No.33 Lusakn

Information on Existing Water Sources (Aragatsotn)

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

No.33 Community Lusakn
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	Water Main	40	19	51.5	43	49	3.7	1,340	0.2	0.4	0.2
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	For Lousakn "Chlkanner" water main is the water source, from which it was planned to supply 1l/sec water amount, however only 0.2l/sec is taken presently.
Alternative sources if any	No alternative water sources are available

No.33 Community Lusakn
District Talin
Marz Aragatsotn
Sampling date 28/Jul/2007

	Parameters analysed	Units	No.1				Guidelines	
							WHO	Armenia
a	pH		8.3				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	23					
c	TDS	Mg/L	39				1000	1000
1	Al:Aluminum	Mg/L	n.d				0.10	0.50
2	B:Boron	Mg/L	n.d				0.70	0.50
3	Cl:Chloride	Mg/L	6				250	350
4	Cr:Chrome	Mg/L	n.d				0.05	0.05
5	Cu:Copper	Mg/L	n.d				2	1
6	F:Fluoride	Mg/L	0.02				1.50	
7	Hardness	Mg/L	210				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	0.9				50.0	45.0
13	SO4:Sulfate	Mg/L	4.0				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	n.d				0.0030	0.0010
19	Pb:Lead	Mg/L	0.001				0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002				0.00100	0.00050
21	Se:Selenium	Mg/L	<0.001				0.010	0.010
22	Sr:Strontium	Mg/L	<0.7				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.33 Community Lusakn
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	1		164	15.0	Not Identified
2	2		168	15.0	Not Identified
3	3		164	15.0	Not Identified
4	5		164	15.0	Not Identified
5	6		164	15.0	Not Identified
6	7		154	15.0	Not Identified

No. **33** **Marz** Aragatsotn **Community** Lusakn

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Fair	Possible	
2	Water main	Difficult	Possible	Pipeline is mostly far from 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°19'51.5″	43°49'03.7″	1,340	2004	Steel	0.2	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1,830	65	Steel	0.2	2004	Medium	Yes
	1,400	50	Steel		2004	Medium	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°18'05.7″	43°49'15.0″	1197	reinforced concrete	Rectangular	2x(8x8x5)	2x250	No

5. CHLORINATION

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	Yes	Reservoir	Powder	Twice per month

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1600	150	Steel	1987	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)
2	1987		Yes	100	Yes

9. DRAINAGE SYSTEM

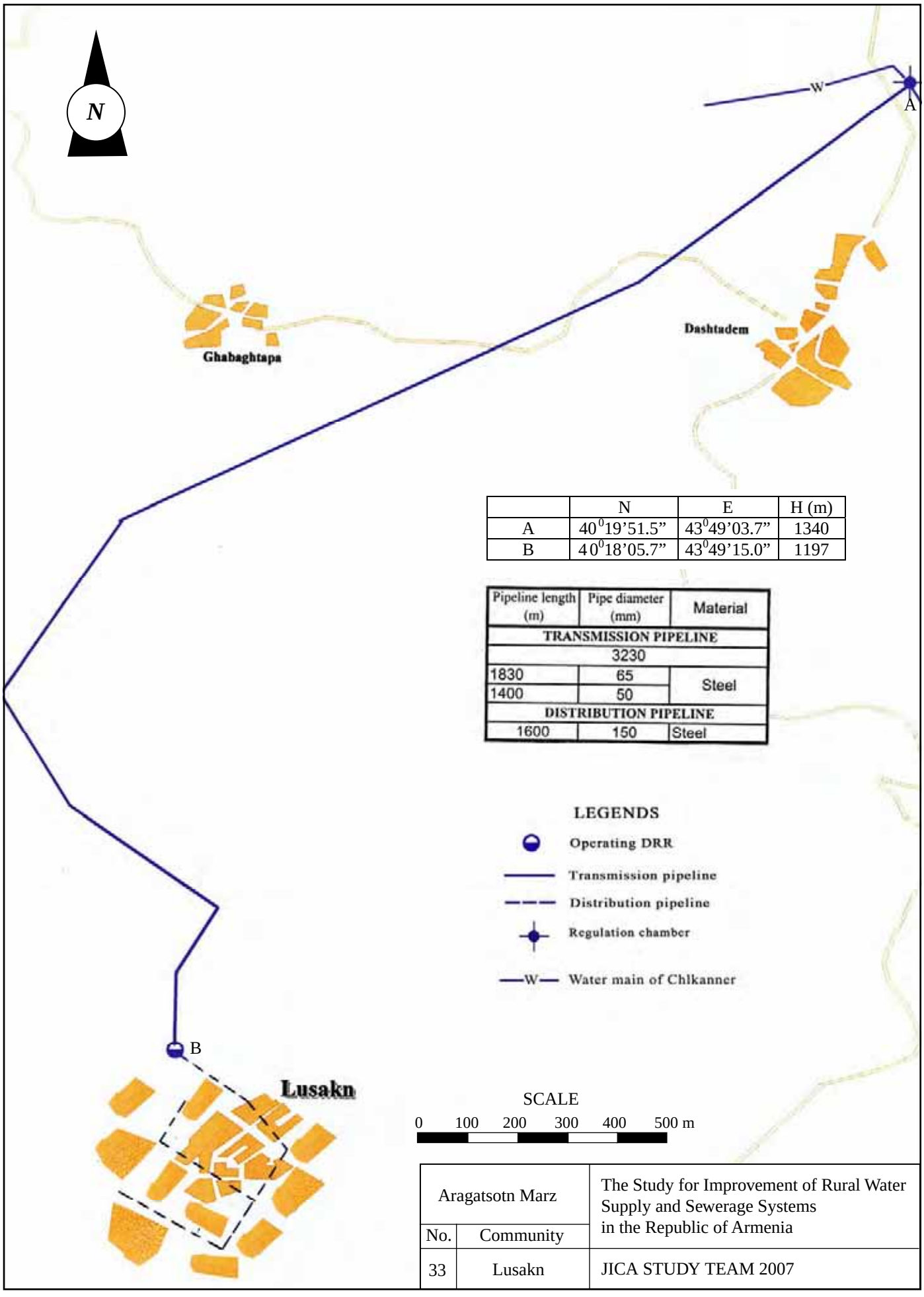
Existence (Y/N)	Rehabilitation Necessity	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Aragatsotn**
Number and Name of Community	**No.33 Lusakn**
District	**Talin**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	263
A2	Actual population in 2007	200
A3	Number of households	70
A4.1	Elderly people	6
A4.2	Population in labor force (age from 16 to 62)	121
A4.3	Children	58
A5.1	Pensioners	11
A5.2	Unemployed	32
A5.3	Receiving benefits	6
A6	Average monthly income of household (AMD)	50,000
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	36
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	1,900
	Annual Budget of the community 2005, in thousand AMD	2,250
	Annual Budget of the community 2006, in thousand AMD	2,100
	Annual Budget of the community 2007, in thousand AMD	1,500
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	11
	Amount spent in drinking water sector 2005, in thousand AMD	0
	Amount spent in drinking water sector 2006, in thousand AMD	300
	Amount spent in drinking water sector 2007, in thousand AMD	200
	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, dried 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	almost sufficient
D7	Number of house connection to drinking water system	40
D8	How many house connection household set the water meter	0
D9	Number of public taps	4
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?	irregularly 4 hrs
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?	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	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?	WUA
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	Darbinyan Gagik
E2	Position	2-nd class specialist
E3	Telephone	(093)742883
E4	Quantity and present condition of the water supply facilities: spring/ intake	2 partially repaired
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)	1 partially repaired
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	partially repaired
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?	administration head
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)	300,000
	Repair cost(AMD)	200,000
	Others(AMD)	0
	Total (AMD)	500,000
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	yes
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

Aragatsotn
No.33 Lusakn



	N	E	H (m)
A	$40^0$19’51.5”	$43^0$49’03.7”	1340
B	$40^0$18’05.7”	$43^0$49’15.0”	1197

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
3230		
1830	65	Steel
1400	50	
DISTRIBUTION PIPELINE		
1600	150	Steel

LEGENDS

- Operating DRR
- Transmission pipeline
- Distribution pipeline
- Regulation chamber
- W Water main of Chlkanner

SCALE

0 100 200 300 400 500 m

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

Marz : **Aragatsotn** No.33
Name : **Lusakn**

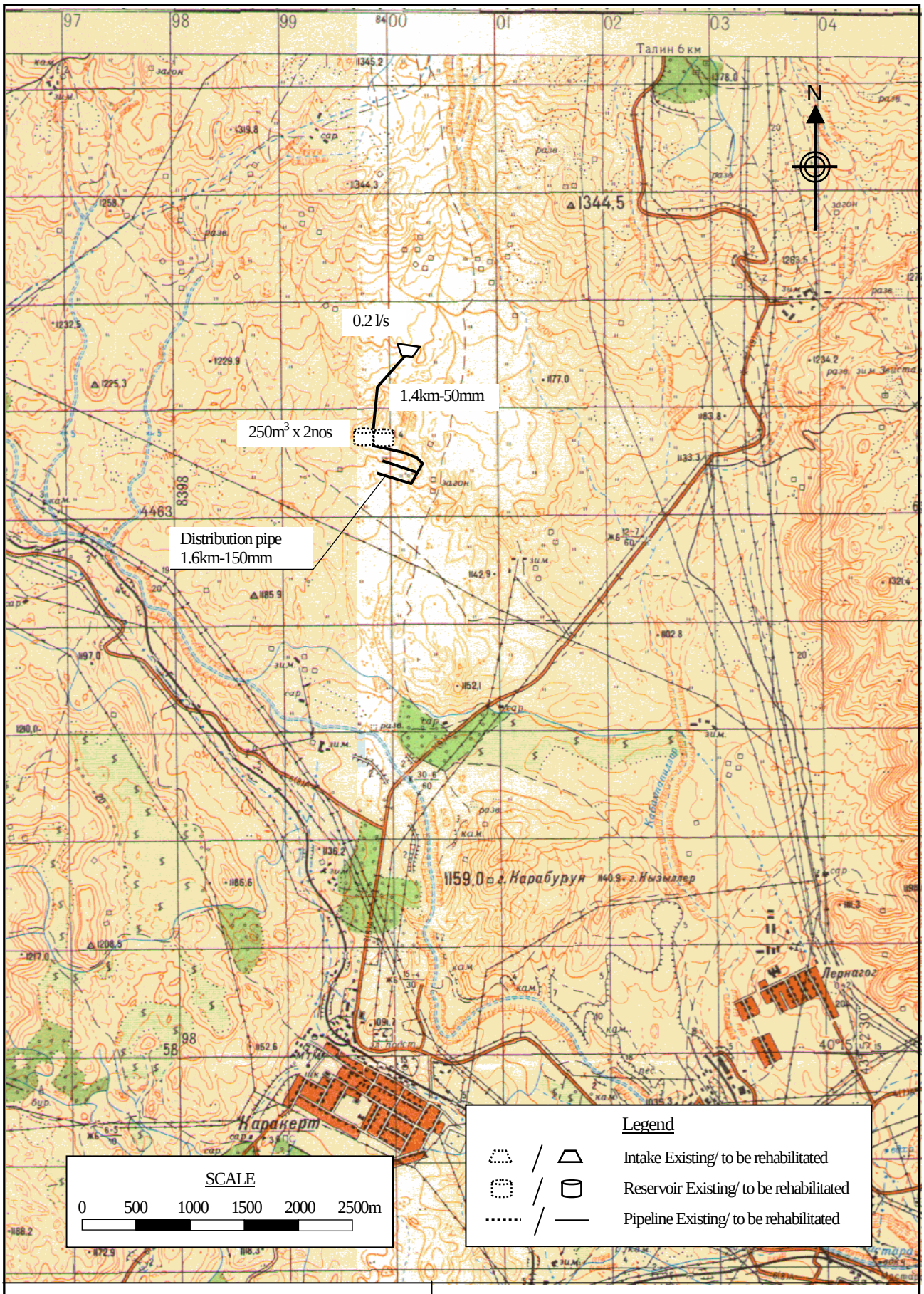
No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	200	persons	20.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	36	pupils	0.4	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	70	household	6.1	
	Sub-total			26.5	
	Unaccouted for water (20%)			5.3	
1	Average Daily Water Demand		19.8	31.8	m3/day
2	Maximum Daily Water Demand			38.2	m3/day
3	Maximum Hourly Water Demand			8.3	m3/hr

