STATE COMMITTEE ON WATER SYSTEMS
THE REPUBLIC OF ARMENIA

THE STUDY
FOR
IMPROVEMENT OF RURAL WATER SUPPLY
AND
SEWAGE SYSTEMS
IN
THE REPUBLIC OF ARMENIA

FINAL REPORT

DATA BOOK (2/4)

MARCH 2009

JAPAN INTERNATIONAL COOPERATION AGENCY

NIPPON KOEI CO., LTD.

THE STUDY

FOR

IMPROVEMENT OF RURAL WATER SUPPLY AND SEWAGE SYSTEMS

IN

THE REPUBLIC OF ARMENIA

FINAL REPORT

DATA BOOK (2/4)

2. SHIRAK MARZ

No.	Rural Community
1	Alvar
2	Aghvorik
3	Ardenis
4	Arpeni
5	Bandivan
6	Bashgyugh
7	Garnarich+Yeghnajur
8	Kamkhut
9	Zari Shat
10	Zorakert+Darik
11	Lernakert
12	Lernut
13	Tsaghkut
14	Kamo
15	Karmraqar
16	Kaqavasar
17	Krashen
18	Krasar
19	Mayisyan Kayaran
20	Hovit
21	Dzorashen
22	Akhuryan Kayaran
23	Mets Sariar
24	Musaelyan
25	Shaghik
26	Shirak
27	Pemzashen
28	Jajur
29	Jajur Kayaran
30	Jrarat
31	Sarnaghbyur
32	Sarapat
33	Sizavet
34	Tzoghamarg
35	Poqr Sariar

2 SHIRAK MARZ

No.1 Alvar

Information on Existing Water Sources (Shirak)

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

No.1 Community Alvar
District Amasia
Marz Shirak

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	41	1	12.6	43	45	6.9	2,108	1.5	4.0	2.3
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	
Alternative sources if any	There is a unconnected spring at 150m distance from the existing spring intake

No.1 Community Alvar
District Amasia
Marz Shirak
Sampling date 13/Aug/2007

	Parameters analysed	Units	No.1				Guidelines	
							WHO	Armenia
a	pH		7.6				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	10.6					
c	TDS	Mg/L	153				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	5				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	n.d				1.50	
7	Hardness	Mg/L	375				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	0.01				0.70	0.10
17	Be:Berillium	Mg/L	0.00011				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					-	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.1 Community Alvar
District Amasia
Marz Shirak

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	02	03	52-54,0,0,0	0,4,0,0,0	Not Identified
2	05	22	-	Not Identified	Not Identified
3	06	09	52-54,0,0,0	0,4,0,0,0	Not Identified
4	07	10	52-56; 0,0,0	0,4 ; 0; 0,0	Not Identified
5	08	01	60,56,76,0	0,4; 0,4; 0,7;0	Not Identified

No. 1 **Marz** Shirak **Community** Alvar

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	Possible	Possible	

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	41°01′12,6″	43°45′06,9″	2,108	1989	Concrete	2.3	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	2,000	100	Polyethylene	2.2	1989	Little	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	41°01′57,7″	43°44′55,8″	2,078	Steel	Circle	4×d=1m, l=20m	64	Yes

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	3,000	100	Polyethylene	1989	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)
No				0	

9. DRAINAGE SYSTEM

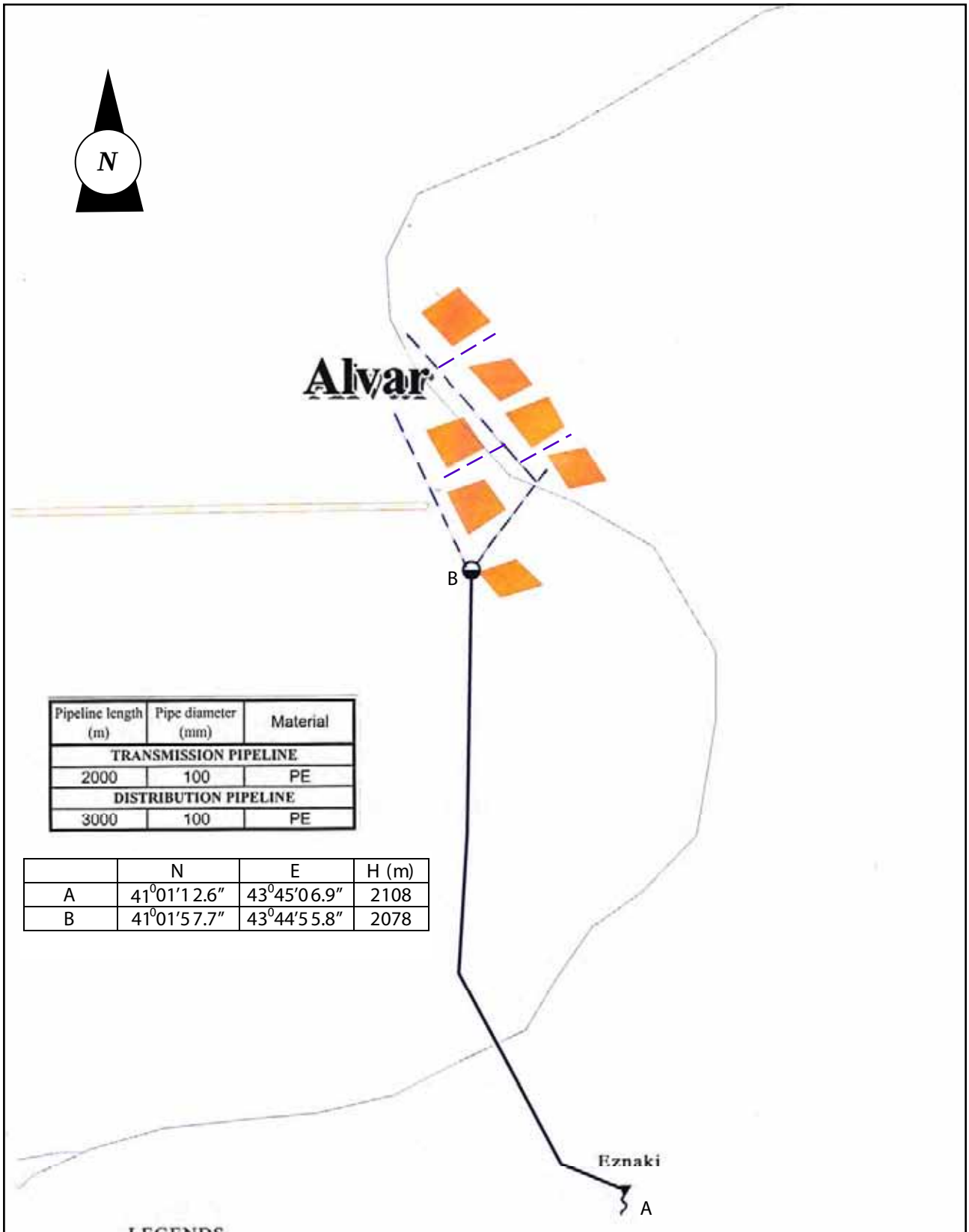
Existence (Y/N)	Rehabilitation Necessity (Y/N)	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Shirak**
Number and Name of Community	**No.1 Alvar**
District	**Amasia**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	170
A2	Actual population in 2007	170
A3	Number of households	33
A4.1	Elderly people	20
A4.2	Population in labor force (age from 16 to 62)	110
A4.3	Children	40
A5.1	Pensioners	10
A5.2	Unemployed	0
A5.3	Receiving benefits	0
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	33
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	4,000
	Annual Budget of the community 2005, in thousand AMD	4,800
	Annual Budget of the community 2006, in thousand AMD	5,200
	Annual Budget of the community 2007, in thousand AMD	4,000
	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	yes
D2	Water use permit number	1401
D3	Date of expiry of water use permit	2010
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	absent
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	8
D10.1	How is the regime of water supply in your community in the dry season?	regularly 12 hrs
D10.2	How is the regime of water supply in your community in the wet season?	regularly 12 hrs
D11	What time of day water is given?	8.00-12.00
D12	Are you pleased with duration of domestic water supply?	mainly displeased
D13	Are hours of water supply convenient?	fully 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?	insufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Pahoyan Hrach
E2	Position	water distributor
E3	Telephone	with the help of administration haed
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-partially repaired.
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1-deteriorated, 3-partially repaired
E7	Quantity and present condition of the water supply facilities: net/distribution	partially repaired
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?	hired specialist from community
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)	228,000
	Repair cost(AMD)	0
	Others(AMD)	0
	Total (AMD)	228,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	residents 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

