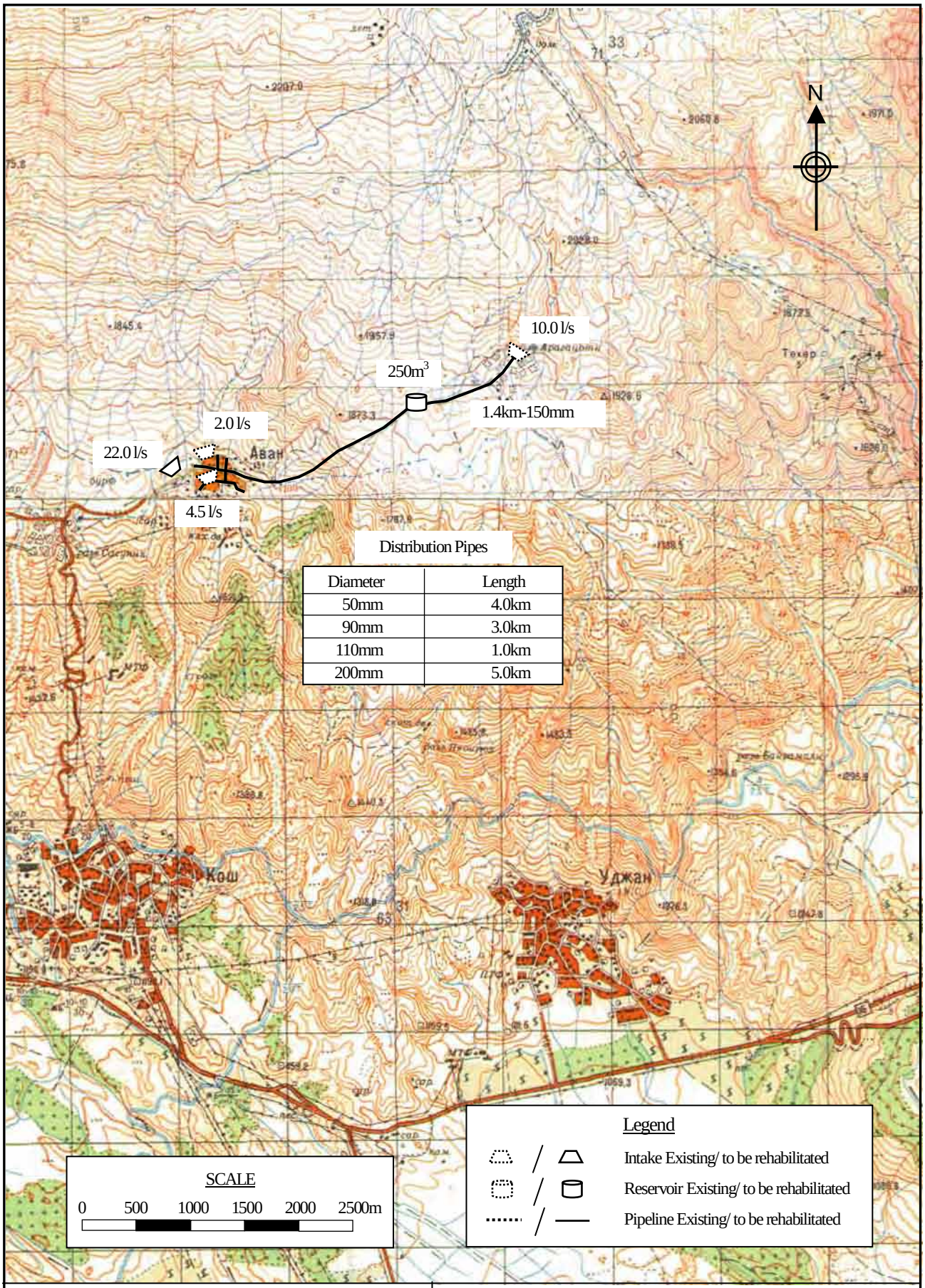
Aragatsotn Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
05	Avan + khnusik	JICA STUDY TEAM 2007

Marz : **Aragatsotn** No.5
Name : **Avan**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	987	persons	98.7	
	2 Factory	-	nos	0.0	
	3 School (pupils)	168	pupils	1.7	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	7 Livestocks (87lit/household)	185	household	16.1	
	Sub-total			116.5	
	Unaccouted for water (20%)			23.3	
1	Average Daily Water Demand			139.8	m3/day
2	Maximum Daily Water Demand			167.8	m3/day
3	Maximum Hourly Water Demand			20.0	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	4	36.5	lit/sec		3153.6	m3/day
`	Total					3153.6	m3/day
	2 Required reservoir volume					240	m3

C	**WATER SUPPLY FACILITIES REHABILITATION PLAN**		
	No Item	Quantity	Unit
	1 Intake		
	1m3		nos
	2m3	1	nos
	3m3		nos
	4m3		nos
	2 Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter	1,400	m
	200mm diameter		m
	250mm diameter		m
	3 Reservoir		
	250m3 capacity	1	nos
	4 Distribution pipe		
	50mm diameter	4,000	m
	75mm diameter		m
	90mm diameter	3,000	m
	110mm diameter	1,000	m
	150mm diameter		m
	200mm diameter	5,000	m
	250mm diameter		m
	5 House connection	95	nos
	6 Water meter installation	185	nos
	7 Public tap	2	nos
	8 Chlorination	1	nos
	9 Pumps	-	nos



Distribution Pipes

Diameter	Length
50mm	4.0km
90mm	3.0km
110mm	1.0km
200mm	5.0km

Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Aragatsotn	
No. 05	Avan+Khnusik	JICA STUDY TEAM

Marz : **Aragatsotn**
No. : **5**
Name : **Avan**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3		nos	367,700	
		2m3	1	nos	545,000	545,000
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					545,000
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm	1,400	m	13,140	18,396,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					18,396,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3	1	nos	25,952,800	25,952,800
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					25,952,800
4	Distribution Pipe					
		50mm	4,000	m	5,520	22,080,000
		75mm		m	7,160	
		90mm	3,000	m	8,040	24,120,000
		110mm	1,000	m	9,680	9,680,000
		150mm		m	13,140	
		200mm	5,000	m	19,440	97,200,000
		250mm		m	27,040	
	Sub-total					153,080,000
5	House Connection		95	nos	74,000	7,030,000
6	Water Meter Installation		185	nos	80,000	14,800,000
7	Public Tap		2	nos	90,000	180,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	5,200	m	3,600	18,720,000
	Total				AMD	239,203,800
					Equivalent to USD	782,940
					Equivalent to JPY	82,600,160
					AMD	USD
	Investment Cost per household		185	HH	1,292,994	4,232
	Investment Cost per person		987	persons	242,354	793