B WATER SUPPLY PLAN

		Nr.	Total vol.			
1	Water source type					
a	Existing pipeline	1	0.2	lit/sec	17.3	m3/day
`	Total				17.3	m3/day
2	Additional water source					
2	Required reservoir volume				99	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	1,400	m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
4	Distribution pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter	1,600	m
	200mm diameter		m
	250mm diameter		m
5	House connection	30	nos
6	Water meter installation	70	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. 33	Lusaskn	JICA STUDY TEAM

Marz : **Aragatsotn**
No. : **33**
Name : **Lusakn**

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	1,400	m	5,520	7,728,000
		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					7,728,000
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		m	9,680	
		150mm	1,600	m	13,140	21,024,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					21,024,000
5	House Connection		30	nos	74,000	2,220,000
6	Water Meter Installation		70	nos	80,000	5,600,000
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	640	m	3,600	2,304,000
	Total				AMD	39,833,700
					Equivalent to USD	130,380
					Equivalent to JPY	13,755,091
					AMD	USD
	Investment Cost per household		70	HH	569,053	1,863
	Investment Cost per person		200	persons	199,169	652

ARAGATSOTN MARZ
Talin District
No 33 Lusakn

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		9.7																																							
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		54.04	0.00	0.00	0.15	0.31	0.35	0.36	0.61	0.63	0.65	0.67	1.01	1.04	1.07	1.11	1.15	1.18	1.22	1.26	1.31	1.35	1.39	1.44	1.49	1.54	1.59	1.64	1.69	1.75	1.81	1.87	1.93	1.99	2.06	2.12	2.19	2.27	2.34	2.42	2.50	2.58
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				59																																					
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		2.59			0.02	0.04	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	0.10	0.10	0.10	0.11	0.11	0.11	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		12.46			0.07	0.15	0.18	0.19	0.19	0.20	0.21	0.21	0.22	0.23	0.24	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.30	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.40	0.41	0.42	0.44	0.45	0.47	0.48	0.50	0.51	0.53	0.55	0.57
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					0.07	0.15	0.18	0.19	0.19	0.20	0.21	0.21	0.22	0.23	0.24	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.30	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.40	0.41	0.42	0.44	0.45	0.47	0.48	0.50	0.51	0.53	0.55	0.57
5. Pump replacement		0.00																0.00															0.00									
Sub-total		32.75	0.00	0.00	0.33	0.44	0.48	0.49	0.50	0.52	0.54	0.55	0.58	0.60	0.62	0.63	0.65	0.68	0.71	0.73	0.75	0.78	0.79	0.83	0.86	0.88	0.91	0.94	0.97	1.00	1.04	1.08	1.11	1.15	1.18	1.23	1.26	1.30	1.34	1.39	1.43	1.49
C Gross Income (A-B)		21.29	0.00	0.00	-0.18	-0.13	-0.13	-0.13	0.11	0.11	0.11	0.12	0.43	0.44	0.45	0.48	0.50	0.50	0.51	0.53	0.56	0.57	0.60	0.61	0.63	0.66	0.68	0.70	0.72	0.75	0.77	0.79	0.82	0.84	0.88	0.89	0.93	0.97	1.00	1.03	1.07	1.09
D Depreciation cost		37.80						1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08
E Interest paid		13.52	0.02	0.04	0.26	0.50	0.56	0.57	0.57	0.57	0.57	0.57	0.57	0.55	0.54	0.52	0.50	0.49	0.47	0.45	0.44	0.42	0.40	0.38	0.36	0.34	0.33	0.31	0.29	0.27	0.25	0.23	0.21	0.19	0.17	0.15	0.13	0.11	0.09	0.07	0.04	0.02
F Net Income		-30.03	-0.02	-0.04	-0.44	-0.63	-0.69	-1.78	-1.54	-1.54	-1.54	-1.53	-1.22	-1.19	-1.17	-1.12	-1.08	-1.07	-1.04	-1.00	-0.96	-0.93	-0.88	-0.85	-0.81	-0.76	-0.73	-0.69	-0.65	-0.60	-0.56	-0.52	-0.47	-0.43	-0.37	-0.34	-0.28	-0.22	-0.17	-0.12	-0.05	-0.01
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		-30.03	-0.02	-0.04	-0.44	-0.63	-0.69	-1.78	-1.54	-1.54	-1.54	-1.53	-1.22	-1.19	-1.17	-1.12	-1.08	-1.07	-1.04	-1.00	-0.96	-0.93	-0.88	-0.85	-0.81	-0.76	-0.73	-0.69	-0.65	-0.60	-0.56	-0.52	-0.47	-0.43	-0.37	-0.34	-0.28	-0.22	-0.17	-0.12	-0.05	-0.01
OM Cost Recovery Ratio (A/B)		165%	0%	0%	46%	71%	73%	73%	122%	121%	120%	122%	174%	173%	173%	176%	177%	174%	172%	173%	175%	173%	176%	173%	173%	175%	175%	174%	174%	175%	174%	173%	174%	173%	175%	172%	174%	175%	175%	174%	175%	173%

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	-30.03	-0.02	-0.04	-0.44	-0.63	-0.69	-1.78	-1.54	-1.54	-1.54	-1.53	-1.22	-1.19	-1.17	-1.12	-1.08	-1.07	-1.04	-1.00	-0.96	-0.93	-0.88	-0.85	-0.81	-0.76	-0.73	-0.69	-0.65	-0.60	-0.56	-0.52	-0.47	-0.43	-0.37	-0.34	-0.28	-0.22	-0.17	-0.12	-0.05	-0.01
2. Depreciation cost	37.80	0.00	0.00	0.00	0.00	0.00	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08
3. Interest Paid	13.52	0.02	0.04	0.26	0.50	0.56	0.57	0.57	0.57	0.57	0.57	0.57	0.55	0.54	0.52	0.50	0.49	0.47	0.45	0.44	0.42	0.40	0.38	0.36	0.34	0.33	0.31	0.29	0.27	0.25	0.23	0.21	0.19	0.17	0.15	0.13	0.11	0.09	0.07	0.04	0.02
Sub-total	21.29	0.00	0.00	-0.18	-0.13	-0.13	-0.13	0.11	0.11	0.11	0.12	0.43	0.44	0.45	0.48	0.50	0.50	0.51	0.53	0.56	0.57	0.60	0.61	0.63	0.66	0.68	0.70	0.72	0.75	0.77	0.79	0.82	0.84	0.88	0.89	0.93	0.97	1.00	1.03	1.07	1.09
B Finances																																									
1. Project Loan	57.12	2.36	1.67	22.52	23.06	6.87	0.36	0.28																																	
2. Local fund	19.45	0.79	0.56	7.61	7.91	2.37	0.12	0.09																																	
Sub-total	76.57	3.15	2.23	30.13	30.97	9.24	0.48	0.37																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.56	0.00	0.00	0.18	0.13	0.13	0.13	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	0.00
2. Subsidy for debt services	48.78	0.02	0.04	0.26	0.50	0.56	0.57	0.46	0.46	0.46	0.45	1.78	1.77	1.77	1.73	1.71	1.72	1.70	1.68	1.66	1.65	1.61	1.60	1.58	1.55	1.54	1.52	1.50	1.46	1.44	1.42	1.39	1.37	1.33	1.32	1.28	1.25	1.22	1.19	1.14	1.12
Sub-total	49.34	0.02	0.04	0.44	0.63	0.69	0.70	0.46	0.46	0.46	0.45	1.78	1.77	1.77	1.73	1.71	1.72	1.70	1.68	1.66	1.65	1.61	1.60	1.58	1.55	1.54	1.52	1.50	1.46	1.44	1.42	1.39	1.37	1.33	1.32	1.28	1.25	1.22	1.19	1.14	1.12
Total Cash Inflow	147.20	3.17	2.27	30.39	31.47	9.80	1.05	0.94	0.57	0.57	0.57	2.21	2.21	2.22	2.21	2.21	2.22	2.21	2.21	2.22	2.22	2.21	2.21	2.21	2.21	2.22	2.22	2.22	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.22	2.22	2.22	2.21	2.21
APPLICATION OF FUNDS																																								
D Project disbursement	76.57	3.15	2.23	30.13	30.97	9.24	0.48	0.37																																	
E Total debt services																																								
1. Loan repayment	57.11											1.64	1.66	1.68	1.69	1.71	1.73	1.74	1.76	1.78	1.80	1.81	1.83	1.85	1.87	1.89	1.91	1.93	1.94	1.96	1.98	2.00	2.02	2.04	2.06	2.08	2.11	2.13	2.15	2.17	2.19
2. Interest paid	13.52	0.02	0.04	0.26	0.50	0.56	0.57	0.57	0.57	0.57	0.57	0.57	0.55	0.54	0.52	0.50	0.49	0.47	0.45	0.44	0.42	0.40	0.38	0.36	0.34	0.33	0.31	0.29	0.27	0.25	0.23	0.21	0.19	0.17	0.15	0.13	0.11	0.09	0.07	0.04	0.02
Sub-total	70.63	0.02	0.04	0.26	0.50	0.56	0.57	0.57	0.57	0.57	0.57	2.21	2.21	2.22	2.21	2.21	2.22	2.21	2.21	2.22	2.22	2.21	2.21	2.21	2.21	2.22	2.22	2.22	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.22	2.22	2.22	2.21	2.21
Total Cash Outflow	147.20	3.17	2.27	30.39	31.47	9.80	1.05	0.94	0.57	0.57	0.57	2.21	2.21	2.22	2.21	2.21	2.22	2.21	2.21	2.22	2.22	2.21	2.21	2.21	2.21	2.22	2.22	2.22	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.22	2.22	2.22	2.21	2.21
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)	30%	0%	0%	0%	0%	0%	0%	19%	19%	19%	21%	19%	20%	20%	22%	23%	23%	23%	24%	25%	26%	27%	28%	29%	30%	31%	32%	32%	34%	35%	36%	37%	38%	40%	40%	42%	44%	45%	46%	48%	49%
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 33 Lusakn