Shirak
No.1 Alvar



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
2000	100	PE
DISTRIBUTION PIPELINE		
3000	100	PE

	N	E	H (m)
A	41°01′12.6″	43°45′06.9″	2108
B	41°01′57.7″	43°44′55.8″	2078

LEGENDS

- Spring intake
- Operating DRR
- Transmission pipeline
- Distribution pipeline

SCALE

0 200 400 600 800 1000 m

Shirak Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
01	Alvar	JICA STUDY TEAM 2007

Marz : **Shirak** No.1
Name : **Alvar**

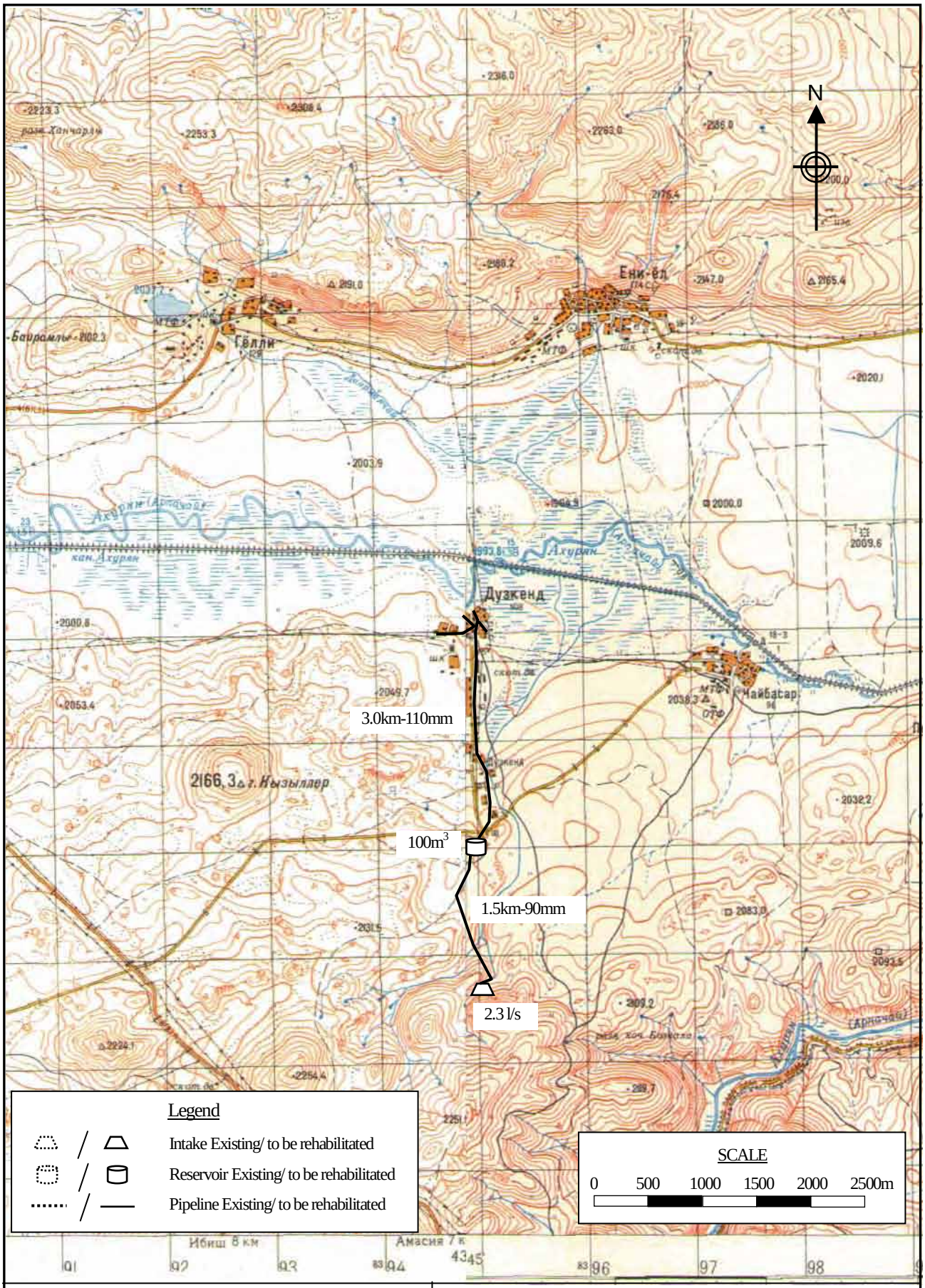
No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	170	persons	17.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	33	pupils	0.3	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	7 Livestocks (87lit/household)	33	household	2.9	
	Sub-total			20.2	
	Unaccouted for water (20%)			4.0	
1	Average Daily Water Demand			24.2	m3/day
2	Maximum Daily Water Demand			29.1	m3/day
3	Maximum Hourly Water Demand			7.1	m3/hr

B WATER SUPPLY PLAN

		Nr.	Total vol.			
	1 Water source type					
	a Spring	1	2.3	lit/sec	198.7	m3/day
`	Total				198.7	m3/day
	2 Required reservoir volume				85	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	1,500	m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	100m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter	3,000	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	18	nos
6	Water meter intallation	33	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	Shirak	
No. 01	Alvar	JICA STUDY TEAM

Marz : **Shirak**
No. : **1**
Name : **Alvar**

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	1,500	m	8,040	12,060,000
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					12,060,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3	1	nos	12,968,300	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					12,968,300
4	Distribution Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	3,000	m	9,680	29,040,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					29,040,000
5	House Connection		18	nos	74,000	1,332,000
6	Water Meter Installation		33	nos	80,000	2,640,000
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	1,200	m	3,600	4,320,000
	Total				AMD	63,318,000
					Equivalent to USD	207,247
					Equivalent to JPY	21,864,523
					AMD	USD
	Investment Cost per household		33	HH	1,918,727	6,280
	Investment Cost per person		170	persons	372,459	1,219