ARAGATSOTN MARZ
Talin District
No 5 Avan+Khnusik

PROJECTED INCOME STATEMENT **Unit: million AMD**

Description	Unit	Total	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A Water Sales Revenue																																										
Consumption water volume	1000m3/yr		42.5																																							
Unit rate	AMD/m3				40.00	40.00	40.00	41.32	70.00	72.31	74.70	77.16	115.65	119.47	123.41	127.48	131.69	136.03	140.52	145.16	149.95	154.90	160.01	165.29	170.75	176.38	182.20	188.21	194.42	200.84	207.47	214.31	221.39	228.69	236.24	244.04	252.09	260.41	269.00	277.88	287.05	296.52
Sub-total		237.50	0.00	0.00	0.67	1.35	1.53	1.58	2.68	2.77	2.86	2.95	4.43	4.57	4.72	4.88	5.04	5.21	5.38	5.56	5.74	5.93	6.12	6.33	6.53	6.75	6.97	7.20	7.44	7.69	7.94	8.20	8.47	8.75	9.04	9.34	9.65	9.97	10.29	10.63	10.99	11.35
B Operating Costs																																										
1. Staff salary																																										
Inspectors	person				1																																					
Pump operators	person				0																																					
Base Salary	AMD/m/p				20,000	20,660	21,342	22,046	22,774	23,525	24,301	25,103	25,932	26,788	27,672	28,585	29,528	30,502	31,509	32,549	33,623	34,732	35,879	37,063	38,286	39,549	40,854	42,202	43,595	45,034	46,520	48,055	49,641	51,279	52,971	54,719	56,525	58,390	60,317	62,308	64,364	66,488
Sub-total		17.70			0.24	0.25	0.26	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.37	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.51	0.52	0.54	0.56	0.58	0.60	0.62	0.64	0.66	0.68	0.70	0.72	0.75	0.77	0.80
2. Chlorine																																										
Pouring volume	kg/yr				256																																					
Unit rate	AMD/kg				600	620	640	661	683	706	729	753	778	804	830	858	886	915	945	976	1009	1042	1076	1112	1149	1186	1226	1266	1308	1351	1396	1442	1489	1538	1589	1642	1696	1752	1810	1869	1931	1995
Sub-total		11.20			0.07	0.14	0.16	0.17	0.17	0.18	0.19	0.19	0.20	0.21	0.21	0.22	0.23	0.23	0.24	0.25	0.26	0.27	0.28	0.28	0.29	0.30	0.31	0.32	0.33	0.35	0.36	0.37	0.38	0.39	0.41	0.42	0.43	0.45	0.46	0.48	0.49	0.51
3. Electricity (for pump)		0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. Maintenance cost		43.88			0.26	0.55	0.64	0.66	0.68	0.71	0.73	0.75	0.78	0.80	0.83	0.86	0.89	0.92	0.95	0.98	1.01	1.04	1.08	1.11	1.15	1.19	1.23	1.27	1.31	1.35	1.40	1.44	1.49	1.54	1.59	1.64	1.70	1.75	1.81	1.87	1.93	1.99
Pump repair					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe repair					0.26	0.55	0.64	0.66	0.68	0.71	0.73	0.75	0.78	0.80	0.83	0.86	0.89	0.92	0.95	0.98	1.01	1.04	1.08	1.11	1.15	1.19	1.23	1.27	1.31	1.35	1.40	1.44	1.49	1.54	1.59	1.64	1.70	1.75	1.81	1.87	1.93	1.99
5. Pump replacement		0.00																0.00															0.00									
Sub-total		72.78	0.00	0.00	0.57	0.94	1.06	1.09	1.12	1.17	1.21	1.24	1.29	1.33	1.37	1.42	1.47	1.52	1.57	1.62	1.67	1.73	1.79	1.83	1.90	1.96	2.03	2.10	2.16	2.24	2.32	2.39	2.47	2.55	2.64	2.72	2.81	2.90	2.99	3.10	3.19	3.30
C Gross Income (A-B)		164.72	0.00	0.00	0.10	0.41	0.47	0.49	1.56	1.60	1.65	1.71	3.14	3.24	3.35	3.46	3.57	3.69	3.81	3.94	4.07	4.20	4.33	4.50	4.63	4.79	4.94	5.10	5.28	5.45	5.62	5.81	6.00	6.20	6.40	6.62	6.84	7.07	7.30	7.53	7.80	8.05
D Depreciation cost		227.15						6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49
E Interest paid		69.07	0.02	0.04	1.28	2.56	2.92	2.93	2.93	2.93	2.93	2.93	2.93	2.85	2.76	2.68	2.59	2.50	2.41	2.32	2.23	2.14	2.05	1.96	1.86	1.77	1.67	1.57	1.48	1.38	1.28	1.18	1.08	0.97	0.87	0.76	0.66	0.55	0.44	0.33	0.22	0.11
F Net Income		-131.50	-0.02	-0.04	-1.18	-2.15	-2.45	-8.93	-7.86	-7.82	-7.77	-7.71	-6.28	-6.10	-5.90	-5.71	-5.51	-5.30	-5.09	-4.87	-4.65	-4.43	-4.21	-3.95	-3.72	-3.47	-3.22	-2.96	-2.69	-2.42	-2.15	-1.86	-1.57	-1.26	-0.96	-0.63	-0.31	0.03	0.37	0.71	1.09	1.45
G Tax and duties		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H Net Income after deduction of TAX		-131.50	-0.02	-0.04	-1.18	-2.15	-2.45	-8.93	-7.86	-7.82	-7.77	-7.71	-6.28	-6.10	-5.90	-5.71	-5.51	-5.30	-5.09	-4.87	-4.65	-4.43	-4.21	-3.95	-3.72	-3.47	-3.22	-2.96	-2.69	-2.42	-2.15	-1.86	-1.57	-1.26	-0.96	-0.63	-0.31	0.03	0.37	0.71	1.09	1.45
OM Cost Recovery Ratio (A/B)		326%	0%	0%	118%	143%	144%	145%	239%	237%	236%	238%	343%	344%	345%	344%	343%	343%	343%	343%	344%	343%	342%	346%	344%	344%	343%	343%	344%	343%	342%	343%	343%	343%	342%	343%	343%	344%	344%	343%	345%	344%