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	54.04	52.3%
	Subsidy	49.34	47.7%
	Total	103.38	100.0%
2	**Expenditure**		
	OM cost	32.75	31.7%
	Loan repayment	57.11	55.2%
	Interest paid	13.52	13.1%
	Surplus cash	0.00	0.0%
	Total	103.38	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	51.54	2.30	1.64	20.61	20.46	5.94	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
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
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
Mantenance cost	6.34			0.07	0.15	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Pump replacement																	0.00															0.00								
Sub-total	16.95			0.33	0.42	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Total Outflow	68.49	2.30	1.64	20.94	20.88	6.39	0.78	0.71	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
B BENEFIT																																							
1. Water Tariff	34.03	0.00	0.00	0.15	0.31	0.35	0.36	0.61	0.63	0.65	0.67	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
2. Subsidy	36.27	0.00	0.00	0.18	0.13	0.13	0.13	0.00	0.00	0.00	0.00	1.21	1.22	1.23	1.21	1.21	1.23	1.23	1.23	1.22	1.23	1.21	1.22	1.22	1.21	1.21	1.21	1.21	1.19	1.19	1.19	1.18	1.18	1.16	1.17	1.15	1.14	1.13	1.12	1.10	1.10
Total Inflow	70.30	0.00	0.00	0.33	0.44	0.48	0.49	0.61	0.63	0.65	0.67	2.22	2.23	2.24	2.22	2.22	2.24	2.24	2.24	2.23	2.24	2.22	2.23	2.23	2.22	2.22	2.22	2.22	2.20	2.20	2.20	2.19	2.19	2.17	2.18	2.16	2.15	2.14	2.13	2.11	2.11
NET BENEFIT	1.82	-2.30	-1.64	-20.6	-20.4	-5.9	-0.29	-0.10	0.18	0.20	0.22	1.77	1.78	1.79	1.77	1.77	1.79	1.79	1.79	1.78	1.79	1.77	1.78	1.78	1.77	1.77	1.77	1.77	1.75	1.75	1.75	1.74	1.74	1.72	1.73	1.71	1.70	1.69	1.68	1.66	1.66

FIRR = 0.16%

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	-18.37	-2.53	-1.80	-22.7	-22.5	-6.5	-0.32	-0.13	0.18	0.20	0.22	1.77	1.78	1.79	1.77	1.77	1.79	1.79	1.79	1.78	1.79	1.77	1.78	1.78	1.77	1.77	1.77	1.77	1.75	1.75	1.75	1.74	1.74	1.72	1.73	1.71	1.70	1.69	1.68	1.66	1.66
	2	Capital cost 20% up	-23.22	-2.76	-1.97	-24.7	-24.5	-7.1	-0.36	-0.15	0.18	0.20	0.22	1.77	1.78	1.79	1.77	1.77	1.79	1.79	1.79	1.78	1.79	1.77	1.78	1.78	1.77	1.77	1.77	1.77	1.75	1.75	1.75	1.74	1.74	1.72	1.73	1.71	1.70	1.69	1.68	1.66	1.66
2	1	OM cost 10% up	-14.71	-2.30	-1.64	-20.6	-20.5	-6.0	-0.34	-0.15	0.14	0.16	0.18	1.73	1.74	1.75	1.73	1.73	1.75	1.75	1.75	1.74	1.75	1.73	1.74	1.74	1.73	1.73	1.73	1.73	1.71	1.71	1.71	1.70	1.70	1.68	1.69	1.67	1.66	1.65	1.64	1.62	1.62
	2	OM cost 20% up	-15.89	-2.30	-1.64	-20.7	-20.5	-6.0	-0.38	-0.19	0.09	0.11	0.13	1.68	1.69	1.70	1.68	1.68	1.70	1.70	1.70	1.69	1.70	1.68	1.69	1.69	1.68	1.68	1.68	1.68	1.66	1.66	1.66	1.65	1.65	1.63	1.64	1.62	1.61	1.60	1.59	1.57	1.57
3	1	Revenue 10% down	-18.20	-2.30	-1.64	-20.6	-20.5	-6.0	-0.34	-0.16	0.12	0.14	0.15	1.55	1.56	1.57	1.55	1.55	1.57	1.57	1.57	1.56	1.57	1.55	1.56	1.56	1.55	1.55	1.55	1.55	1.53	1.53	1.53	1.52	1.52	1.50	1.51	1.49	1.49	1.48	1.47	1.45	1.45
	2	Revenue 20% down	-22.88	-2.30	-1.64	-20.7	-20.5	-6.0	-0.39	-0.22	0.05	0.07	0.09	1.33	1.33	1.34	1.33	1.33	1.34	1.34	1.34	1.33	1.34	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.31	1.31	1.31	1.30	1.30	1.29	1.29	1.28	1.27	1.26	1.25	1.24	1.24

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.28%	-15.76	-6.34%
	2	Capital cost 20% up	-0.68%	-12.39	-8.07%
2	1	OM cost 10% up	0.01%	139.06	0.72%
	2	OM cost 20% up	-0.14%	-21.36	-4.68%
3	1	Revenue 10% down	-0.49%	-13.31	-7.51%
	2	Revenue 20% down	-1.21%	-11.33	-8.82%

No.34 Tsaghkahovit

Information on Existing Water Sources (Aragatsotn)

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

No.34 Community Tsaghkahovit
District Aragats
Marz Aragatsotn

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	3 spring intakes	40	32	21.9	44	12	5.4	3,129	25.0	40.0	40.0
2	a spring intake	40	36	3.8	44	11	7.2	2,412	7.0	13.0	11.5
3	a spring intake	40	36	30.3	44	11	9.3	2,355			
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	The internal network is in deteriorated condition, there is estimated 60% leakage
Alternative sources if any	There is great water stock in the area of "Jaghatsner" spring.

No.34 Community Tsaghkahovit
District Aragats
Marz Aragatsotn
Sampling date 13/Jul/2007

	Parameters analysed	Units	No.1				Guidelines	
							WHO	Armenia
a	pH		6.5				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	6					
c	TDS	Mg/L	28				1000	1000
1	Al:Aluminum	Mg/L	0.01				0.10	0.50
2	B:Boron	Mg/L	n.d				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	0.04				1.50	
7	Hardness	Mg/L	30				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	1.8				50.0	45.0
13	SO4:Sulfate	Mg/L	6.0				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	n.d				0.70	0.10
17	Be:Berillium	Mg/L	n.d				NA	0.00020
18	Cd:Cadmium	Mg/L	n.d				0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001				0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002				0.00100	0.00050
21	Se:Selenium	Mg/L	<0.001				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	n.d				-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml	n.d				0	0
26	Total bacteria	bacteria per 1 ml	47				-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.34 Community Tsaghkahovit
District Aragats
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		8-82	0.4-1.5	Not Identified
2	3		8-82	0.4-1.5	Not Identified
3	4		8-82	0.4-1.5	Not Identified
4	6		3-20	Not Identified	Not Identified
5	7		4-23	0.4-1.5	Not Identified
6	8		4-21	Not Identified	Not Identified

No. 34 **Marz** Aragatsotn **Community** Tsaghkahovit

1. ACCESSIBILITY TO THE SITE

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

2. INTAKE STRUCTURE

No.	Water main	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°32'21.9″	44°12'05.4″	3,129	2006	reinforced concrete	40.0	No
2	Spring					reinforced concrete		No
3	Spring					reinforced concrete		No
4	Spring	40°36'03.8″	44°11'07.2″	2,412	1953	reinforced concrete	11.5	Yes
5	Spring	40°36'30.3″	44°11'09.3″	2,355	1953	Steel		Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1600	200	Steel	38	2006	Little	No
	10400	150	Steel			Little	No
2	4500	150	Steel	7	1953	Medium	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°37'37.6″	44°12'29.5″	2168	reinforced concrete	Rectangular	2×(4×14×12	2×650	Yes

5. CHLORINATION EQUIPMENT

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	Yes	Reservoir		no chlorination

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	2000	300	cast iron	1955	Medium	Yes
2	2000	100	cast iron		Medium	Yes
2	2000	150	Steel		Huge	Yes
4	2000	100	Steel		Huge	Yes
5	1000	80	Steel		Huge	Yes
6	1000	65	Steel		Huge	Yes
7	1000	50	Steel		Huge	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)
20	1955		No	0	Yes