SHIRAK MARZ
Amasia District
No 1 Alvar

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		7.3																																							
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		40.70	0.00	0.00	0.00	0.26	0.26	0.27	0.46	0.48	0.49	0.51	0.76	0.78	0.81	0.84	0.87	0.89	0.92	0.95	0.99	1.02	1.05	1.09	1.12	1.16	1.20	1.24	1.28	1.32	1.36	1.41	1.45	1.50	1.55	1.60	1.66	1.71	1.77	1.83	1.89	1.95
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				44																																				
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		1.92			0.00	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	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	0.08	0.09
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		13.09			0.00	0.19	0.19	0.20	0.20	0.21	0.22	0.23	0.23	0.24	0.25	0.26	0.27	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.36	0.37	0.38	0.39	0.41	0.42	0.43	0.45	0.46	0.48	0.49	0.51	0.53	0.54	0.56	0.58	0.60
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	0.19	0.19	0.20	0.20	0.21	0.22	0.23	0.23	0.24	0.25	0.26	0.27	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.36	0.37	0.38	0.39	0.41	0.42	0.43	0.45	0.46	0.48	0.49	0.51	0.53	0.54	0.56	0.58	0.60
5. Pump replacement		0.00																0.00															0.00									
Sub-total		32.71	0.00	0.00	0.24	0.47	0.48	0.49	0.50	0.52	0.54	0.56	0.57	0.60	0.62	0.64	0.66	0.68	0.70	0.72	0.74	0.78	0.80	0.82	0.85	0.88	0.91	0.95	0.97	1.01	1.04	1.07	1.12	1.15	1.19	1.22	1.26	1.31	1.34	1.39	1.43	1.49
C Gross Income (A-B)		7.99	0.00	0.00	-0.24	-0.21	-0.22	-0.22	-0.04	-0.04	-0.05	-0.05	0.19	0.18	0.19	0.20	0.21	0.21	0.22	0.23	0.25	0.24	0.25	0.27	0.27	0.28	0.29	0.29	0.31	0.31	0.32	0.34	0.33	0.35	0.36	0.38	0.40	0.40	0.43	0.44	0.46	0.46
D Depreciation cost		60.20						1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
E Interest paid		20.10	0.02	0.04	0.06	0.84	0.85	0.86	0.86	0.86	0.86	0.86	0.86	0.84	0.81	0.79	0.76	0.73	0.71	0.68	0.66	0.63	0.60	0.57	0.55	0.52	0.49	0.46	0.43	0.40	0.38	0.35	0.32	0.29	0.26	0.22	0.19	0.16	0.13	0.10	0.07	0.03
F Net Income		-72.31	-0.02	-0.04	-0.30	-1.05	-1.07	-2.80	-2.62	-2.62	-2.63	-2.63	-2.39	-2.38	-2.34	-2.31	-2.27	-2.24	-2.21	-2.17	-2.13	-2.11	-2.07	-2.02	-2.00	-1.96	-1.92	-1.89	-1.84	-1.81	-1.78	-1.73	-1.71	-1.66	-1.62	-1.56	-1.51	-1.48	-1.42	-1.38	-1.33	-1.29
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		-72.31	-0.02	-0.04	-0.30	-1.05	-1.07	-2.80	-2.62	-2.62	-2.63	-2.63	-2.39	-2.38	-2.34	-2.31	-2.27	-2.24	-2.21	-2.17	-2.13	-2.11	-2.07	-2.02	-2.00	-1.96	-1.92	-1.89	-1.84	-1.81	-1.78	-1.73	-1.71	-1.66	-1.62	-1.56	-1.51	-1.48	-1.42	-1.38	-1.33	-1.29
OM Cost Recovery Ratio (A/B)		124%	0%	0%	0%	55%	54%	55%	92%	92%	91%	91%	133%	130%	131%	131%	132%	131%	131%	132%	134%	131%	131%	133%	132%	132%	132%	131%	132%	131%	131%	132%	129%	130%	130%	131%	132%	131%	132%	132%	132%	131%

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	-72.31	-0.02	-0.04	-0.30	-1.05	-1.07	-2.80	-2.62	-2.62	-2.63	-2.63	-2.39	-2.38	-2.34	-2.31	-2.27	-2.24	-2.21	-2.17	-2.13	-2.11	-2.07	-2.02	-2.00	-1.96	-1.92	-1.89	-1.84	-1.81	-1.78	-1.73	-1.71	-1.66	-1.62	-1.56	-1.51	-1.48	-1.42	-1.38	-1.33	-1.29
2. Depreciation cost	60.20	0.00	0.00	0.00	0.00	0.00	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
3. Interest Paid	20.10	0.02	0.04	0.06	0.84	0.85	0.86	0.86	0.86	0.86	0.86	0.86	0.84	0.81	0.79	0.76	0.73	0.71	0.68	0.66	0.63	0.60	0.57	0.55	0.52	0.49	0.46	0.43	0.40	0.38	0.35	0.32	0.29	0.26	0.22	0.19	0.16	0.13	0.10	0.07	0.03
Sub-total	7.99	0.00	0.00	-0.24	-0.21	-0.22	-0.22	-0.04	-0.04	-0.05	-0.05	0.19	0.18	0.19	0.20	0.21	0.21	0.22	0.23	0.25	0.24	0.25	0.27	0.27	0.28	0.29	0.29	0.31	0.31	0.32	0.34	0.33	0.35	0.36	0.38	0.40	0.40	0.43	0.44	0.46	0.46
B Finances																																									
1. Project Loan	86.09	2.36	1.67	2.24	78.21	0.97	0.36	0.28																																	
2. Local fund	29.18	0.79	0.56	0.74	26.85	0.17	0.04	0.03																																	
Sub-total	115.27	3.15	2.23	2.98	105.06	1.14	0.40	0.31																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	1.07	0.00	0.00	0.24	0.21	0.22	0.22	0.04	0.04	0.05	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	0.00	0.00	0.00	0.00
2. Subsidy for debt services	97.12	0.02	0.04	0.06	0.84	0.85	0.86	0.86	0.86	0.86	0.86	3.15	3.16	3.14	3.14	3.13	3.12	3.12	3.10	3.09	3.10	3.08	3.06	3.07	3.06	3.04	3.04	3.02	3.02	3.02	3.00	3.01	2.99	2.98	2.95	2.93	2.93	2.91	2.90	2.88	2.87
Sub-total	98.19	0.02	0.04	0.30	1.05	1.07	1.08	0.90	0.90	0.91	0.91	3.15	3.16	3.14	3.14	3.13	3.12	3.12	3.10	3.09	3.10	3.08	3.06	3.07	3.06	3.04	3.04	3.02	3.02	3.02	3.00	3.01	2.99	2.98	2.95	2.93	2.93	2.91	2.90	2.88	2.87
Total Cash Inflow	221.45	3.17	2.27	3.04	105.90	1.99	1.26	1.17	0.86	0.86	0.86	3.34	3.34	3.33	3.34	3.34	3.33	3.34	3.33	3.34	3.34	3.33	3.33	3.34	3.34	3.33	3.33	3.33	3.33	3.34	3.34	3.34	3.34	3.33	3.33	3.33	3.34	3.34	3.34	3.34	3.33
APPLICATION OF FUNDS																																									
D Project disbursement	115.27	3.15	2.23	2.98	105.06	1.14	0.40	0.31																																	
E Total debt services																																									
1. Loan repayment	86.08											2.48	2.50	2.52	2.55	2.58	2.60	2.63	2.65	2.68	2.71	2.73	2.76	2.79	2.82	2.84	2.87	2.90	2.93	2.96	2.99	3.02	3.05	3.08	3.11	3.14	3.17	3.21	3.24	3.27	3.30
2. Interest paid	20.10	0.02	0.04	0.06	0.84	0.85	0.86	0.86	0.86	0.86	0.86	0.86	0.84	0.81	0.79	0.76	0.73	0.71	0.68	0.66	0.63	0.60	0.57	0.55	0.52	0.49	0.46	0.43	0.40	0.38	0.35	0.32	0.29	0.26	0.22	0.19	0.16	0.13	0.10	0.07	0.03
Sub-total	106.18	0.02	0.04	0.06	0.84	0.85	0.86	0.86	0.86	0.86	0.86	3.34	3.34	3.33	3.34	3.34	3.33	3.34	3.33	3.34	3.34	3.33	3.33	3.34	3.34	3.33	3.33	3.33	3.33	3.34	3.34	3.34	3.34	3.34	3.33	3.33	3.33	3.34	3.34	3.34	3.33
Total Cash Outflow	221.45	3.17	2.27	3.04	105.90	1.99	1.26	1.17	0.86	0.86	0.86	3.34	3.34	3.33	3.34	3.34	3.33	3.34	3.33	3.34	3.34	3.33	3.33	3.34	3.34	3.33	3.33	3.33	3.33	3.34	3.34	3.34	3.34	3.34	3.33	3.33	3.33	3.34	3.34	3.34	3.33
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)	8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	6%	5%	6%	6%	6%	6%	7%	7%	7%	7%	8%	8%	8%	8%	9%	9%	9%	9%	10%	10%	10%	10%	11%	11%	12%	12%	13%	13%	14%	14%
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%