PROJECTED CASH FLOW STATEMENT **Unit: million AMD**

Description	Total	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
SOURCES OF FUNDS																																									
A Internal Cash Generation																																									
1. Net Income	-131.50	-0.02	-0.04	-1.18	-2.15	-2.45	-8.93	-7.86	-7.82	-7.77	-7.71	-6.28	-6.10	-5.90	-5.71	-5.51	-5.30	-5.09	-4.87	-4.65	-4.43	-4.21	-3.95	-3.72	-3.47	-3.22	-2.96	-2.69	-2.42	-2.15	-1.86	-1.57	-1.26	-0.96	-0.63	-0.31	0.03	0.37	0.71	1.09	1.45
2. Depreciation cost	227.15	0.00	0.00	0.00	0.00	0.00	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49
3. Interest Paid	69.07	0.02	0.04	1.28	2.56	2.92	2.93	2.93	2.93	2.93	2.93	2.93	2.85	2.76	2.68	2.59	2.50	2.41	2.32	2.23	2.14	2.05	1.96	1.86	1.77	1.67	1.57	1.48	1.38	1.28	1.18	1.08	0.97	0.87	0.76	0.66	0.55	0.44	0.33	0.22	0.11
Sub-total	164.72	0.00	0.00	0.10	0.41	0.47	0.49	1.56	1.60	1.65	1.71	3.14	3.24	3.35	3.46	3.57	3.69	3.81	3.94	4.07	4.20	4.33	4.50	4.63	4.79	4.94	5.10	5.28	5.45	5.62	5.81	6.00	6.20	6.40	6.62	6.84	7.07	7.30	7.53	7.80	8.05
B Finances																																									
1. Project Loan	293.06	2.36	1.67	124.02	127.96	36.41	0.36	0.28																																	
2. Local fund	100.18	0.79	0.56	42.01	43.94	12.67	0.12	0.09																																	
Sub-total	393.24	3.15	2.23	166.03	171.90	49.08	0.48	0.37																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Subsidy for debt services	197.39	0.02	0.04	1.18	2.15	2.45	2.44	1.37	1.33	1.28	1.22	8.22	8.12	8.00	7.90	7.79	7.66	7.54	7.41	7.28	7.15	7.03	6.86	6.72	6.57	6.41	6.25	6.08	5.91	5.74	5.55	5.36	5.15	4.96	4.73	4.52	4.28	4.05	3.82	3.55	3.30
Sub-total	197.39	0.02	0.04	1.18	2.15	2.45	2.44	1.37	1.33	1.28	1.22	8.22	8.12	8.00	7.90	7.79	7.66	7.54	7.41	7.28	7.15	7.03	6.86	6.72	6.57	6.41	6.25	6.08	5.91	5.74	5.55	5.36	5.15	4.96	4.73	4.52	4.28	4.05	3.82	3.55	3.30
Total Cash Inflow	755.35	3.17	2.27	167.31	174.46	52.00	3.41	3.30	2.93	2.93	2.93	11.36	11.36	11.35	11.36	11.36	11.35	11.35	11.35	11.35	11.35	11.36	11.36	11.35	11.36	11.35	11.35	11.36	11.36	11.36	11.36	11.36	11.35	11.36	11.35	11.36	11.35	11.35	11.35	11.35	11.35
APPLICATION OF FUNDS																																								
D Project disbursement	393.24	3.15	2.23	166.03	171.90	49.08	0.48	0.37																																	
E Total debt services																																									
1. Loan repayment	293.04											8.43	8.51	8.59	8.68	8.77	8.85	8.94	9.03	9.12	9.21	9.31	9.40	9.49	9.59	9.68	9.78	9.88	9.98	10.08	10.18	10.28	10.38	10.49	10.59	10.70	10.80	10.91	11.02	11.13	11.24
2. Interest paid	69.07	0.02	0.04	1.28	2.56	2.92	2.93	2.93	2.93	2.93	2.93	2.93	2.85	2.76	2.68	2.59	2.50	2.41	2.32	2.23	2.14	2.05	1.96	1.86	1.77	1.67	1.57	1.48	1.38	1.28	1.18	1.08	0.97	0.87	0.76	0.66	0.55	0.44	0.33	0.22	0.11
Sub-total	362.11	0.02	0.04	1.28	2.56	2.92	2.93	2.93	2.93	2.93	2.93	11.36	11.36	11.35	11.36	11.36	11.35	11.35	11.35	11.35	11.35	11.36	11.36	11.35	11.36	11.35	11.35	11.36	11.36	11.36	11.36	11.36	11.35	11.36	11.35	11.36	11.35	11.35	11.35	11.35	11.35
Total Cash Outflow	755.35	3.17	2.27	167.31	174.46	52.00	3.41	3.30	2.93	2.93	2.93	11.36	11.36	11.35	11.36	11.36	11.35	11.35	11.35	11.35	11.35	11.36	11.36	11.35	11.36	11.35	11.35	11.36	11.36	11.36	11.36	11.36	11.35	11.36	11.35	11.36	11.35	11.35	11.35	11.35	11.35
F Net Surplus Cash (A+C2)-E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Project Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	45%	0%	0%	8%	16%	16%	17%	53%	55%	56%	58%	28%	29%	30%	30%	31%	33%	34%	35%	36%	37%	38%	40%	41%	42%	44%	45%	46%	48%	49%	51%	53%	55%	56%	58%	60%	62%	64%	66%	69%	71%
Cost recovery by water fee + subsidy ((A+C2)/E)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

ARAGATSOTN MARZ
Talin District
No 5 Avan+Khnusik

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	237.50	54.6%
	Subsidy	197.39	45.4%
	Total	434.89	100.0%
2	**Expenditure**		
	OM cost	72.78	16.7%
	Loan repayment	293.04	67.4%
	Interest paid	69.07	15.9%
	Surplus cash	0.00	0.0%
	Total	434.89	100.0%