9. DRAINAGE SYSTEM

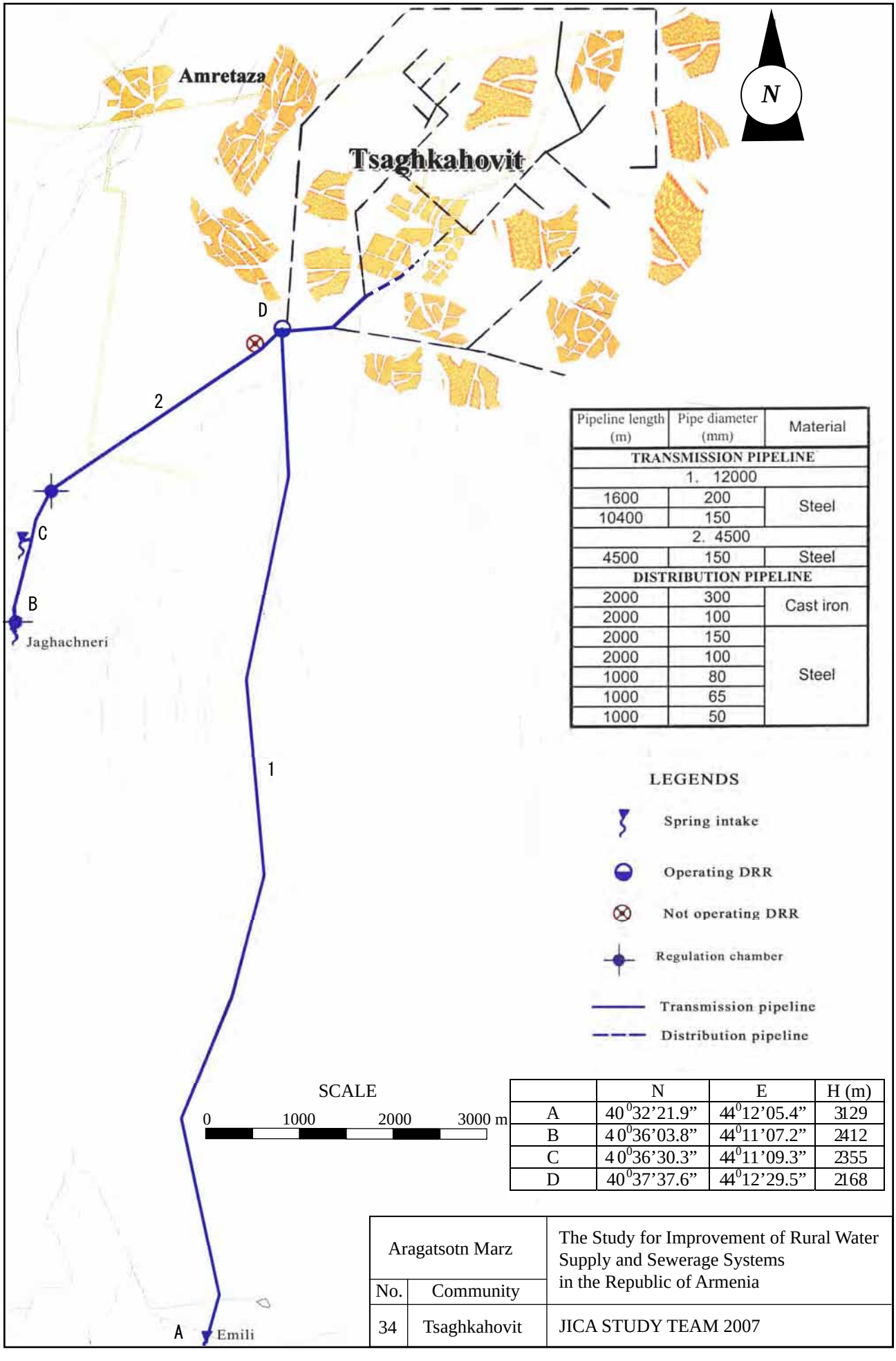
Existence (Y/N)	Rehabilitation Necessity (Y/N)	Remarks
Yes	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Aragatsotn**
Number and Name of Community	**No.34 Tsaghkahovit**
District	**Aragats**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	2,150
A2	Actual population in 2007	2,165
A3	Number of households	621
A4.1	Elderly people	170
A4.2	Population in labor force (age from 16 to 62)	1,400
A4.3	Children	542
A5.1	Pensioners	225
A5.2	Unemployed	50
A5.3	Receiving benefits	86
A6	Average monthly income of household (AMD)	10,000
A7	Number of medical ambulance staion/first and health post	1
A8	Number of beds in each medical ambulance staion	20
A9	Number of school	1
A10	Number of pupils	328
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	5,910
	Annual Budget of the community 2005, in thousand AMD	5,615
	Annual Budget of the community 2006, in thousand AMD	7,400
	Annual Budget of the community 2007, in thousand AMD	2,998
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	2,100
	Amount spent in drinking water sector 2005, in thousand AMD	2,100
	Amount spent in drinking water sector 2006, in thousand AMD	2,100
	Amount spent in drinking water sector 2007, in thousand AMD	2,100
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned.
C: Socio-Economic Survey		
C1	Major industries of the community:	cereals, vegetables
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	in process
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	590
D8	How many house connection household set the water meter	0
D9	Number of public taps	20
D10.1	How is the regime of water supply in your community in the dry season?	no water at all
D10.2	How is the regime of water supply in your community in the wet season?	regularly 6 hrs
D11	What time of day water is given?	8-11; 15-18
D12	Are you pleased with duration of domestic water supply?	mainly displeased
D13	Are hours of water supply convenient?	mainly 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)	120
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	400
D16	Drinking water monthly water fee per household	500drams
D17	How often do you usually pay water fees?	irregularly, when affordable
D18	Water fee structure 1Flate rate, 2 Having water tariff	flat rate
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	Kirakosyan Hamlet
E2	Position	leading specialist
E3	Telephone	with the help of administration head
E4	Quantity and present condition of the water supply facilities: spring/ intake	9 partially repaired
E5	Quantity and present condition of the water supply facilities:	partially repaired
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1 rehabilitated·
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
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	hired specialist from community
E14	How you prepare O&M costs?	community budget
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	1,396,000
	Repair cost(AMD)	700,000
	Others(AMD)	0
	Total (AMD)	2,096,000
E16	Do the residents participate in the O&M works?	earthwork, 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	yes
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	yes
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	yes
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	yes

Aragatsotn
No.34 Tsaghkahovit



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
1. 12000		
1600	200	Steel
10400	150	
2. 4500		
4500	150	Steel
DISTRIBUTION PIPELINE		
2000	300	Cast iron
2000	100	
2000	150	Steel
2000	100	
1000	80	
1000	65	
1000	50	

LEGENDS

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

SCALE

0 1000 2000 3000 m

	N	E	H (m)
A	40^{0}32’21.9”	44^{0}12’05.4”	3129
B	40^{0}36’03.8”	44^{0}11’07.2”	2412
C	40^{0}36’30.3”	44^{0}11’09.3”	2355
D	40^{0}37’37.6”	44^{0}12’29.5”	2168

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

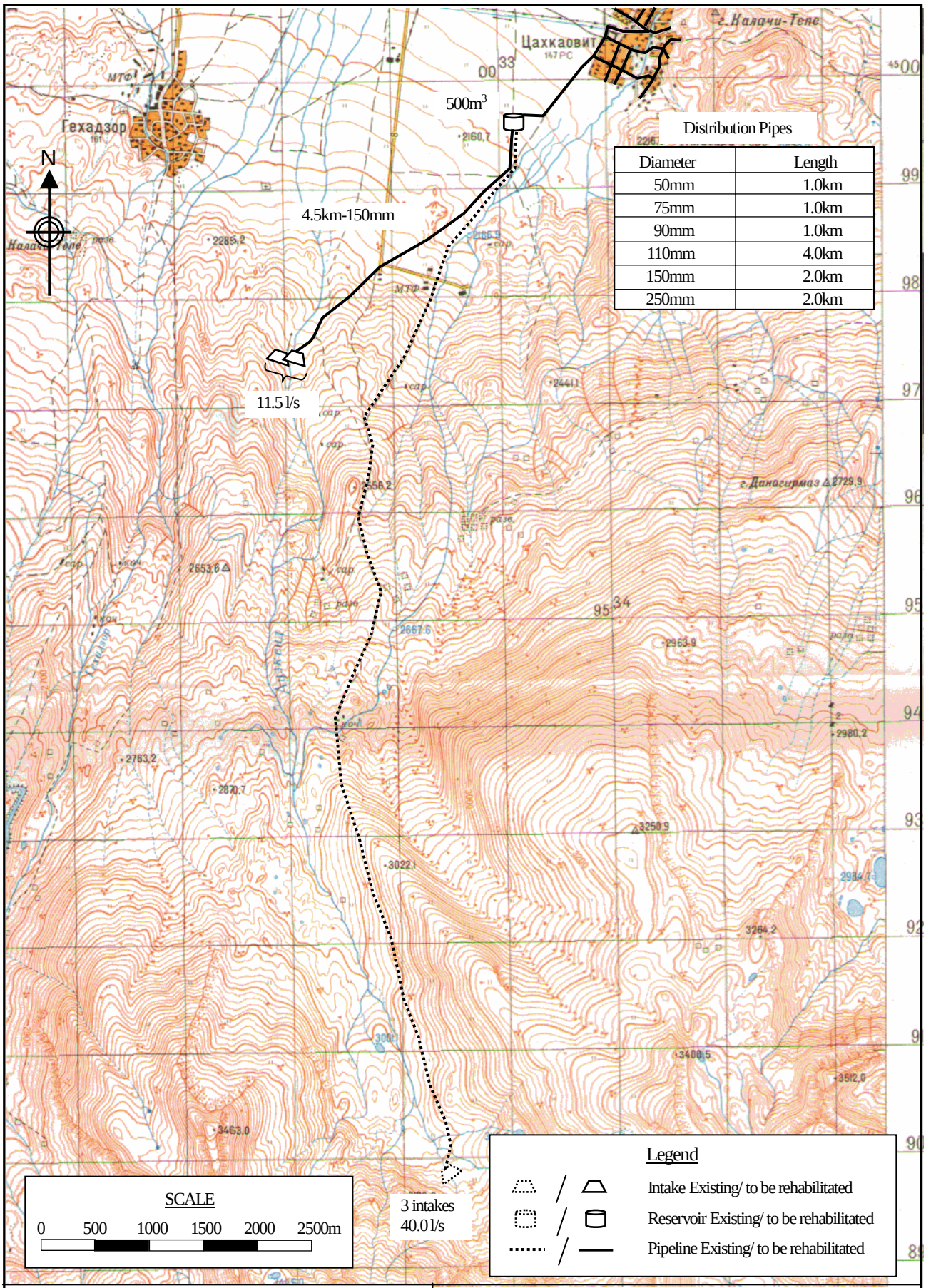
Marz : **Aragatsotn** No.34
Name : **Tsaghkahovit**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	2,165	persons	216.5	
	2 Factory	-	nos	0.0	
	3 School (pupils)	328	pupils	3.3	
	4 Medical Ambulance Station	1	nos	1.2	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	621	household	54.0	
	Sub-total			275.0	
	Unaccouted for water (20%)			55.0	
1	Average Daily Water Demand			330.0	m3/day
2	Maximum Daily Water Demand			396.0	m3/day
3	Maximum Hourly Water Demand			38.6	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	5	51.5	lit/sec		4,449.6	m3/day
`	Total					4,449.6	m3/day
	2 Required reservoir volume					463	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		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter	4,500	m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	500m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter	1,000	m
	75mm diameter	1,000	m
	90mm diameter	1,000	m
	110mm diameter	4,000	m
	150mm diameter	2,000	m
	200mm diameter		m
	250mm diameter	2,000	m
5	House connection	31	nos
6	Water meter installation	621	nos
7	Public tap	7	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. 34	Tsaghkahovit	JICA STUDY TEAM