SHIRAK MARZ
Amasia District
No 1 Alvar

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

Item	Millon AMD	Rate
1 Revenue		
Water fee revenue	40.70	29.3%
Subsidy	98.19	70.7%
Total	138.89	100.0%
2 Expenditure		
OM cost	32.71	23.6%
Loan repayment	86.08	62.0%
Interest paid	20.10	14.5%
Surplus cash	0.00	0.0%
Total	138.89	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	76.77	2.30	1.64	2.11	69.25	0.88	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	1.11			0.00	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
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	6.66			0.00	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Pump replacement																	0.00															0.00								
Sub-total	16.89			0.24	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	0.45
Total Outflow	93.66	2.30	1.64	2.35	69.70	1.33	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	25.53	0.00	0.00	0.00	0.26	0.26	0.27	0.46	0.48	0.49	0.51	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
2. Subsidy	78.09	0.00	0.00	0.24	0.21	0.22	0.22	0.04	0.04	0.05	0.05	2.29	2.32	2.33	2.35	2.37	2.39	2.41	2.42	2.43	2.47	2.48	2.49	2.52	2.54	2.55	2.58	2.59	2.62	2.64	2.65	2.69	2.70	2.72	2.73	2.74	2.77	2.78	2.80	2.81	2.84
Total Inflow	103.62	0.00	0.00	0.24	0.47	0.48	0.49	0.50	0.52	0.54	0.56	3.05	3.08	3.09	3.11	3.13	3.15	3.17	3.18	3.19	3.23	3.24	3.25	3.28	3.30	3.31	3.34	3.35	3.38	3.40	3.41	3.45	3.46	3.48	3.49	3.50	3.53	3.54	3.56	3.57	3.60
NET BENEFIT	9.96	-2.30	-1.64	-2.1	-69.2	-0.9	-0.29	-0.21	0.07	0.09	0.11	2.60	2.63	2.64	2.66	2.68	2.70	2.72	2.73	2.74	2.78	2.79	2.80	2.83	2.85	2.86	2.89	2.90	2.93	2.95	2.96	3.00	3.01	3.03	3.04	3.05	3.08	3.09	3.11	3.12	3.15

FIRR = 0.56%

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	-23.00	-2.53	-1.80	-2.3	-76.2	-0.9	-0.32	-0.24	0.07	0.09	0.11	2.60	2.63	2.64	2.66	2.68	2.70	2.72	2.73	2.74	2.78	2.79	2.80	2.83	2.85	2.86	2.89	2.90	2.93	2.95	2.96	3.00	3.01	3.03	3.04	3.05	3.08	3.09	3.11	3.12	3.15
	2	Capital cost 20% up	-30.18	-2.76	-1.97	-2.5	-83.1	-1.0	-0.36	-0.26	0.07	0.09	0.11	2.60	2.63	2.64	2.66	2.68	2.70	2.72	2.73	2.74	2.78	2.79	2.80	2.83	2.85	2.86	2.89	2.90	2.93	2.95	2.96	3.00	3.01	3.03	3.04	3.05	3.08	3.09	3.11	3.12	3.15
2	1	OM cost 10% up	-17.00	-2.30	-1.64	-2.1	-69.3	-0.9	-0.34	-0.26	0.03	0.04	0.06	2.56	2.59	2.60	2.62	2.64	2.66	2.68	2.69	2.70	2.74	2.75	2.76	2.79	2.81	2.82	2.85	2.86	2.89	2.91	2.92	2.96	2.97	2.99	3.00	3.01	3.04	3.05	3.07	3.08	3.11
	2	OM cost 20% up	-18.18	-2.30	-1.64	-2.2	-69.3	-0.9	-0.38	-0.30	-0.02	0.00	0.02	2.51	2.54	2.55	2.57	2.59	2.61	2.63	2.64	2.65	2.69	2.70	2.71	2.74	2.76	2.77	2.80	2.81	2.84	2.86	2.87	2.91	2.92	2.94	2.95	2.96	2.99	3.00	3.02	3.03	3.06
3	1	Revenue 10% down	-22.60	-2.30	-1.64	-2.1	-69.3	-0.9	-0.34	-0.26	0.02	0.04	0.05	2.30	2.32	2.33	2.35	2.37	2.39	2.40	2.41	2.42	2.46	2.47	2.48	2.50	2.52	2.53	2.56	2.57	2.59	2.61	2.62	2.66	2.66	2.68	2.69	2.70	2.73	2.74	2.75	2.76	2.79
	2	Revenue 20% down	-29.37	-2.30	-1.64	-2.2	-69.3	-0.9	-0.39	-0.31	-0.03	-0.02	0.00	1.99	2.01	2.02	2.04	2.05	2.07	2.09	2.09	2.10	2.13	2.14	2.15	2.17	2.19	2.20	2.22	2.23	2.25	2.27	2.28	2.31	2.32	2.33	2.34	2.35	2.37	2.38	2.40	2.41	2.43

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	0.12%	36.18	2.76%
	2	Capital cost 20% up	-0.27%	-30.59	-3.27%
2	1	OM cost 10% up	0.47%	1.99	50.16%
	2	OM cost 20% up	0.37%	5.01	19.96%
3	1	Revenue 10% down	-0.02%	-246.36	-0.41%
	2	Revenue 20% down	-0.67%	-18.37	-5.44%

No.2 Aghvorik

Information on Existing Water Sources (Shirak)

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

No.2 Community Aghvorik
District Amasia
Marz Shirak

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	41	4	51.5	43	44	45.9	2,147	3.0	3.8	1.8
2	Spring	41	4	38.8	43	45	34.0	2,034	0.1	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	
Alternative sources if any	

No.2 Community Aghvorik
District Amasia
Marz Shirak
Sampling date 09/Aug/2007

	Parameters analysed	Units	No.1	No.2			Guidelines	
							WHO	Armenia
a	pH		7.3	7.1			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	9.5	12.9				
c	TDS	Mg/L	197	111			1000	1000
1	Al:Aluminum	Mg/L	n.d	n.d			0.10	0.50
2	B:Boron	Mg/L	n.d	n.d			0.70	0.50
3	Cl:Chloride	Mg/L	5	6			250	350
4	Cr:Chrome	Mg/L	<0.01	<0.01			0.05	0.05
5	Cu:Copper	Mg/L	n.d	n.d			2	1
6	F:Fluoride	Mg/L	0.22	0.21			1.50	
7	Hardness	Mg/L	425	320			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	n.d	n.d			0.070	0.250
11	Ni:Nickel	Mg/L	n.d	n.d			0.020	0.100
12	Nitrate(NO3+)	Mg/L	2.2	3.6			50.0	45.0
13	SO4:Sulfate	Mg/L	3.0	8.0			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	0.03	0.03			0.70	0.10
17	Be:Berillium	Mg/L	0.00006	0.00006			NA	0.00020
18	Cd:Cadmium	Mg/L	n.d	n.d			0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001	<0.001			0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002	<0.0002			0.00100	0.00050
21	Se:Selenium	Mg/L	0.001	n.d			0.010	0.010
22	Sr:Strontium	Mg/L	0.1	0.1			NA	7.0
23	CN:Cyanide	Mg/L	n.d	n.d			0.070	0.035
24	Coli form bacteria	bacteria per 100 ml	<3				-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml	n.d				0	0
26	Total bacteria	bacteria per 1 ml	15				-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.2 Community Aghvorik
District Amasia
Marz Shirak

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	02	03	-	Not Identified	Not Identified
2	05	22	-	Not Identified	Not Identified
3	06	09	-	Not Identified	Not Identified
4	07	10	-	0,4;0;0;0	Not Identified
5	08	01	60,0,0,0	Not Identified	Not Identified

No. 2 **Marz** Shirak **Community** Aghvorik

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			No resvoir

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	41°04′51,5″	43°44′45,9″	2,147	1920	Masonry	1.8	Yes
2	Spring	41°04′38,8″	43°45′34″	2,034		Concrete	0.2	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	3,000	100	Steel	1.5	1960	Little	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	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	3,500	100	Steel	1950	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	1950		No	0	Yes