B. FIRR CALCULATION **Unit: million AMD**

Description	Total	Year																																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A COST																																									
1. Investment Cost	262.13	2.30	1.64	113.16	113.17	31.27	0.33	0.26																																	
2. Operation and Maintenance Cost																																									
Salary	9.12			0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Chlorine	5.97			0.07	0.14	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Electricity	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mantenance cost	22.39			0.26	0.53	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Pump replacement																	0.00															0.00										
Sub-total	37.47			0.57	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total Outflow	299.60	2.30	1.64	113.73	114.08	32.27	1.33	1.26	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
B BENEFIT																																								
1. Water Tariff	149.29	0.00	0.00	0.67	1.35	1.53	1.58	2.68	2.77	2.86	2.95	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43
2. Subsidy	136.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.29	5.27	5.24	5.22	5.20	5.16	5.13	5.09	5.05	5.01	4.98	4.90	4.86	4.80	4.74	4.68	4.60	4.53	4.46	4.37	4.28	4.18	4.09	3.97	3.86	3.73	3.61	3.49	3.33	3.19
Total Inflow	285.60	0.00	0.00	0.67	1.35	1.53	1.58	2.68	2.77	2.86	2.95	9.72	9.70	9.67	9.65	9.63	9.59	9.56	9.52	9.48	9.44	9.41	9.33	9.29	9.23	9.17	9.11	9.03	8.96	8.89	8.80	8.71	8.61	8.52	8.40	8.29	8.16	8.04	7.92	7.76	7.62
NET BENEFIT	-14.00	-2.30	-1.64	-113.1	-112.7	-30.7	0.25	1.42	1.77	1.86	1.95	8.72	8.70	8.67	8.65	8.63	8.59	8.56	8.52	8.48	8.44	8.41	8.33	8.29	8.23	8.17	8.11	8.03	7.96	7.89	7.80	7.71	7.61	7.52	7.40	7.29	7.16	7.04	6.92	6.76	6.62

FIRR = -0.27%

C. SENSITIVITY ANALYSIS

No.		Description	PV 1.75%	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	1	Capital cost 10% up	-105.71	-2.53	-1.80	-124.4	-124.0	-33.9	0.22	1.39	1.77	1.86	1.95	8.72	8.70	8.67	8.65	8.63	8.59	8.56	8.52	8.48	8.44	8.41	8.33	8.29	8.23	8.17	8.11	8.03	7.96	7.89	7.80	7.71	7.61	7.52	7.40	7.29	7.16	7.04	6.92	6.76	6.62
	2	Capital cost 20% up	-130.31	-2.76	-1.97	-135.7	-135.4	-37.0	0.18	1.37	1.77	1.86	1.95	8.72	8.70	8.67	8.65	8.63	8.59	8.56	8.52	8.48	8.44	8.41	8.33	8.29	8.23	8.17	8.11	8.03	7.96	7.89	7.80	7.71	7.61	7.52	7.40	7.29	7.16	7.04	6.92	6.76	6.62
2	1	OM cost 10% up	-83.72	-2.30	-1.64	-113.1	-112.8	-30.8	0.15	1.32	1.67	1.76	1.85	8.62	8.60	8.57	8.55	8.53	8.49	8.46	8.42	8.38	8.34	8.31	8.23	8.19	8.13	8.07	8.01	7.93	7.86	7.79	7.70	7.61	7.51	7.42	7.30	7.19	7.06	6.94	6.82	6.66	6.52
	2	OM cost 20% up	-86.33	-2.30	-1.64	-113.2	-112.9	-30.9	0.05	1.22	1.57	1.66	1.75	8.52	8.50	8.47	8.45	8.43	8.39	8.36	8.32	8.28	8.24	8.21	8.13	8.09	8.03	7.97	7.91	7.83	7.76	7.69	7.60	7.51	7.41	7.32	7.20	7.09	6.96	6.84	6.72	6.56	6.42
3	1	Revenue 10% down	-100.21	-2.30	-1.64	-113.1	-112.9	-30.9	0.09	1.15	1.49	1.57	1.66	7.75	7.73	7.70	7.69	7.67	7.63	7.60	7.57	7.53	7.50	7.47	7.40	7.36	7.31	7.25	7.20	7.13	7.06	7.00	6.92	6.84	6.75	6.67	6.56	6.46	6.34	6.24	6.13	5.98	5.86
	2	Revenue 20% down	-119.32	-2.30	-1.64	-113.2	-113.0	-31.0	-0.07	0.88	1.22	1.29	1.36	6.78	6.76	6.74	6.72	6.70	6.67	6.65	6.62	6.58	6.55	6.53	6.46	6.43	6.38	6.34	6.29	6.22	6.17	6.11	6.04	5.97	5.89	5.82	5.72	5.63	5.53	5.43	5.34	5.21	5.10

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.72%	-6.30	-15.86%
	2	Capital cost 20% up	-1.12%	-7.64	-13.09%
2	1	OM cost 10% up	-0.34%	-2.14	-46.68%
	2	OM cost 20% up	-0.41%	-3.54	-28.26%
3	1	Revenue 10% down	-0.84%	-6.85	-14.60%
	2	Revenue 20% down	-1.48%	-8.21	-12.19%

No.6 Avtona

Information on Existing Water Sources (Aragatsotn)

Study for Improvement of Rural Water Supply and Sewage Systems in RA

No.6 Community Avtona
District Talin
Marz Aragatsotn

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Toshqorp spring	40	23	0.9	44	2	53.8	2,101	1.8	4.0	2.0
2											
3											
4											
5											
6											
7											
8											
9											
10											

Notes:

Latitude, Longitude, Atitude:	*Measured at site*
Yield (Min, Max):	*Interviewed to the Community*
Yield (at site):	*Measured / estimated at site in summer of 2007*

Users Acceptnce for water quality	Acceptable
Notes	Water is diveted at Kakavadzer chamber into No.6 Avtona (2L/sec) and No.39 Kaqavadzor (5L/sec). The coodinates are of the distribution Chamber.
Alternative sources if any	No alternative water sources are available