Marz : **Aragatsotn**
No. : **34**
Name : **Tsaghkahovit**

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		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm	4,500	m	13,140	59,130,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					59,130,000
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	1	nos	42,520,900	42,520,900
	Sub-total					42,520,900
4	Distribution Pipe					
		50mm	1,000	m	5,520	5,520,000
		75mm	1,000	m	7,160	7,160,000
		90mm	1,000	m	8,040	8,040,000
		110mm	4,000	m	9,680	38,720,000
		150mm	2,000	m	13,140	26,280,000
		200mm		m	19,440	
		250mm	2,000	m	27,040	54,080,000
	Sub-total					139,800,000
5	House Connection		31	nos	74,000	2,294,000
6	Water Meter Installation		621	nos	80,000	49,680,000
7	Public Tap		7	nos	90,000	630,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	4,400	m	3,600	15,840,000
	Total				AMD	311,130,300
					Equivalent to USD	1,018,363
					Equivalent to JPY	107,437,309
					AMD	USD
	Investment Cost per household		621	HH	501,015	1,640
	Investment Cost per person		2,165	persons	143,709	470

ARAGATSOTN MARZ
Aparan District
No 34 Tsaghkahovit

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		100.4																																							
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		560.25	0.00	0.00	1.48	2.96	3.61	3.73	6.32	6.53	6.75	6.97	10.45	10.79	11.15	11.52	11.90	12.29	12.69	13.11	13.55	13.99	14.45	14.93	15.43	15.93	16.46	17.00	17.56	18.14	18.74	19.36	20.00	20.66	21.34	22.05	22.77	23.52	24.30	25.10	25.93	26.79
B Operating Costs																																									
1. Staff salary																																									
Inspectors	person				2																																				
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		35.40			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	0.76	0.78	0.81	0.83	0.86	0.89	0.92	0.95	0.98	1.01	1.05	1.08	1.12	1.15	1.19	1.23	1.27	1.31	1.36	1.40	1.45	1.50	1.54	1.60
2. Chlorine																																									
Pouring volume	kg/yr				603																																				
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		26.40			0.15	0.30	0.39	0.40	0.41	0.43	0.44	0.45	0.47	0.48	0.50	0.52	0.53	0.55	0.57	0.59	0.61	0.63	0.65	0.67	0.69	0.72	0.74	0.76	0.79	0.81	0.84	0.87	0.90	0.93	0.96	0.99	1.02	1.06	1.09	1.13	1.16	1.20
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		70.04			0.39	0.81	1.02	1.06	1.09	1.13	1.17	1.20	1.24	1.29	1.33	1.37	1.42	1.46	1.51	1.56	1.61	1.67	1.72	1.78	1.84	1.90	1.96	2.03	2.09	2.16	2.23	2.31	2.38	2.46	2.54	2.63	2.71	2.80	2.90	2.99	3.09	3.19
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					0.39	0.81	1.02	1.06	1.09	1.13	1.17	1.20	1.24	1.29	1.33	1.37	1.42	1.46	1.51	1.56	1.61	1.67	1.72	1.78	1.84	1.90	1.96	2.03	2.09	2.16	2.23	2.31	2.38	2.46	2.54	2.63	2.71	2.80	2.90	2.99	3.09	3.19
5. Pump replacement		0.00																0.00															0.00									
Sub-total		131.84	0.00	0.00	1.02	1.61	1.92	1.99	2.05	2.12	2.19	2.25	2.33	2.41	2.49	2.58	2.66	2.74	2.84	2.93	3.03	3.13	3.23	3.34	3.45	3.57	3.68	3.80	3.93	4.05	4.19	4.33	4.47	4.62	4.77	4.93	5.09	5.26	5.44	5.62	5.79	5.99
C Gross Income (A-B)		428.41	0.00	0.00	0.46	1.35	1.69	1.74	4.27	4.41	4.56	4.72	8.12	8.38	8.66	8.94	9.24	9.55	9.85	10.18	10.52	10.86	11.22	11.59	11.98	12.36	12.78	13.20	13.63	14.09	14.55	15.03	15.53	16.04	16.57	17.12	17.68	18.26	18.86	19.48	20.14	20.80
D Depreciation cost		295.40						8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44
E Interest paid		88.98	0.02	0.04	1.53	3.08	3.78	3.79	3.79	3.79	3.79	3.79	3.79	3.68	3.57	3.46	3.35	3.24	3.12	3.01	2.89	2.77	2.65	2.53	2.41	2.29	2.16	2.04	1.91	1.78	1.65	1.52	1.39	1.26	1.12	0.99	0.85	0.71	0.57	0.43	0.29	0.15
F Net Income		44.03	-0.02	-0.04	-1.07	-1.73	-2.09	-10.49	-7.96	-7.82	-7.67	-7.51	-4.11	-3.74	-3.35	-2.96	-2.55	-2.13	-1.71	-1.27	-0.81	-0.35	0.13	0.62	1.13	1.63	2.18	2.72	3.28	3.87	4.46	5.07	5.70	6.34	7.01	7.69	8.39	9.11	9.85	10.61	11.41	12.21
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		44.03	-0.02	-0.04	-1.07	-1.73	-2.09	-10.49	-7.96	-7.82	-7.67	-7.51	-4.11	-3.74	-3.35	-2.96	-2.55	-2.13	-1.71	-1.27	-0.81	-0.35	0.13	0.62	1.13	1.63	2.18	2.72	3.28	3.87	4.46	5.07	5.70	6.34	7.01	7.69	8.39	9.11	9.85	10.61	11.41	12.21
OM Cost Recovery Ratio (A/B)		425%	0%	0%	145%	183%	188%	187%	308%	308%	308%	310%	448%	448%	448%	447%	447%	449%	447%	447%	447%	447%	447%	447%	447%	446%	447%	447%	447%	448%	447%	447%	447%	447%	447%	447%	447%	447%	447%	448%	447%

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	44.03	-0.02	-0.04	-1.07	-1.73	-2.09	-10.49	-7.96	-7.82	-7.67	-7.51	-4.11	-3.74	-3.35	-2.96	-2.55	-2.13	-1.71	-1.27	-0.81	-0.35	0.13	0.62	1.13	1.63	2.18	2.72	3.28	3.87	4.46	5.07	5.70	6.34	7.01	7.69	8.39	9.11	9.85	10.61	11.41	12.21
2. Depreciation cost	295.40	0.00	0.00	0.00	0.00	0.00	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44
3. Interest Paid	88.98	0.02	0.04	1.53	3.08	3.78	3.79	3.79	3.79	3.79	3.79	3.79	3.68	3.57	3.46	3.35	3.24	3.12	3.01	2.89	2.77	2.65	2.53	2.41	2.29	2.16	2.04	1.91	1.78	1.65	1.52	1.39	1.26	1.12	0.99	0.85	0.71	0.57	0.43	0.29	0.15
Sub-total	428.41	0.00	0.00	0.46	1.35	1.69	1.74	4.27	4.41	4.56	4.72	8.12	8.38	8.66	8.94	9.24	9.55	9.85	10.18	10.52	10.86	11.22	11.59	11.98	12.36	12.78	13.20	13.63	14.09	14.55	15.03	15.53	16.04	16.57	17.12	17.68	18.26	18.86	19.48	20.14	20.80
B Finances																																									
1. Project Loan	379.27	2.36	1.67	149.84	154.64	70.12	0.36	0.28																																	
2. Local fund	129.81	0.79	0.56	50.75	53.10	24.40	0.12	0.09																																	
Sub-total	509.08	3.15	2.23	200.59	207.74	94.52	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	76.50	0.02	0.04	1.07	1.73	2.09	2.05	0.00	0.00	0.00	0.00	6.57	6.31	6.03	5.75	5.46	5.15	4.84	4.52	4.18	3.84	3.47	3.10	2.72	2.34	1.91	1.50	1.07	0.60	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	76.50	0.02	0.04	1.07	1.73	2.09	2.05	0.00	0.00	0.00	0.00	6.57	6.31	6.03	5.75	5.46	5.15	4.84	4.52	4.18	3.84	3.47	3.10	2.72	2.34	1.91	1.50	1.07	0.60	0.14	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	1013.99	3.17	2.27	202.12	210.82	98.30	4.27	4.64	4.41	4.56	4.72	14.69	14.69	14.69	14.69	14.70	14.70	14.69	14.70	14.70	14.70	14.69	14.69	14.70	14.70	14.69	14.70	14.70	14.69	14.69	15.03	15.53	16.04	16.57	17.12	17.68	18.26	18.86	19.48	20.14	20.80
APPLICATION OF FUNDS																																									
D Project disbursement	509.08	3.15	2.23	200.59	207.74	94.52	0.48	0.37																																	
E Total debt services																																									
1. Loan repayment	379.25											10.90	11.01	11.12	11.23	11.35	11.46	11.57	11.69	11.81	11.93	12.04	12.16	12.29	12.41	12.53	12.66	12.79	12.91	13.04	13.17	13.30	13.44	13.57	13.71	13.84	13.98	14.12	14.26	14.41	14.55
2. Interest paid	88.98	0.02	0.04	1.53	3.08	3.78	3.79	3.79	3.79	3.79	3.79	3.79	3.68	3.57	3.46	3.35	3.24	3.12	3.01	2.89	2.77	2.65	2.53	2.41	2.29	2.16	2.04	1.91	1.78	1.65	1.52	1.39	1.26	1.12	0.99	0.85	0.71	0.57	0.43	0.29	0.15
Sub-total	468.23	0.02	0.04	1.53	3.08	3.78	3.79	3.79	3.79	3.79	3.79	14.69	14.69	14.69	14.69	14.70	14.70	14.69	14.70	14.70	14.70	14.69	14.69	14.70	14.70	14.69	14.70	14.70	14.69	14.69	14.69	14.69	14.70	14.69	14.70	14.69	14.69	14.69	14.70	14.70	14.70
Total Cash Outflow	977.31	3.17	2.27	202.12	210.82	98.30	4.27	4.16	3.79	3.79	3.79	14.69	14.69	14.69	14.69	14.70	14.70	14.69	14.70	14.70	14.70	14.69	14.69	14.70	14.70	14.69	14.70	14.70	14.69	14.69	14.69	14.69	14.70	14.69	14.70	14.69	14.69	14.69	14.70	14.70	14.70
F Net Surplus Cash (A+C2)-E	36.68	0.00	0.00	0.00	0.00	0.00	0.00	0.48	0.62	0.77	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.84	1.34	1.88	2.42	2.99	3.57	4.17	4.79	5.44	6.10
Project Cost Recovery Ratio (%)																																									
Cost recovery by water fee (A/E)	91%	0%	0%	30%	44%	45%	46%	113%	116%	120%	125%	55%	57%	59%	61%	63%	65%	67%	69%	72%	74%	76%	79%	81%	84%	87%	90%	93%	96%	99%	102%	106%	109%	113%	116%	120%	124%	128%	133%	137%	141%
Cost recovery by water fee + subsidy ((A+C2)/E)	108%	100%	100%	100%	100%	100%	100%	113%	116%	120%	125%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	102%	106%	109%	113%	116%	120%	124%	128%	133%	137%	141%