9. DRAINAGE SYSTEM

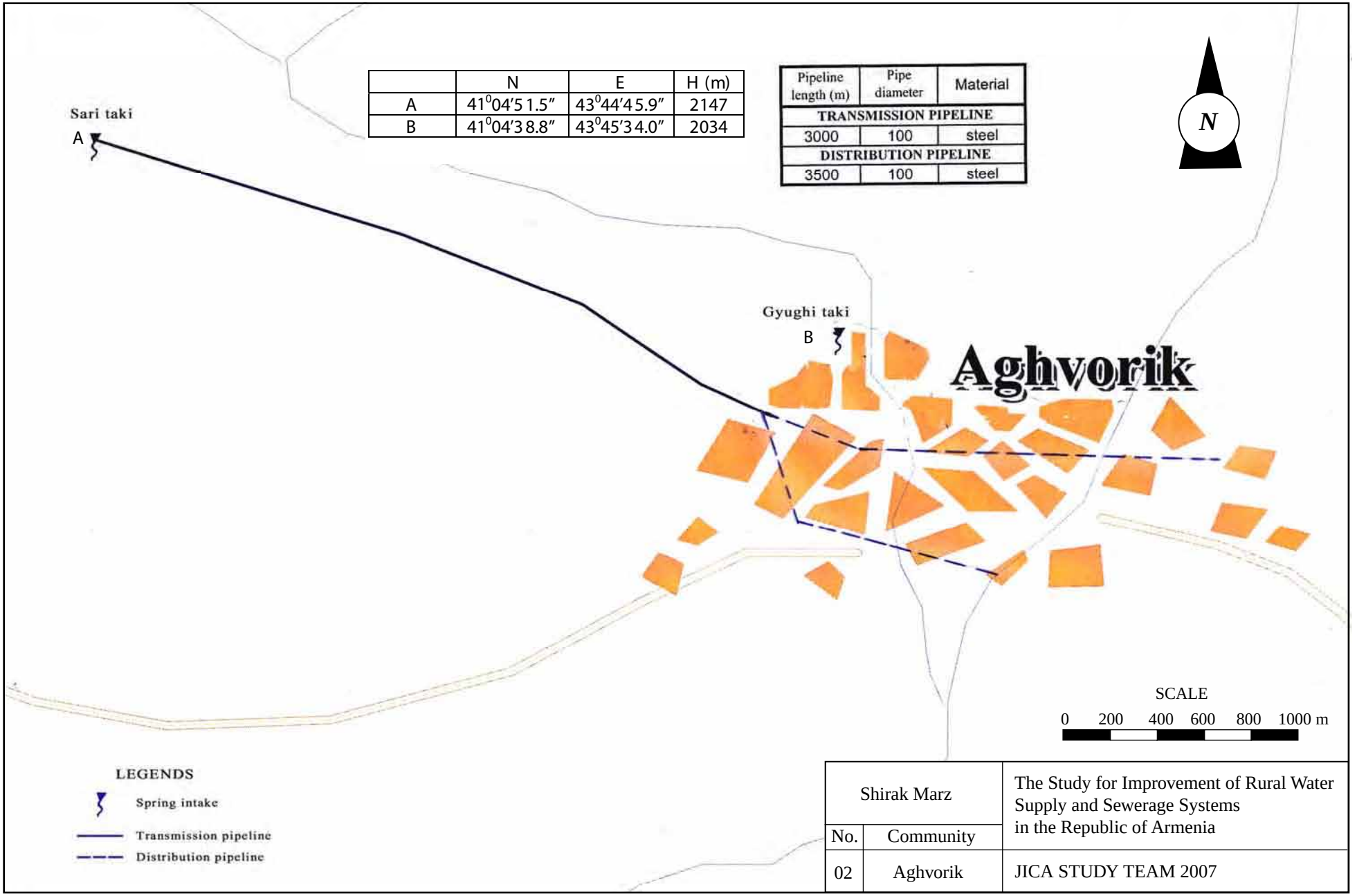
Existence (Y/N)	Rehabilitation Necessity (Y/N)	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Shirak**
Number and Name of Community	**No.2 Aghvorik**
District	**Amasia**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	140
A2	Actual population in 2007	117
A3	Number of households	17
A4.1	Elderly people	15
A4.2	Population in labor force (age from 16 to 62)	82
A4.3	Children	20
A5.1	Pensioners	1
A5.2	Unemployed	0
A5.3	Receiving benefits	1
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	12
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	5,000
	Annual Budget of the community 2005, in thousand AMD	5,000
	Annual Budget of the community 2006, in thousand AMD	5,500
	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	240
	Amount spent in drinking water sector 2005, in thousand AMD	240
	Amount spent in drinking water sector 2006, in thousand AMD	240
	Amount spent in drinking water sector 2007, in thousand AMD	240
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	meat, dairy, potatoes
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	0 976
D3	Date of expiry of water use permit	2006-2009
D4	Planned date of obtaining water use permit	-
D5	Present condition of the water supply volume of Domestic use	sufficient
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	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?	24 hrs
D11	What time of day water is given?	-
D12	Are you pleased with duration of domestic water supply?	fully pleased
D13	Are hours of water supply convenient?	fully 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)	40
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	100
D16	Drinking water monthly water fee per household	250AMD per capita/ month
D17	How often do you usually pay water fees?	-
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?	insufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Meliqyan Aram
E2	Position	water line inspector
E3	Telephone	-
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)	absent
E7	Quantity and present condition of the water supply facilities: net/distribution	1-deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	2-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?	community
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?	no collection
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	240,000
	Repair cost(AMD)	0
	Others(AMD)	0
	Total (AMD)	240,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	residents 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	yes
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Shirak
No.2 Aghvorik



	N	E	H (m)
A	41°04′51.5″	43°44′45.9″	2147
B	41°04′38.8″	43°45′34.0″	2034

Pipeline length (m)	Pipe diameter	Material
TRANSMISSION PIPELINE		
3000	100	steel
DISTRIBUTION PIPELINE		
3500	100	steel

Shirak Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
02	Aghvorik	JICA STUDY TEAM 2007

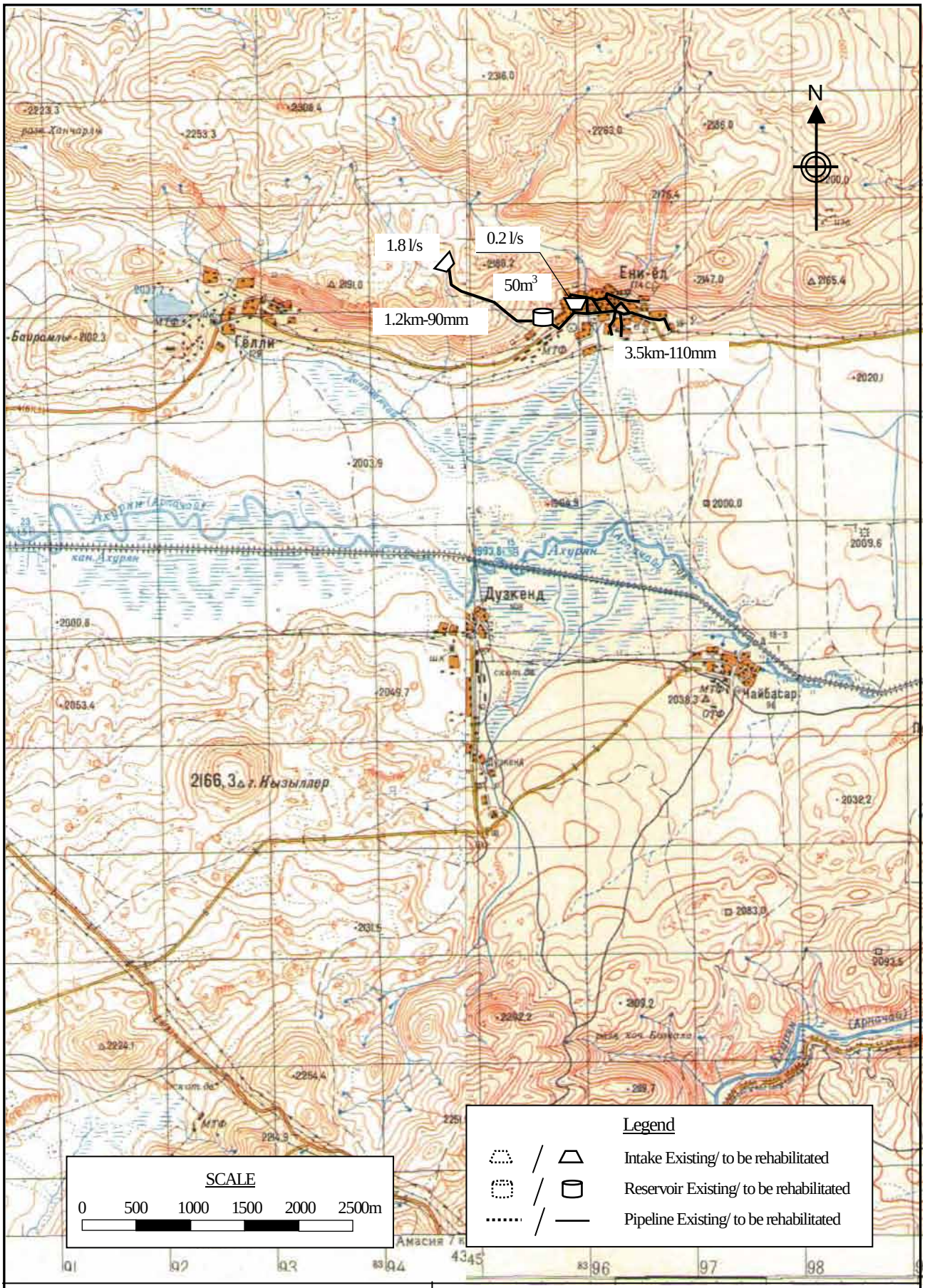
Marz : **Shirak** No.2
Name : **Aghvorik**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	117	persons	11.7	
	2 Factory	-	nos	0.0	
	3 School (pupils)	12	pupils	0.1	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	7 Livestocks (87lit/household)	17	household	1.5	
	Sub-total			13.3	
	Unaccouted for water (20%)			2.7	
1	Average Daily Water Demand			16.0	m3/day
2	Maximum Daily Water Demand			19.2	m3/day
3	Maximum Hourly Water Demand			4.7	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	1	1.8	lit/sec		155.5	m3/day
	b Spring	1	0.2	lit/sec		17.3	m3/day
`	Total					172.8	m3/day
	2 Required reservoir volume					56	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	1,200	m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
	3 Reservoir		
	50m3 capacity	1	nos
	4 Distribution pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter	3,500	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
	5 House connection	17	nos
	6 Water meter installation	17	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	Shirak	
No. 02	Aghvorik	JICA STUDY TEAM