No.6 Community Avtona
District Talin
Marz Aragatsotn
Sampling date 07/Sep/2007

	Parameters analysed	Units	No.1 Tashkorpa				Guidelines	
							WHO	Armenia
a	pH		7.3				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	9.4					
c	TDS	Mg/L	22				1000	1000
1	Al:Aluminum	Mg/L	0.03				0.10	0.50
2	B:Boron	Mg/L	<0.2				0.70	0.50
3	Cl:Chloride	Mg/L	4				250	350
4	Cr:Chrome	Mg/L	<0.01				0.05	0.05
5	Cu:Copper	Mg/L	n.d				2	1
6	F:Fluoride	Mg/L	0.60				1.50	
7	Hardness	Mg/L	50				500	700
8	Fe:Iron	Mg/L	n.d				0.30	0.30
9	Mn:Manganese	Mg/L	n.d				0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d				0.070	0.250
11	Ni:Nickel	Mg/L	n.d				0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.3				50.0	45.0
13	SO4:Sulfate	Mg/L	2.0				250.0	500.0
14	Zn:Zink	Mg/L	n.d				3.0	5.0
15	As:Arsenic	Mg/L	n.d				0.0	0.1
16	Ba:Barium	Mg/L	<0.01				0.70	0.10
17	Be:Berillium	Mg/L	n.d				NA	0.00020
18	Cd:Cadmium	Mg/L	0.0001				0.0030	0.0010
19	Pb:Lead	Mg/L	0.001				0.010	0.030
20	Hg:Mercury	Mg/L	0.00020				0.00100	0.00050
21	Se:Selenium	Mg/L	n.d				0.010	0.010
22	Sr:Strontium	Mg/L	n.d				NA	7.0
23	CN:Cyanide	Mg/L	n.d				0.070	0.035
24	Coli form bacteria	bacteria per 100 ml					-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
26	Total bacteria	bacteria per 1 ml					-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.6 Community Avtona
District Talin
Marz Aragatsotn

No.	Month	Date	Total amount of bacteria	Total amount of coliform bacteria	Coliform bacteria tolerant to heat
			nos/1mL	MPN/100mL	nos/100 mL
			Less than 50nos/1mL	Not Identified	Not Identified
1	2		164	15.0	Not Identified
2	3		168	15.0	Not Identified
3	4		136	9.0	Not Identified
4	5		137	9.0	Not Identified
5	6		133	9.0	Not Identified
6	7		18	1.4	Not Identified
7	8		140	9.0	Not Identified

No. 6 **Marz** Aragatsotn **Community** Avtona

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Fair	Possible	
2	Transmission pipeline	Fair	Possible	Pipeline is generally along or close to the road
3	Reservoir	Fair	Possible	

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Water main	40°23'00,9″	44°02'53,8″	2,101	1997	Concrete	2.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	100	80	Steel	2.0	1997	no	No

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°22'58.0″	44°02'52.3″	2,093	Steel	Circle	d=3m,l=10m	60	No

5. CHLORINATION EQUIPMENT

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	No			

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1,500	32	Steel	1998	Little	Yes
2	150	25	Polyethylene		no	No

7. PUMP STATION

Existence (Y/N)	Power source	Type	Capacity (l/s)	Pump head (m)	Tank cap. (m3)	House size (m)	Rehabilitation Necessity (Y/N)
No							

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
4	1998		No	0	Yes

9. DRAINAGE SYSTEM

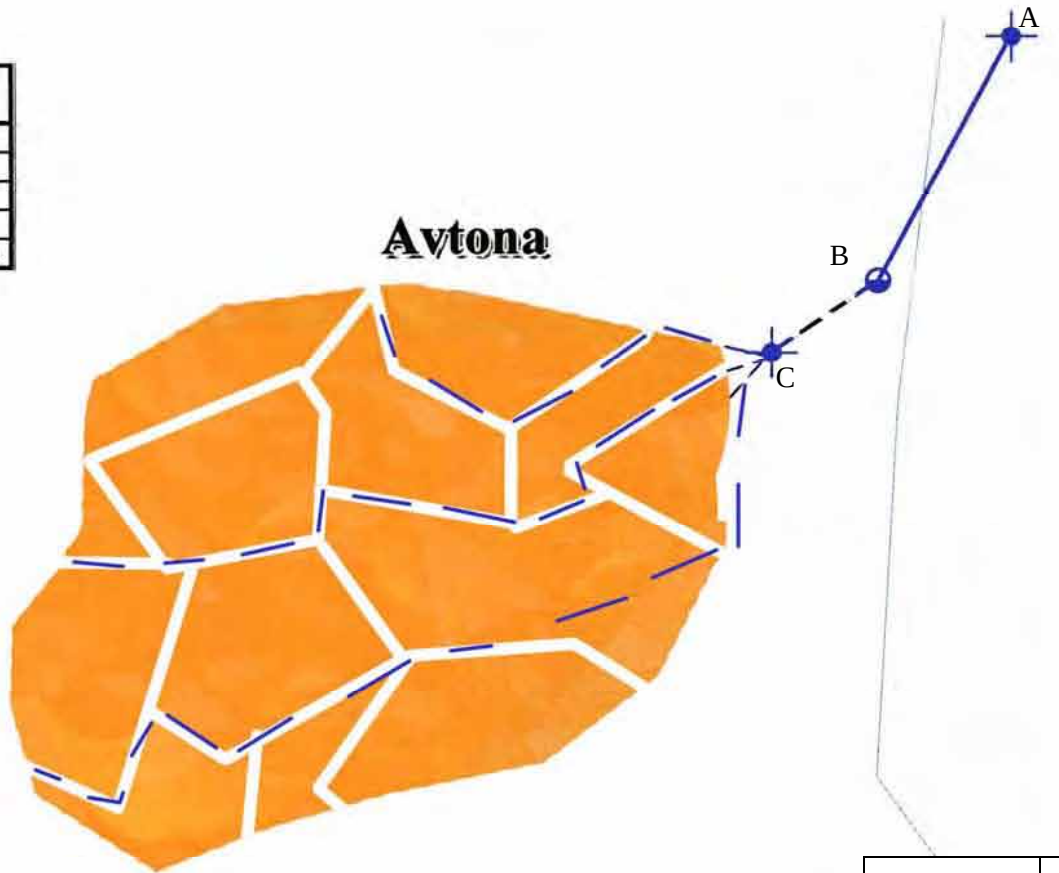
Existence (Y/N)	Rehabilitation Necessity (Y/N)	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Aragatsotn**
Number and Name of Community	**No.6 Avtona**
District	**Talin**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	363
A2	Actual population in 2007	280
A3	Number of households	30
A4.1	Elderly people	15
A4.2	Population in labor force (age from 16 to 62)	229
A4.3	Children	36
A5.1	Pensioners	16
A5.2	Unemployed	0
A5.3	Receiving benefits	2
A6	Average monthly income of household (AMD)	25,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	25
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	150
	Annual Budget of the community 2005, in thousand AMD	120
	Annual Budget of the community 2006, in thousand AMD	220
	Annual Budget of the community 2007, in thousand AMD	120
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	0
	Amount spent in drinking water sector 2005, in thousand AMD	0
	Amount spent in drinking water sector 2006, in thousand AMD	0
	Amount spent in drinking water sector 2007, in thousand AMD	0
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned.
C: Socio-Economic Survey		
C1	Major industries of the community:	dairy, meat
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1-Yes, 2-No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	2007
D5	Present condition of the water supply volume of Domestic use	insufficient
D6	Present condition of the water supply volume of Irrigation water	absent
D7	Number of house connection to drinking water system	0
D8	How many house connection household set the water meter	0
D9	Number of public taps	3
D10.1	How is the regime of water supply in your community in the dry season?	24 hrs (public tap)
D10.2	How is the regime of water supply in your community in the wet season?	24 hrs (public tap)
D11	What time of day water is given?	-
D12	Are you pleased with duration of domestic water supply?	mainly pleased
D13	Are hours of water supply convenient?	-
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	300
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	300
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flate rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	absent
D20	Are you satisfied with irrigation water supply volume?	is not sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	nobody
E2	Position	-
E3	Telephone	-
E4	Quantity and present condition of the water supply facilities: spring/ intake	1 rehabilitated·
E5	Quantity and present condition of the water supply facilities:	1 rehabilitated·
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	absent
E7	Quantity and present condition of the water supply facilities: net/distribution pipes	rehabilitated
E8	Quantity and present condition of the water supply facilities: public tap	rehabilitated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community
E12	How do you repair the water supply facilities?	inviting a specialist
E13	Who is in charge of the repair work in the community?	administration head
E14	How you prepare O&M costs?	no collection
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	0
	Others(AMD)	0
	Total (AMD)	0
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	resident participation
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	absent
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
100	80	Steel
DISTRIBUTION PIPELINE		
1500	32	Steel
150	25	Polyethylene