ARAGATSOTN MARZ
Aparan District
No 34 Tsaghkahovit

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	560.25	88.0%
	Subsidy	76.50	12.0%
	Total	636.75	100.0%
2	**Expenditure**		
	OM cost	131.84	20.7%
	Loan repayment	379.25	59.6%
	Interest paid	88.98	14.0%
	Surplus cash	36.68	5.8%
	Total	636.75	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	338.15	2.30	1.64	136.70	136.75	60.17	0.33	0.26																																
2. Operation and Maintenance Cost																																								
Salary	18.24			0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
Chlorine	13.78			0.15	0.31	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
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	35.74			0.39	0.79	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Pump replacement																	0.00															0.00									
Sub-total	67.75			1.02	1.58	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
Total Outflow	405.90	2.30	1.64	137.72	138.33	61.98	2.14	2.07	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
B BENEFIT																																								
1. Water Tariff	351.85	0.00	0.00	1.48	2.96	3.61	3.73	6.32	6.53	6.75	6.97	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45
2. Subsidy	21.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.78	2.63	2.46	2.29	2.11	1.91	1.72	1.51	1.29	1.07	0.82	0.57	0.31	0.05	0.00	0.00	0.00	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	373.37	0.00	0.00	1.48	2.96	3.61	3.73	6.32	6.53	6.75	6.97	13.23	13.08	12.91	12.74	12.56	12.36	12.17	11.96	11.74	11.52	11.27	11.02	10.76	10.50	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45
NET BENEFIT	-32.53	-2.30	-1.64	-136.2	-135.4	-58.4	1.59	4.25	4.72	4.94	5.16	11.42	11.27	11.10	10.93	10.75	10.55	10.36	10.15	9.93	9.71	9.46	9.21	8.95	8.69	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64

FIRR = -0.51%

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	-141.85	-2.53	-1.80	-149.9	-149.0	-64.4	1.56	4.22	4.72	4.94	5.16	11.42	11.27	11.10	10.93	10.75	10.55	10.36	10.15	9.93	9.71	9.46	9.21	8.95	8.69	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64
	2	Capital cost 20% up	-173.54	-2.76	-1.97	-163.6	-162.7	-70.4	1.52	4.20	4.72	4.94	5.16	11.42	11.27	11.10	10.93	10.75	10.55	10.36	10.15	9.93	9.71	9.46	9.21	8.95	8.69	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64
2	1	OM cost 10% up	-114.89	-2.30	-1.64	-136.3	-135.5	-58.6	1.41	4.07	4.54	4.76	4.98	11.24	11.09	10.92	10.75	10.57	10.37	10.18	9.97	9.75	9.53	9.28	9.03	8.77	8.51	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46
	2	OM cost 20% up	-119.61	-2.30	-1.64	-136.4	-135.7	-58.7	1.23	3.89	4.36	4.58	4.80	11.06	10.91	10.74	10.57	10.39	10.19	10.00	9.79	9.57	9.35	9.10	8.85	8.59	8.33	8.28	8.28	8.28	8.28	8.28	8.28	8.28	8.28	8.28	8.28	8.28	8.28	8.28	8.28	8.28
3	1	Revenue 10% down	-135.56	-2.30	-1.64	-136.4	-135.7	-58.7	1.22	3.62	4.07	4.27	4.46	10.10	9.96	9.81	9.66	9.49	9.31	9.14	8.95	8.76	8.56	8.33	8.11	7.87	7.64	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60
	2	Revenue 20% down	-160.96	-2.30	-1.64	-136.5	-136.0	-59.1	0.84	2.99	3.41	3.59	3.77	8.77	8.65	8.52	8.38	8.24	8.08	7.93	7.76	7.58	7.41	7.21	7.01	6.80	6.59	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.98%	-4.78	-20.91%
	2	Capital cost 20% up	-1.39%	-6.34	-15.77%
2	1	OM cost 10% up	-0.62%	-1.77	-56.35%
	2	OM cost 20% up	-0.73%	-3.03	-33.02%
3	1	Revenue 10% down	-1.14%	-5.54	-18.04%
	2	Revenue 20% down	-1.84%	-7.23	-13.82%

No.35 Tsaghkashen

Information on Existing Water Sources (Aragatsotn)

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

No.35 Community Taghkashen
District Aparan
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	30	13.9	44	18	21.1	2,273	1.5	2.5	3.0
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	Not acceptable
Notes	The flow of this spring is divided between two Communitys. 1.5 L/sec is fed to this. Poor water quality.
Alternative sources if any	No alternative water sources are available

No.35 Community Taghkashen
District Aparan
Marz Aragatsotn
Sampling date 17/Jul/2007

	Parameters analysed	Units	No.1				Guidelines	
							WHO	Armenia
a	pH		6.9				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	13.8					
c	TDS	Mg/L	31				1000	1000
1	Al:Aluminum	Mg/L	0.01				0.10	0.50
2	B:Boron	Mg/L	n.d				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	0.03				1.50	
7	Hardness	Mg/L	45				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	1.8				50.0	45.0
13	SO4:Sulfate	Mg/L	3.0				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	n.d				0.70	0.10
17	Be:Berillium	Mg/L	n.d				NA	0.00020
18	Cd:Cadmium	Mg/L	n.d				0.0030	0.0010
19	Pb:Lead	Mg/L	0.001				0.010	0.030
20	Hg:Mercury	Mg/L	n.d				0.00100	0.00050
21	Se:Selenium	Mg/L	<0.001				0.010	0.010
22	Sr:Strontium	Mg/L	<0.7				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.35 Community Taghkashen
District Aparan
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			0.0	Not Identified
2	3			0.4/1; 0.9/1	Not Identified
3	5			2.3/1; 9/2; 4.3/1	Not Identified
4	6			2.8/1; 9/2	Identified in 2 sample
5	7			0.9/1; 9/2; 24/1; 21/1	Identified in 1 sample

No. **35** **Marz** **Aragatsotn** **Community** Tsaghkashen

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Fair	Possible	
2	Transmission pipeline	Possible	Possible	Pipeline is mostly far from 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	Spring	40°30'13.9″	44°18'21.1″	2273	2002	reinforced concrete	3	No

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	2000	100	Steel	1.4	2002	Little	No

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°30'20.7″	44°20'42.8″	2019	reinforced concrete	Rectangular	2x(6x6x4.5)	2x150	Yes

5. CHLORINATION EQUIPMENT

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	Yes	Reservoir	Powder	Twice per nonth

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	160	100	Steel	1985	Little	Yes
2	2350	80	Steel		Huge	Yes
3	970	50	Steel		Huge	Yes
4	3160	32	Steel		Huge	Yes
5	280	25	Steel		Huge	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)
25	1985	1996	Yes	30	Yes