Marz : **Shirak**
No. : **2**
Name : **Aghvorik**

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	1,200	m	8,040	9,648,000
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					9,648,000
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		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	3,500	m	9,680	33,880,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					33,880,000
5	House Connection		17	nos	74,000	1,258,000
6	Water Meter Installation		17	nos	80,000	1,360,000
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	1,400	m	3,600	5,040,000
	Total				AMD	60,875,300
					Equivalent to USD	199,251
					Equivalent to JPY	21,021,027
					AMD	USD
	Investment Cost per household		17	HH	3,580,900	11,721
	Investment Cost per person		117	persons	520,302	1,703

SHIRAK MARZ
Amasia District
No 2 Aghvorik

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		4.9																																							
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		27.09	0.00	0.00	0.00	0.17	0.17	0.18	0.31	0.32	0.33	0.34	0.51	0.52	0.54	0.56	0.58	0.59	0.61	0.63	0.66	0.68	0.70	0.72	0.75	0.77	0.80	0.82	0.85	0.88	0.91	0.94	0.97	1.00	1.03	1.07	1.10	1.14	1.18	1.21	1.25	1.30
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				30																																				
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		1.30			0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06
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		16.73			0.00	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	0.44	0.45	0.47	0.49	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
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	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	0.44	0.45	0.47	0.49	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
5. Pump replacement		0.00																0.00															0.00									
Sub-total		35.73	0.00	0.00	0.24	0.51	0.53	0.53	0.55	0.57	0.59	0.61	0.63	0.65	0.67	0.70	0.72	0.75	0.77	0.79	0.82	0.85	0.87	0.90	0.93	0.96	1.00	1.04	1.06	1.10	1.13	1.17	1.21	1.26	1.30	1.34	1.38	1.42	1.46	1.53	1.57	1.62
C Gross Income (A-B)		-8.64	0.00	0.00	-0.24	-0.34	-0.36	-0.35	-0.24	-0.25	-0.26	-0.27	-0.12	-0.13	-0.13	-0.14	-0.14	-0.16	-0.16	-0.16	-0.16	-0.17	-0.17	-0.18	-0.18	-0.19	-0.20	-0.22	-0.21	-0.22	-0.22	-0.23	-0.24	-0.26	-0.27	-0.27	-0.28	-0.28	-0.28	-0.32	-0.32	-0.32
D Depreciation cost		57.75						1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
E Interest paid		19.18	0.02	0.04	0.06	0.81	0.81	0.82	0.82	0.82	0.82	0.82	0.82	0.80	0.78	0.75	0.73	0.70	0.68	0.65	0.63	0.60	0.58	0.55	0.52	0.50	0.47	0.44	0.41	0.39	0.36	0.33	0.30	0.27	0.24	0.21	0.18	0.15	0.12	0.09	0.06	0.03
F Net Income		-85.57	-0.02	-0.04	-0.30	-1.15	-1.17	-2.82	-2.71	-2.72	-2.73	-2.74	-2.59	-2.58	-2.56	-2.54	-2.52	-2.51	-2.49	-2.46	-2.44	-2.42	-2.40	-2.38	-2.35	-2.34	-2.32	-2.31	-2.27	-2.26	-2.23	-2.21	-2.19	-2.18	-2.16	-2.13	-2.11	-2.08	-2.05	-2.06	-2.03	-2.00
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		-85.57	-0.02	-0.04	-0.30	-1.15	-1.17	-2.82	-2.71	-2.72	-2.73	-2.74	-2.59	-2.58	-2.56	-2.54	-2.52	-2.51	-2.49	-2.46	-2.44	-2.42	-2.40	-2.38	-2.35	-2.34	-2.32	-2.31	-2.27	-2.26	-2.23	-2.21	-2.19	-2.18	-2.16	-2.13	-2.11	-2.08	-2.05	-2.06	-2.03	-2.00
OM Cost Recovery Ratio (A/B)		76%	0%	0%	0%	33%	32%	34%	56%	56%	56%	56%	81%	80%	81%	80%	81%	79%	79%	80%	80%	80%	80%	80%	81%	80%	80%	79%	80%	80%	81%	80%	80%	79%	79%	80%	80%	80%	81%	79%	80%	80%