LEGENDS

- Operating DRR
- Regulation chamber
- Transmission pipeline
- Distribution pipeline

SCALE

0 25 50 75 100 125m

	N	E	H (m)
A	$40^0$23’00.9”	$44^0$02’53.8”	2101
B	$40^0$22’58.0”	$44^0$02’52.3”	2093
C	$40^0$22’57.2”	$44^0$02’51.1”	2088

Aragatsotn Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
06	Avtona	JICA STUDY TEAM 2007

Marz : **Aragatsotn** No.6
Name : **Avtona**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	280	persons	28.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	25	pupils	0.3	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	7 Livestocks (87lit/household)	30	household	2.6	
	Sub-total			30.9	
	Unaccouted for water (20%)			6.2	
1	Average Daily Water Demand			37.1	m3/day
2	Maximum Daily Water Demand			44.5	m3/day
3	Maximum Hourly Water Demand			9.6	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Distribution chamber	1	2.0	lit/sec		172.8	m3/day
`	Total					172.8	m3/day
	2 Required reservoir volume					116	m3

C WATER SUPPLY FACILITIES REHABILITATION PLAN

No	Item	Quantity	Unit
1	Intake		
	1m3	1	nos
	2m3		nos
	3m3		nos
	4m3		nos
2	Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter	100	m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	50m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter	1,500	m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	30	nos
6	Water meter installation	30	nos
7	Public tap	1	nos
8	Chlorination	1	nos
9	Pumps	-	nos

Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Aragatsotn	
No. 06	Avtona	JICA STUDY TEAM

Marz : **Aragatsotn**
No. : **6**
Name : **Avtona**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	1	nos	367,700	367,700
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					367,700
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm	100	m	8,040	804,000
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					804,000
3	Reservoir					
		50m3	1	nos	8,363,900	8,363,900
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					8,363,900
4	Distribution Pipe					
		50mm	1,500	m	5,520	8,280,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					8,280,000
5	House Connection		30	nos	74,000	2,220,000
6	Water Meter Installation		30	nos	80,000	2,400,000
7	Public Tap		1	nos	90,000	90,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	600	m	3,600	2,160,000
	Total				AMD	25,185,600
					Equivalent to USD	82,435
					Equivalent to JPY	8,696,913
					AMD	USD
	Investment Cost per household		30	HH	839,520	2,748
	Investment Cost per person		280	persons	89,949	294