9. DRAINAGE SYSTEM

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

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

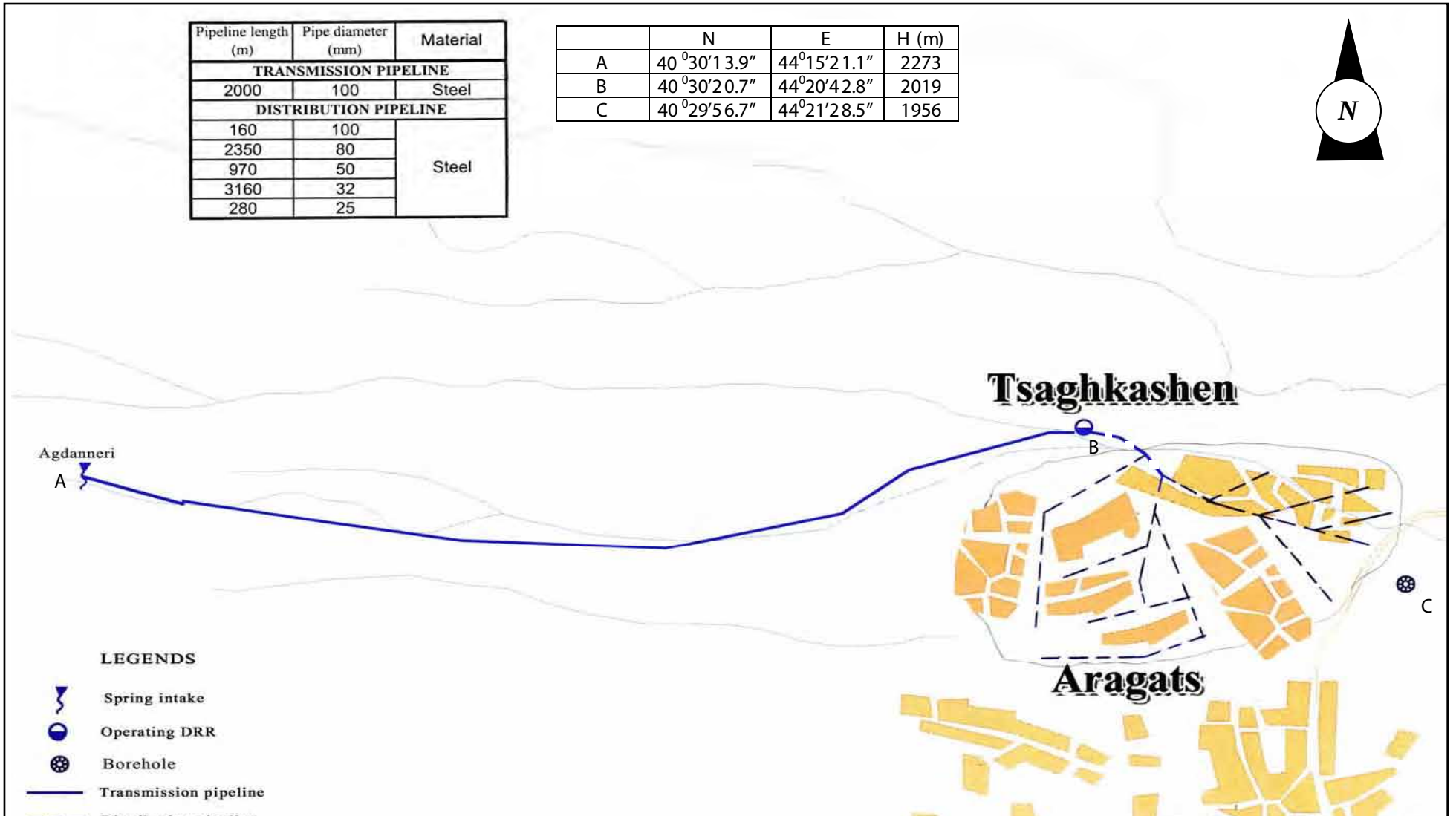
Marz	**Aragatsotn**
Number and Name of Community	**No.35 Tsaghkashen**
District	**Aparan**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	620
A2	Actual population in 2007	815
A3	Number of households	170
A4.1	Elderly people	71
A4.2	Population in labor force (age from 16 to 62)	598
A4.3	Children	156
A5.1	Pensioners	55
A5.2	Unemployed	0
A5.3	Receiving benefits	12
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	110
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	2,083
	Annual Budget of the community 2005, in thousand AMD	1,472
	Annual Budget of the community 2006, in thousand AMD	2,420
	Annual Budget of the community 2007, in thousand AMD	1,390
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	300
	Amount spent in drinking water sector 2005, in thousand AMD	300
	Amount spent in drinking water sector 2006, in thousand AMD	380
	Amount spent in drinking water sector 2007, in thousand AMD	280
	Amount spent in drinking water sector 2008, in thousand AMD	1.080.000
C: Socio-Economic Survey		
C1	Major industries of the community:	dairy, meat, vegetables
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	0693
D3	Date of expiry of water use permit	3years
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	sufficient
D7	Number of house connection to drinking water system	15
D8	How many house connection household set the water meter	0
D9	Number of public taps	15
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?	very 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)	500
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	800
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?	artificial lake
D20	Are you satisfied with irrigation water supply volume?	almost sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Grigoryan Asatur
E2	Position	water pipeline mechanical engineer
E3	Telephone	(0252)94254
E4	Quantity and present condition of the water supply facilities: spring/ intake	2 partially repaired
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)	1 deteriorated
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?	residents
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	volunteers from community
E14	How you prepare O&M costs?	community budget
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	180,000
	Repair cost(AMD)	200,000
	Others(AMD)	0
	Total (AMD)	380,000
E16	Do the residents participate in the O&M works?	earthwork, welding
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	yes
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Aragatsotn
No.35 Tsaghkashen

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
2000	100	Steel
DISTRIBUTION PIPELINE		
160	100	Steel
2350	80	
970	50	
3160	32	
280	25	

	N	E	H (m)
A	40 ^{0}30′13.9″	44^{0}15′21.1″	2273
B	40 ^{0}30′20.7″	44^{0}20′42.8″	2019
C	40 ^{0}29′56.7″	44^{0}21′28.5″	1956



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

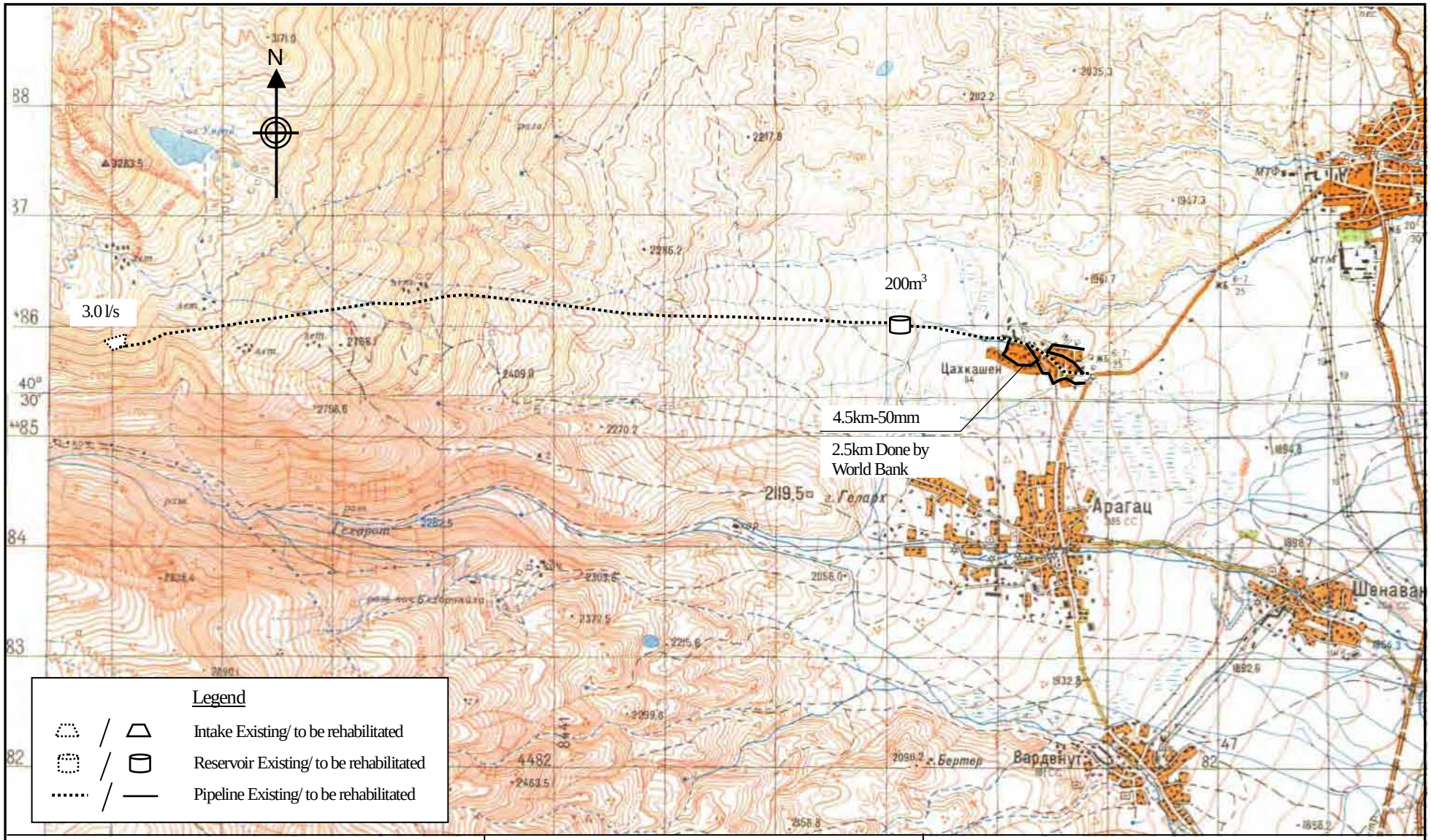
Marz : **Aragatsotn** No.35
Name : **Tsaghkashen**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	815	persons	81.5	
	2 Factory	-	nos	0.0	
	3 School (pupils)	328	pupils	3.3	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	170	household	14.8	
	Sub-total			99.6	
	Unaccouted for water (20%)			19.9	
1	Average Daily Water Demand			119.5	m3/day
2	Maximum Daily Water Demand			143.4	m3/day
3	Maximum Hourly Water Demand			17.1	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	1	3.0	lit/sec		259.2	m3/day
`	Total					259.2	m3/day
	2 Required reservoir volume					205	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		m	
	110mm diameter		m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			
	200m3 capacity	1	nos	
4	Distribution pipe			Done by world bank
	50mm diameter	4,500	m	
	75mm diameter		m	
	90mm diameter		m	2350m rehabilitation
	110mm diameter		m	160m rehabilitation
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	155	nos	
6	Water meter installation	170	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. 35	Tsaghkashen	JICA STUDY TEAM

Marz : **Aragatsotn**
No. : **35**
Name : **Tsaghkashen**

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		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3	1	nos	22,524,600	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					22,524,600
4	Distribution Pipe					
		50mm	4,500	m	5,520	24,840,000
		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					24,840,000
5	House Connection		155	nos	74,000	11,470,000
6	Water Meter Installation		170	nos	80,000	13,600,000
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	1,800	m	3,600	6,480,000
	Total				AMD	79,594,600
					Equivalent to USD	260,522
					Equivalent to JPY	27,485,043
					AMD	USD
	Investment Cost per household		170	HH	468,204	1,532
	Investment Cost per person		815	persons	97,662	320