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	-85.57	-0.02	-0.04	-0.30	-1.15	-1.17	-2.82	-2.71	-2.72	-2.73	-2.74	-2.59	-2.58	-2.56	-2.54	-2.52	-2.51	-2.49	-2.46	-2.44	-2.42	-2.40	-2.38	-2.35	-2.34	-2.32	-2.31	-2.27	-2.26	-2.23	-2.21	-2.19	-2.18	-2.16	-2.13	-2.11	-2.08	-2.05	-2.06	-2.03	-2.00
2. Depreciation cost	57.75	0.00	0.00	0.00	0.00	0.00	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
3. Interest Paid	19.18	0.02	0.04	0.06	0.81	0.81	0.82	0.82	0.82	0.82	0.82	0.82	0.80	0.78	0.75	0.73	0.70	0.68	0.65	0.63	0.60	0.58	0.55	0.52	0.50	0.47	0.44	0.41	0.39	0.36	0.33	0.30	0.27	0.24	0.21	0.18	0.15	0.12	0.09	0.06	0.03
Sub-total	-8.64	0.00	0.00	-0.24	-0.34	-0.36	-0.35	-0.24	-0.25	-0.26	-0.27	-0.12	-0.13	-0.13	-0.14	-0.14	-0.16	-0.16	-0.16	-0.16	-0.17	-0.17	-0.18	-0.18	-0.19	-0.20	-0.22	-0.21	-0.22	-0.22	-0.23	-0.24	-0.26	-0.27	-0.27	-0.28	-0.28	-0.28	-0.32	-0.32	-0.32
B Finances																																								
1. Project Loan	82.31	2.36	1.67	2.24	74.43	0.97	0.36	0.28																																	
2. Local fund	27.87	0.79	0.56	0.74	25.54	0.17	0.04	0.03																																	
Sub-total	110.18	3.15	2.23	2.98	99.97	1.14	0.40	0.31																																	
C Subsidy from Government																																								
1. Subsidy for O&M cost	8.64	0.00	0.00	0.24	0.34	0.36	0.35	0.24	0.25	0.26	0.27	0.12	0.13	0.13	0.14	0.14	0.16	0.16	0.16	0.16	0.17	0.17	0.18	0.18	0.19	0.20	0.22	0.21	0.22	0.22	0.23	0.24	0.26	0.27	0.27	0.28	0.28	0.28	0.32	0.32	0.32
2. Subsidy for debt services	101.50	0.02	0.04	0.06	0.81	0.81	0.82	0.82	0.82	0.82	0.82	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.18	3.19	3.19	3.19	3.19	3.19	3.19	3.18	3.18	3.18	3.19	3.19	3.19	3.19
Sub-total	110.14	0.02	0.04	0.30	1.15	1.17	1.17	1.06	1.07	1.08	1.09	3.31	3.32	3.32	3.33	3.33	3.35	3.35	3.35	3.35	3.36	3.36	3.37	3.37	3.38	3.39	3.41	3.39	3.41	3.41	3.42	3.43	3.45	3.46	3.45	3.46	3.46	3.47	3.51	3.51	3.51
Total Cash Inflow	211.68	3.17	2.27	3.04	100.78	1.95	1.22	1.13	0.82	0.82	0.82	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.18	3.19	3.19	3.19	3.19	3.19	3.19	3.18	3.18	3.18	3.19	3.19	3.19	3.19
APPLICATION OF FUNDS																																								
D Project disbursement	110.18	3.15	2.23	2.98	99.97	1.14	0.40	0.31																																	
E Total debt services																																								
1. Loan repayment	82.32											2.37	2.39	2.41	2.44	2.46	2.49	2.51	2.54	2.56	2.59	2.61	2.64	2.67	2.69	2.72	2.75	2.77	2.80	2.83	2.86	2.89	2.92	2.95	2.97	3.00	3.03	3.07	3.10	3.13	3.16
2. Interest paid	19.18	0.02	0.04	0.06	0.81	0.81	0.82	0.82	0.82	0.82	0.82	0.82	0.80	0.78	0.75	0.73	0.70	0.68	0.65	0.63	0.60	0.58	0.55	0.52	0.50	0.47	0.44	0.41	0.39	0.36	0.33	0.30	0.27	0.24	0.21	0.18	0.15	0.12	0.09	0.06	0.03
Sub-total	101.50	0.02	0.04	0.06	0.81	0.81	0.82	0.82	0.82	0.82	0.82	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.18	3.19	3.19	3.19	3.19	3.19	3.19	3.18	3.18	3.18	3.19	3.19	3.19	3.19
Total Cash Outflow	211.68	3.17	2.27	3.04	100.78	1.95	1.22	1.13	0.82	0.82	0.82	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.18	3.19	3.19	3.19	3.19	3.19	3.19	3.18	3.18	3.18	3.19	3.19	3.19	3.19
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)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
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%

SHIRAK MARZ
Amasia District
No 2 Aghvorik

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	27.09	19.7%
	Subsidy	110.14	80.3%
	Total	137.23	100.0%
2	**Expenditure**		
	OM cost	35.73	26.0%
	Loan repayment	82.32	60.0%
	Interest paid	19.18	14.0%
	Surplus cash	0.00	0.0%
	Total	137.23	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	73.33	2.30	1.64	2.11	65.81	0.88	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	0.74			0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
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	8.51			0.00	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Pump replacement																	0.00															0.00									
Sub-total	18.37			0.24	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Total Outflow	91.70	2.30	1.64	2.35	66.30	1.37	0.82	0.75	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
B BENEFIT																																								
1. Water Tariff	17.12	0.00	0.00	0.00	0.17	0.17	0.18	0.31	0.32	0.33	0.34	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51
2. Subsidy	90.96	0.00	0.00	0.24	0.34	0.36	0.35	0.24	0.25	0.26	0.27	2.49	2.52	2.54	2.58	2.60	2.65	2.67	2.70	2.72	2.76	2.78	2.82	2.85	2.88	2.92	2.97	2.98	3.02	3.05	3.09	3.13	3.18	3.22	3.24	3.28	3.31	3.35	3.42	3.45	3.48
Total Inflow	108.08	0.00	0.00	0.24	0.51	0.53	0.53	0.55	0.57	0.59	0.61	3.00	3.03	3.05	3.09	3.11	3.16	3.18	3.21	3.23	3.27	3.29	3.33	3.36	3.39	3.43	3.48	3.49	3.53	3.56	3.60	3.64	3.69	3.73	3.75	3.79	3.82	3.86	3.93	3.96	3.99
NET BENEFIT	16.38	-2.30	-1.64	-2.1	-65.8	-0.8	-0.29	-0.20	0.08	0.10	0.12	2.51	2.54	2.56	2.60	2.62	2.67	2.69	2.72	2.74	2.78	2.80	2.84	2.87	2.90	2.94	2.99	3.00	3.04	3.07	3.11	3.15	3.20	3.24	3.26	3.30	3.33	3.37	3.44	3.47	3.50

FIRR = 0.92%

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	-17.90	-2.53	-1.80	-2.3	-72.4	-0.9	-0.32	-0.23	0.08	0.10	0.12	2.51	2.54	2.56	2.60	2.62	2.67	2.69	2.72	2.74	2.78	2.80	2.84	2.87	2.90	2.94	2.99	3.00	3.04	3.07	3.11	3.15	3.20	3.24	3.26	3.30	3.33	3.37	3.44	3.47	3.50
	2	Capital cost 20% up	-24.76	-2.76	-1.97	-2.5	-79.0	-1.0	-0.36	-0.25	0.08	0.10	0.12	2.51	2.54	2.56	2.60	2.62	2.67	2.69	2.72	2.74	2.78	2.80	2.84	2.87	2.90	2.94	2.99	3.00	3.04	3.07	3.11	3.15	3.20	3.24	3.26	3.30	3.33	3.37	3.44	3.47	3.50
2	1	OM cost 10% up	-12.33	-2.30	-1.64	-2.1	-65.8	-0.9	-0.34	-0.25	0.03	0.05	0.07	2.46	2.49	2.51	2.55	2.57	2.62	2.64	2.67	2.69	2.73	2.75	2.79	2.82	2.85	2.89	2.94	2.95	2.99	3.02	3.06	3.10	3.15	3.19	3.21	3.25	3.28	3.32	3.39	3.42	3.45
	2	OM cost 20% up	-13.61	-2.30	-1.64	-2.2	-65.9	-0.9	-0.39	-0.30	-0.02	0.00	0.02	2.41	2.44	2.46	2.50	2.52	2.57	2.59	2.62	2.64	2.68	2.70	2.74	2.77	2.80	2.84	2.89	2.90	2.94	2.97	3.01	3.05	3.10	3.14	3.16	3.20	3.23	3.27	3.34	3.37	3.40
3	1	Revenue 10% down	-18.08	-2.30	-1.64	-2.1	-65.8	-0.9	-0.34	-0.26	0.02	0.04	0.06	2.21	2.24	2.26	2.29	2.31	2.35	2.37	2.40	2.42	2.45	2.47	2.51	2.53	2.56	2.60	2.64	2.65	2.69	2.71	2.75	2.79	2.83	2.87	2.89	2.92	2.95	2.98	3.05	3.07	3.10
	2	Revenue 20% down	-25.12	-2.30	-1.64	-2.2	-65.9	-0.9	-0.40	-0.31	-0.03	-0.02	0.00	1.91	1.93	1.95	1.98	2.00	2.04	2.05	2.08	2.09	2.13	2.14	2.17	2.20	2.22	2.25	2.29	2.30	2.33	2.36	2.39	2.42	2.46	2.49	2.51	2.54	2.57	2.60	2.65	2.68	2.70

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	0.48%	9.15	10.93%
	2	Capital cost 20% up	0.09%	96.44	1.04%
2	1	OM cost 10% up	0.82%	1.22	82.07%
	2	OM cost 20% up	0.72%	2.79	35.86%
3	1	Revenue 10% down	0.33%	18.02	5.55%
	2	Revenue 20% down	-0.32%	-38.26	-2.61%

No.3 Ardenis

Information on Existing Water Sources (Shirak)

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

No.3 Community Ardenis
District Amasia
Marz Shirak

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	springs	41	5	6.0	43	43	7.9	2,118	3.0	8.0	5.0
2	spring	41	5	1.1	43	43	12.6	2,112	-	-	
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	The Community has military unit, which uses water pipeline.
Alternative sources if any	There is a half-constructed operating spring intake at 2km distance from the Community