ARAGATSOTN MARZ
Talin District
No 6 Avtona

PROJECTED INCOME STATEMENT **Unit: million AMD**

Description	Unit	Total	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A Water Sales Revenue																																										
Consumption water volume	1000m3/yr		11.3																																							
Unit rate	AMD/m3				40.00	40.00	40.00	41.32	70.00	72.31	74.70	77.16	115.65	119.47	123.41	127.48	131.69	136.03	140.52	145.16	149.95	154.90	160.01	165.29	170.75	176.38	182.20	188.21	194.42	200.84	207.47	214.31	221.39	228.69	236.24	244.04	252.09	260.41	269.00	277.88	287.05	296.52
Sub-total		62.98	0.00	0.00	0.18	0.36	0.41	0.42	0.71	0.73	0.76	0.78	1.17	1.21	1.25	1.29	1.34	1.38	1.43	1.47	1.52	1.57	1.62	1.68	1.73	1.79	1.85	1.91	1.97	2.04	2.11	2.18	2.25	2.32	2.40	2.48	2.56	2.64	2.73	2.82	2.91	3.01
B Operating Costs																																									
1. Staff salary																																									
Inspectors	person				1																																				
Pump operators	person				0																																				
Base Salary	AMD/m/p				20,000	20,660	21,342	22,046	22,774	23,525	24,301	25,103	25,932	26,788	27,672	28,585	29,528	30,502	31,509	32,549	33,623	34,732	35,879	37,063	38,286	39,549	40,854	42,202	43,595	45,034	46,520	48,055	49,641	51,279	52,971	54,719	56,525	58,390	60,317	62,308	64,364	66,488
Sub-total		17.70			0.24	0.25	0.26	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.37	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.51	0.52	0.54	0.56	0.58	0.60	0.62	0.64	0.66	0.68	0.70	0.72	0.75	0.77	0.80
2. Chlorine																																									
Pouring volume	kg/yr				68																																				
Unit rate	AMD/kg				600	620	640	661	683	706	729	753	778	804	830	858	886	915	945	976	1009	1042	1076	1112	1149	1186	1226	1266	1308	1351	1396	1442	1489	1538	1589	1642	1696	1752	1810	1869	1931	1995
Sub-total		2.97			0.02	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.12	0.12	0.12	0.13	0.13	0.14
3. Electricity (for pump)		0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. Maintenance cost		4.38			0.03	0.05	0.06	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.11	0.12	0.12	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.18	0.18	0.19	0.19	0.20
Pump repair					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe repair					0.03	0.05	0.06	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.11	0.12	0.12	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.18	0.18	0.19	0.19	0.20
5. Pump replacement		0.00																0.00															0.00									
Sub-total		25.05	0.00	0.00	0.29	0.34	0.36	0.37	0.39	0.40	0.41	0.43	0.44	0.45	0.47	0.49	0.50	0.52	0.53	0.56	0.57	0.59	0.61	0.63	0.65	0.67	0.69	0.73	0.74	0.77	0.79	0.82	0.85	0.87	0.91	0.93	0.97	1.00	1.02	1.07	1.09	1.14
C Gross Income (A-B)		37.93	0.00	0.00	-0.11	0.02	0.05	0.05	0.32	0.33	0.35	0.35	0.73	0.76	0.78	0.80	0.84	0.86	0.90	0.91	0.95	0.98	1.01	1.05	1.08	1.12	1.16	1.18	1.23	1.27	1.32	1.36	1.40	1.45	1.49	1.55	1.59	1.64	1.71	1.75	1.82	1.87
D Depreciation cost		23.80						0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
E Interest paid		9.45	0.02	0.04	0.19	0.34	0.39	0.40	0.40	0.40	0.40	0.40	0.40	0.39	0.37	0.36	0.35	0.34	0.33	0.32	0.30	0.29	0.28	0.27	0.25	0.24	0.23	0.21	0.20	0.19	0.17	0.16	0.15	0.13	0.12	0.10	0.09	0.07	0.06	0.05	0.03	0.02
F Net Income		4.68	-0.02	-0.04	-0.30	-0.32	-0.34	-1.03	-0.76	-0.75	-0.73	-0.73	-0.35	-0.31	-0.27	-0.24	-0.19	-0.16	-0.11	-0.09	-0.03	0.01	0.05	0.10	0.15	0.20	0.25	0.29	0.35	0.40	0.47	0.52	0.57	0.64	0.69	0.77	0.82	0.89	0.97	1.02	1.11	1.17
G Tax and duties		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H Net Income after deduction of TAX		4.68	-0.02	-0.04	-0.30	-0.32	-0.34	-1.03	-0.76	-0.75	-0.73	-0.73	-0.35	-0.31	-0.27	-0.24	-0.19	-0.16	-0.11	-0.09	-0.03	0.01	0.05	0.10	0.15	0.20	0.25	0.29	0.35	0.40	0.47	0.52	0.57	0.64	0.69	0.77	0.82	0.89	0.97	1.02	1.11	1.17
OM Cost Recovery Ratio (A/B)		251%	0%	0%	63%	107%	114%	114%	182%	183%	185%	181%	266%	269%	266%	263%	268%	265%	270%	263%	267%	266%	266%	267%	266%	267%	268%	262%	266%	265%	267%	266%	265%	267%	264%	267%	264%	264%	268%	264%	267%	264%

PROJECTED CASH FLOW STATEMENT **Unit: million AMD**

Description	Total	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
SOURCES OF FUNDS																																									
A Internal Cash Generation																																									
1. Net Income	4.68	-0.02	-0.04	-0.30	-0.32	-0.34	-1.03	-0.76	-0.75	-0.73	-0.73	-0.35	-0.31	-0.27	-0.24	-0.19	-0.16	-0.11	-0.09	-0.03	0.01	0.05	0.10	0.15	0.20	0.25	0.29	0.35	0.40	0.47	0.52	0.57	0.64	0.69	0.77	0.82	0.89	0.97	1.02	1.11	1.17
2. Depreciation cost	23.80	0.00	0.00	0.00	0.00	0.00	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
3. Interest Paid	9.45	0.02	0.04	0.19	0.34	0.39	0.40	0.40	0.40	0.40	0.40	0.40	0.39	0.37	0.36	0.35	0.34	0.33	0.32	0.30	0.29	0.28	0.27	0.25	0.24	0.23	0.21	0.20	0.19	0.17	0.16	0.15	0.13	0.12	0.10	0.09	0.07	0.06	0.05	0.03	0.02
Sub-total	37.93	0.00	0.00	-0.11	0.02	0.05	0.05	0.32	0.33	0.35	0.35	0.73	0.76	0.78	0.80	0.84	0.86	0.90	0.91	0.95	0.98	1.01	1.05	1.08	1.12	1.16	1.18	1.23	1.27	1.32	1.36	1.40	1.45	1.49	1.55	1.59	1.64	1.71	1.75	1.82	1.87
B Finances																																									
1. Project Loan	39.77	2.36	1.67	15.06	15.34	4.70	0.36	0.28																																	
2. Local fund	13.51	0.79	0.56	5.08	5.24	1.63	0.12	0.09																																	
Sub-total	53.28	3.15	2.23	20.14	20.58	6.33	0.48	0.37																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.11	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Subsidy for debt services	12.34	0.02	0.04	0.19	0.32	0.34	0.35	0.08	0.07	0.05	0.05	0.81	0.79	0.76	0.74	0.70	0.68	0.64	0.64	0.59	0.56	0.53	0.50	0.46	0.42	0.38	0.36	0.31	0.27	0.22	0.18	0.15	0.09	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	12.44	0.02	0.04	0.30	0.32	0.34	0.35	0.08	0.07	0.05	0.05	0.81	0.79	0.76	0.74	0.70	0.68	0.64	0.64	0.59	0.56	0.53	0.50	0.46	0.42	0.38	0.36	0.31	0.27	0.22	0.18	0.15	0.09	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Cash Inflow	103.65	3.17	2.27	20.33	20.92	6.72	0.88	0.77	0.40	0.40	0.40	1.54	1.55	1.54	1.54	1.54	1.54	1.54	1.55	1.54	1.54	1.54	1.55	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.55	1.54	1.54	1.55	1.59	1.64	1.71	1.75	1.82	1.87
APPLICATION OF FUNDS																																								
D Project disbursement	53.28	3.15	2.23	20.14	20.58	6.33	0.48	0.37																																	
E Total debt services																																								
1. Loan repayment	39.79											1.14	1.16	1.17	1.18	1.19	1.20	1.21	1.23	1.24	1.25	1.26	1.28	1.29	1.30	1.31	1.33	1.34	1.35	1.37	1.38	1.40	1.41	1.42	1.44	1.45	1.47	1.48	1.50	1.51	1.53
2. Interest paid	9.45	0.02	0.04	0.19	0.34	0.39	0.40	0.40	0.40	0.40	0.40	0.40	0.39	0.37	0.36	0.35	0.34	0.33	0.32	0.30	0.29	0.28	0.27	0.25	0.24	0.23	0.21	0.20	0.19	0.17	0.16	0.15	0.13	0.12	0.10	0.09	0.07	0.06	0.05	0.03	0.02
Sub-total	49.24	0.02	0.04	0.19	0.34	0.39	0.40	0.40	0.40	0.40	0.40	1.54	1.55	1.54	1.54	1.54	1.54	1.54	1.55	1.54	1.54	1.54	1.55	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.55	1.54	1.54	1.54	1.54	1.54	1.54	1.55	1.54	1.55
Total Cash Outflow	102.52	3.17	2.27	20.33	20.92	6.72	0.88	0.77	0.40	0.40	0.40	1.54	1.55	1.54	1.54	1.54	1.54	1.54	1.55	1.54	1.54	1.54	1.55	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.55	1.54	1.54	1.54	1.54	1.54	1.54	1.55	1.54	1.55
F Net Surplus Cash (A+C2)-E	1.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.10	0.17	0.20	0.28	0.32
Project Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	77%	0%	0%	0%	7%	13%	13%	80%	83%	88%	88%	47%	49%	51%	52%	55%	56%	58%	59%	62%	64%	66%	68%	70%	73%	75%	77%	80%	82%	86%	88%	90%	94%	97%	101%	103%	106%	111%	113%	118%	121%
Cost recovery by water fee + subsidy ((A+C2)/E)	102%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	101%	103%	106%	111%	113%	118%	121%