ARAGATSOTN MARZ
Aparan District
No 35 Tsaghkashen

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		35.6																																							
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		198.44	0.00	0.00	0.52	1.05	1.28	1.32	2.24	2.31	2.39	2.47	3.70	3.82	3.95	4.08	4.21	4.35	4.50	4.64	4.80	4.96	5.12	5.29	5.46	5.64	5.83	6.02	6.22	6.43	6.64	6.86	7.08	7.32	7.56	7.81	8.07	8.33	8.61	8.89	9.18	9.49
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				214																																					
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		9.38			0.05	0.11	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.17	0.18	0.18	0.19	0.20	0.20	0.21	0.22	0.22	0.23	0.24	0.25	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.39	0.40	0.41	0.43
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		22.61			0.13	0.26	0.33	0.34	0.35	0.36	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.50	0.52	0.54	0.56	0.57	0.59	0.61	0.63	0.65	0.68	0.70	0.72	0.74	0.77	0.79	0.82	0.85	0.88	0.91	0.93	0.97	1.00	1.03
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					0.13	0.26	0.33	0.34	0.35	0.36	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.50	0.52	0.54	0.56	0.57	0.59	0.61	0.63	0.65	0.68	0.70	0.72	0.74	0.77	0.79	0.82	0.85	0.88	0.91	0.93	0.97	1.00	1.03
5. Pump replacement		0.00																0.00															0.00									
Sub-total		49.69	0.00	0.00	0.42	0.62	0.73	0.74	0.77	0.79	0.83	0.85	0.88	0.91	0.94	0.96	1.00	1.04	1.07	1.10	1.14	1.18	1.22	1.25	1.30	1.33	1.38	1.43	1.48	1.53	1.58	1.63	1.69	1.74	1.80	1.86	1.92	1.98	2.04	2.12	2.18	2.26
C Gross Income (A-B)		148.75	0.00	0.00	0.10	0.43	0.55	0.58	1.47	1.52	1.56	1.62	2.82	2.91	3.01	3.12	3.21	3.31	3.43	3.54	3.66	3.78	3.90	4.04	4.16	4.31	4.45	4.59	4.74	4.90	5.06	5.23	5.39	5.58	5.76	5.95	6.15	6.35	6.57	6.77	7.00	7.23
D Depreciation cost		75.60						2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16
E Interest paid		24.59	0.02	0.04	0.44	0.85	1.03	1.05	1.05	1.05	1.05	1.05	1.04	1.01	0.98	0.95	0.92	0.89	0.86	0.83	0.80	0.76	0.73	0.70	0.66	0.63	0.60	0.56	0.53	0.49	0.46	0.42	0.38	0.35	0.31	0.27	0.23	0.20	0.16	0.12	0.08	0.04
F Net Income		48.56	-0.02	-0.04	-0.34	-0.42	-0.48	-2.63	-1.74	-1.69	-1.65	-1.59	-0.38	-0.26	-0.13	0.01	0.13	0.26	0.41	0.55	0.70	0.86	1.01	1.18	1.34	1.52	1.69	1.87	2.05	2.25	2.44	2.65	2.85	3.07	3.29	3.52	3.76	3.99	4.25	4.49	4.76	5.03
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		48.56	-0.02	-0.04	-0.34	-0.42	-0.48	-2.63	-1.74	-1.69	-1.65	-1.59	-0.38	-0.26	-0.13	0.01	0.13	0.26	0.41	0.55	0.70	0.86	1.01	1.18	1.34	1.52	1.69	1.87	2.05	2.25	2.44	2.65	2.85	3.07	3.29	3.52	3.76	3.99	4.25	4.49	4.76	5.03
OM Cost Recovery Ratio (A/B)		399%	0%	0%	123%	170%	175%	178%	291%	292%	288%	291%	420%	420%	420%	425%	421%	418%	421%	422%	421%	420%	420%	423%	420%	424%	422%	421%	420%	420%	420%	421%	419%	421%	420%	420%	420%	421%	422%	419%	421%	420%

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	48.56	-0.02	-0.04	-0.34	-0.42	-0.48	-2.63	-1.74	-1.69	-1.65	-1.59	-0.38	-0.26	-0.13	0.01	0.13	0.26	0.41	0.55	0.70	0.86	1.01	1.18	1.34	1.52	1.69	1.87	2.05	2.25	2.44	2.65	2.85	3.07	3.29	3.52	3.76	3.99	4.25	4.49	4.76	5.03
2. Depreciation cost	75.60	0.00	0.00	0.00	0.00	0.00	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16
3. Interest Paid	24.59	0.02	0.04	0.44	0.85	1.03	1.05	1.05	1.05	1.05	1.05	1.04	1.01	0.98	0.95	0.92	0.89	0.86	0.83	0.80	0.76	0.73	0.70	0.66	0.63	0.60	0.56	0.53	0.49	0.46	0.42	0.38	0.35	0.31	0.27	0.23	0.20	0.16	0.12	0.08	0.04
Sub-total	148.75	0.00	0.00	0.10	0.43	0.55	0.58	1.47	1.52	1.56	1.62	2.82	2.91	3.01	3.12	3.21	3.31	3.43	3.54	3.66	3.78	3.90	4.04	4.16	4.31	4.45	4.59	4.74	4.90	5.06	5.23	5.39	5.58	5.76	5.95	6.15	6.35	6.57	6.77	7.00	7.23
B Finances																																									
1. Project Loan	104.44	2.36	1.67	39.99	41.12	18.66	0.36	0.28																																	
2. Local fund	35.68	0.79	0.56	13.54	14.10	6.48	0.12	0.09																																	
Sub-total	140.12	3.15	2.23	53.53	55.22	25.14	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	9.58	0.02	0.04	0.34	0.42	0.48	0.47	0.00	0.00	0.00	0.00	1.22	1.13	1.03	0.92	0.83	0.74	0.62	0.51	0.39	0.26	0.15	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
Sub-total	9.58	0.02	0.04	0.34	0.42	0.48	0.47	0.00	0.00	0.00	0.00	1.22	1.13	1.03	0.92	0.83	0.74	0.62	0.51	0.39	0.26	0.15	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
Total Cash Inflow	298.45	3.17	2.27	53.97	56.07	26.17	1.53	1.84	1.52	1.56	1.62	4.04	4.04	4.04	4.04	4.04	4.05	4.05	4.05	4.05	4.04	4.05	4.05	4.16	4.31	4.45	4.59	4.74	4.90	5.06	5.23	5.39	5.58	5.76	5.95	6.15	6.35	6.57	6.77	7.00	7.23
APPLICATION OF FUNDS																																								
D Project disbursement	140.12	3.15	2.23	53.53	55.22	25.14	0.48	0.37																																	
E Total debt services																																								
1. Loan repayment	104.44											3.00	3.03	3.06	3.09	3.12	3.16	3.19	3.22	3.25	3.28	3.32	3.35	3.38	3.42	3.45	3.49	3.52	3.56	3.59	3.63	3.66	3.70	3.74	3.77	3.81	3.85	3.89	3.93	3.97	4.01
2. Interest paid	24.59	0.02	0.04	0.44	0.85	1.03	1.05	1.05	1.05	1.05	1.05	1.04	1.01	0.98	0.95	0.92	0.89	0.86	0.83	0.80	0.76	0.73	0.70	0.66	0.63	0.60	0.56	0.53	0.49	0.46	0.42	0.38	0.35	0.31	0.27	0.23	0.20	0.16	0.12	0.08	0.04
Sub-total	129.03	0.02	0.04	0.44	0.85	1.03	1.05	1.05	1.05	1.05	1.05	4.04	4.04	4.04	4.04	4.04	4.05	4.05	4.05	4.05	4.04	4.05	4.05	4.04	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.04	4.05	4.05	4.04	4.04	4.05	4.05	4.05	4.05	4.05
Total Cash Outflow	269.15	3.17	2.27	53.97	56.07	26.17	1.53	1.42	1.05	1.05	1.05	4.04	4.04	4.04	4.04	4.04	4.05	4.05	4.05	4.05	4.04	4.05	4.05	4.04	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.04	4.05	4.05	4.04	4.04	4.05	4.05	4.05	4.05	4.05
F Net Surplus Cash (A+C2)-E	29.30	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.47	0.51	0.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.26	0.40	0.54	0.69	0.85	1.01	1.18	1.35	1.53	1.71	1.91	2.11	2.30	2.52	2.72	2.95	3.18
Project Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	115%	0%	0%	22%	51%	53%	55%	140%	145%	149%	154%	70%	72%	75%	77%	79%	82%	85%	87%	90%	94%	96%	100%	103%	106%	110%	113%	117%	121%	125%	129%	133%	138%	142%	147%	152%	157%	162%	167%	173%	179%
Cost recovery by water fee + subsidy ((A+C2)/E)	123%	100%	100%	100%	100%	100%	100%	140%	145%	149%	154%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	103%	106%	110%	113%	117%	121%	125%	129%	133%	138%	142%	147%	152%	157%	162%	167%	173%	179%	

ARAGATSOTN MARZ
Aparan District
No 35 Tsaghkashen

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	198.44	95.4%
	Subsidy	9.58	4.6%
	Total	208.02	100.0%
2	**Expenditure**		
	OM cost	49.69	23.9%
	Loan repayment	104.44	50.2%
	Interest paid	24.59	11.8%
	Surplus cash	29.30	14.1%
	Total	208.02	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	93.54	2.30	1.64	36.54	36.42	16.05	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
Chlorine	4.84			0.05	0.11	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
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
Mantenance cost	11.54			0.13	0.25	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Pump replacement																	0.00															0.00								
Sub-total	25.51			0.42	0.60	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
Total Outflow	119.05	2.30	1.64	36.96	37.02	16.73	1.01	0.94	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
B BENEFIT																																								
1. Water Tariff	124.58	0.00	0.00	0.52	1.05	1.28	1.32	2.24	2.31	2.39	2.47	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
2. Subsidy	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.12	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	124.93	0.00	0.00	0.52	1.05	1.28	1.32	2.24	2.31	2.39	2.47	3.88	3.82	3.75	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
NET BENEFIT	5.88	-2.30	-1.64	-36.4	-36.0	-15.5	0.31	1.30	1.63	1.71	1.79	3.20	3.14	3.07	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02

FIRR = **0.30%**

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	-29.97	-2.53	-1.80	-40.1	-39.6	-17.1	0.28	1.27	1.63	1.71	1.79	3.20	3.14	3.07	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02
	2	Capital cost 20% up	-38.75	-2.76	-1.97	-43.8	-43.3	-18.7	0.24	1.25	1.63	1.71	1.79	3.20	3.14	3.07	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02
2	1	OM cost 10% up	-22.98	-2.30	-1.64	-36.5	-36.0	-15.5	0.24	1.23	1.56	1.64	1.72	3.13	3.07	3.00	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95
	2	OM cost 20% up	-24.76	-2.30	-1.64	-36.5	-36.1	-15.6	0.17	1.16	1.49	1.57	1.65	3.06	3.00	2.93	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88
3	1	Revenue 10% down	-29.63	-2.30	-1.64	-36.5	-36.1	-15.6	0.18	1.08	1.40	1.47	1.54	2.81	2.76	2.70	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65
	2	Revenue 20% down	-38.07	-2.30	-1.64	-36.5	-36.2	-15.7	0.05	0.85	1.17	1.23	1.30	2.42	2.38	2.32	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.17%	-28.01	-3.57%
	2	Capital cost 20% up	-0.59%	-15.15	-6.60%
2	1	OM cost 10% up	0.17%	7.54	13.26%
	2	OM cost 20% up	0.04%	64.33	1.55%
3	1	Revenue 10% down	-0.36%	-18.50	-5.40%
	2	Revenue 20% down	-1.09%	-12.79	-7.82%