ARAGATSOTN MARZ
Talin District
No 6 Avtona

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	62.98	83.5%
	Subsidy	12.44	16.5%
	Total	75.42	100.0%
2	**Expenditure**		
	OM cost	25.05	33.2%
	Loan repayment	39.79	52.8%
	Interest paid	9.45	12.5%
	Surplus cash	1.13	1.5%
	Total	75.42	100.0%

B. FIRR CALCULATION **Unit: million AMD**

Description	Total	Year																																						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A COST																																								
1. Investment Cost	36.05	2.30	1.64	13.80	13.64	4.08	0.33	0.26																																
2. Operation and Maintenance Cost																																								
Salary	9.12			0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Chlorine	1.50			0.02	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Electricity	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mantenance cost	2.24			0.03	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Pump replacement																	0.00															0.00									
Sub-total	12.86			0.29	0.33	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Total Outflow	48.91	2.30	1.64	14.09	13.97	4.42	0.67	0.60	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
B BENEFIT																																								
1. Water Tariff	39.45	0.00	0.00	0.18	0.36	0.41	0.42	0.71	0.73	0.76	0.78	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17
2. Subsidy	5.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.40	0.39	0.38	0.35	0.34	0.31	0.32	0.29	0.27	0.25	0.23	0.21	0.18	0.15	0.15	0.11	0.08	0.05	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Inflow	44.45	0.00	0.00	0.29	0.36	0.41	0.42	0.71	0.73	0.76	0.78	1.58	1.57	1.56	1.55	1.52	1.51	1.48	1.49	1.46	1.44	1.42	1.40	1.38	1.35	1.32	1.32	1.28	1.25	1.22	1.19	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17
NET BENEFIT	-4.46	-2.30	-1.64	-13.8	-13.6	-4.0	-0.25	0.11	0.39	0.42	0.44	1.24	1.23	1.22	1.21	1.18	1.17	1.14	1.15	1.12	1.10	1.08	1.06	1.04	1.01	0.98	0.98	0.94	0.91	0.88	0.85	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83

FIRR = -0.66%

C. SENSITIVITY ANALYSIS

No.		Description	PV 1.75%	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	1	Capital cost 10% up	-15.99	-2.53	-1.80	-15.2	-15.0	-4.4	-0.28	0.08	0.39	0.42	0.44	1.24	1.23	1.22	1.21	1.18	1.17	1.14	1.15	1.12	1.10	1.08	1.06	1.04	1.01	0.98	0.98	0.94	0.91	0.88	0.85	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	2	Capital cost 20% up	-19.38	-2.76	-1.97	-16.6	-16.3	-4.8	-0.32	0.06	0.39	0.42	0.44	1.24	1.23	1.22	1.21	1.18	1.17	1.14	1.15	1.12	1.10	1.08	1.06	1.04	1.01	0.98	0.98	0.94	0.91	0.88	0.85	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
2	1	OM cost 10% up	-13.49	-2.30	-1.64	-13.8	-13.6	-4.0	-0.28	0.08	0.36	0.39	0.41	1.21	1.20	1.19	1.18	1.15	1.14	1.11	1.12	1.09	1.07	1.05	1.03	1.01	0.98	0.95	0.95	0.91	0.88	0.85	0.82	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
	2	OM cost 20% up	-14.39	-2.30	-1.64	-13.9	-13.7	-4.1	-0.32	0.04	0.32	0.35	0.37	1.17	1.16	1.15	1.14	1.11	1.10	1.07	1.08	1.05	1.03	1.01	0.99	0.97	0.94	0.91	0.91	0.87	0.84	0.81	0.78	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
3	1	Revenue 10% down	-15.63	-2.30	-1.64	-13.8	-13.6	-4.1	-0.29	0.04	0.32	0.34	0.36	1.08	1.07	1.06	1.06	1.03	1.02	0.99	1.00	0.97	0.96	0.94	0.92	0.90	0.88	0.85	0.85	0.81	0.79	0.76	0.73	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
	2	Revenue 20% down	-18.66	-2.30	-1.64	-13.9	-13.7	-4.1	-0.33	-0.03	0.24	0.27	0.28	0.92	0.92	0.91	0.90	0.88	0.87	0.84	0.85	0.83	0.81	0.80	0.78	0.76	0.74	0.72	0.72	0.68	0.66	0.64	0.61	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-1.11%	-4.12	-24.27%
	2	Capital cost 20% up	-1.52%	-5.70	-17.54%
2	1	OM cost 10% up	-0.85%	-2.33	-42.95%
	2	OM cost 20% up	-1.06%	-3.81	-26.27%
3	1	Revenue 10% down	-1.38%	-5.24	-19.09%
	2	Revenue 20% down	-2.19%	-7.01	-14.27%