No.3 Community Ardenis
District Amasia
Marz Shirak
Sampling date 11/Aug/2007

	Parameters analysed	Units	No.1	No.2	No.3	No.4 herankarayin	Guidelines	
							WHO	Armenia
a	pH		7.1	7.0	6.1	6.7	6.5-8	6.0 - 9.0
b	Temperature	Deg.C	13.5	12.1	8.9	9.7		
c	TDS	Mg/L	57	74	62	281	1000	1000
1	Al:Aluminum	Mg/L	0.03	0.01	n.d	n.d	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	5	6	29	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	0.17	0.29	0.24	0.27	1.50	
7	Hardness	Mg/L	135	170	180	550	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	n.d	0.020	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	4.0	10.2	7.1	18.6	50.0	45.0
13	SO4:Sulfate	Mg/L	4.0	8.0	5.0	55.0	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	0.02	0.02	0.02	0.04	0.70	0.10
17	Be:Berillium	Mg/L	0.00013	0.00011	0.00009	0.00011	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	0.000	0.000	0.000	0.000	0.010	0.030
20	Hg:Mercury	Mg/L	0.00000	0.00000	0.00000	0.00000	0.00100	0.00050
21	Se:Selenium	Mg/L	n.d	n.d	0.000	0.000	0.010	0.010
22	Sr:Strontium	Mg/L	n.d	n.d	n.d	0.1	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					-	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 Ardenis
District Amasia
Marz Shirak

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	02	03	-	Not Identified	Not Identified
2	05	22	-	Not Identified	Not Identified
3	06	09	-	Not Identified	Not Identified
4	07	10	-	Not Identified	Not Identified
5	08	01	80,0,76,60	0,7; 0;0,7;0,4	Not Identified

No. 3 **Marz** Shirak **Community** Ardenis

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	Possible	Possible	

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	41°05′06,0″	43°43′07,9″	2,118	2003	Concrete	5.0	No
2	Spring	41°05′01,1″	43°43′12,6″	2,112	2003	Concrete		No

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	500	80	Steel	4.8	2003	Little	No
2	1,000	50	Steel	4.8		Little	No

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	41°04′49,3″	43°43′19,0″	2,052	Concrete	Rectangular	8×8×4	200	Yes

5. CHLORINATION

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	Yes	Reservoir	Powder	once per 3months

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	700	80	Steel	2003	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)
12		2003	Yes	100	No

9. DRAINAGE SYSTEM

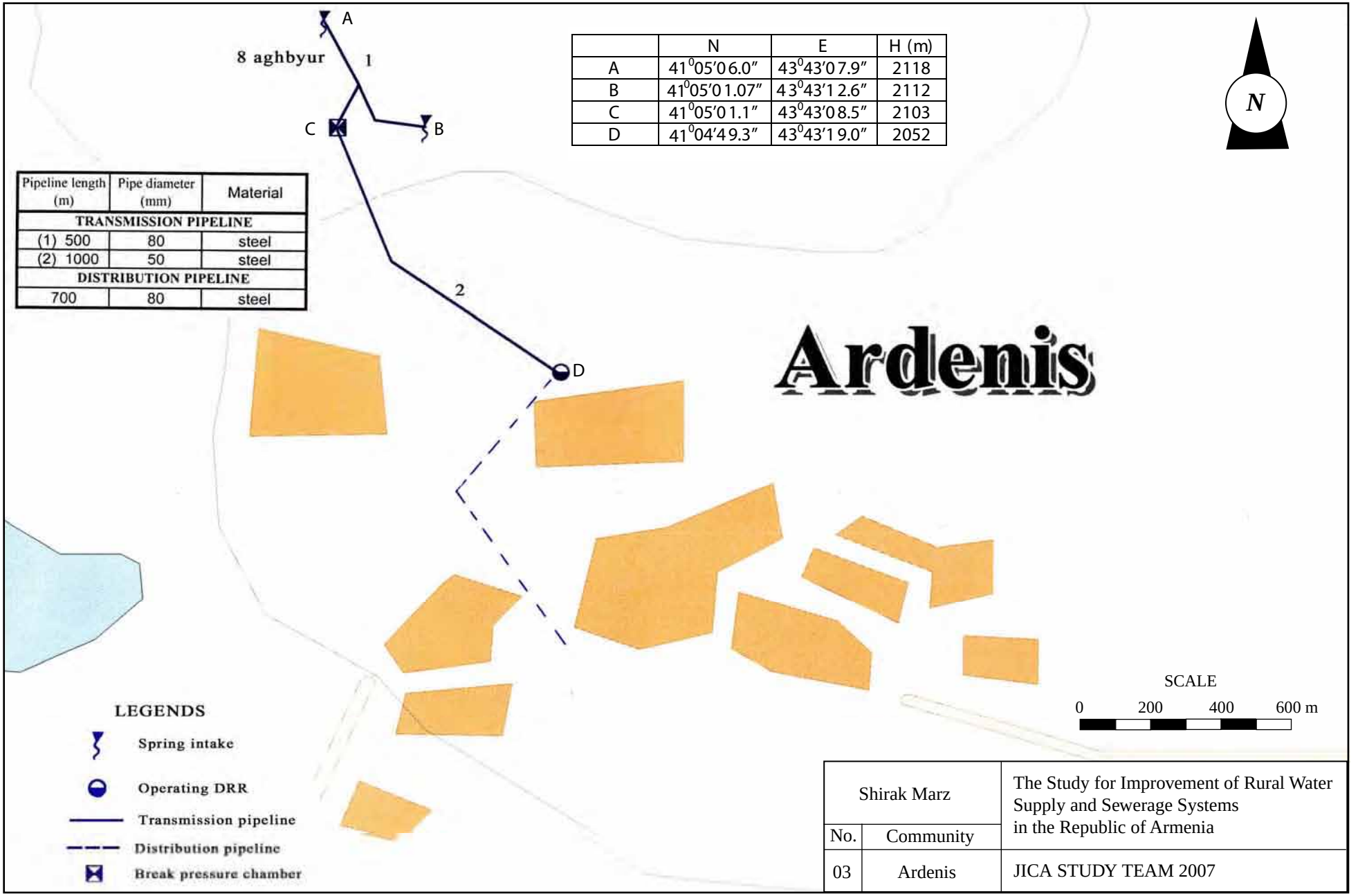
Existence (Y/N)	Rehabilitation Necessity (Y/N)	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Shirak**
Number and Name of Community	**No.3 Ardenis**
District	**Amasia**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	240
A2	Actual population in 2007	320
A3	Number of households	45
A4.1	Elderly people	10
A4.2	Population in labor force (age from 16 to 62)	160
A4.3	Children	150
A5.1	Pensioners	11
A5.2	Unemployed	0
A5.3	Receiving benefits	0
A6	Average monthly income of household (AMD)	40,000
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	30
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	4,071
	Annual Budget of the community 2005, in thousand AMD	3,259
	Annual Budget of the community 2006, in thousand AMD	4,457
	Annual Budget of the community 2007, in thousand AMD	2,300
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	200
	Amount spent in drinking water sector 2005, in thousand AMD	200
	Amount spent in drinking water sector 2006, in thousand AMD	300
	Amount spent in drinking water sector 2007, in thousand AMD	150
	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, potatoes
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	1020
D3	Date of expiry of water use permit	13.02.06-13.02.09
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	absent
D7	Number of house connection to drinking water system	20
D8	How many house connection household set the water meter	0
D9	Number of public taps	12
D10.1	How is the regime of water supply in your community in the dry season?	regularly-10 hrs
D10.2	How is the regime of water supply in your community in the wet season?	regularly-18hrs
D11	What time of day water is given?	22.00-06.00, 17.00-19.00, 06.00-24.00
D12	Are you pleased with duration of domestic water supply?	mainly displeased
D13	Are hours of water supply convenient?	mainly 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)	60
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	160
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?	insufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Manoyan Yeghish
E2	Position	water line inspector
E3	Telephone	-
E4	Quantity and present condition of the water supply facilities: spring/ intake	8-rehabilitated.
E5	Quantity and present condition of the water supply facilities:	8-rehabilitated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	2-partially repaired
E7	Quantity and present condition of the water supply facilities: net/distribution	partially repaired
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?	residents
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
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)	0
	Others(AMD)	0
	Total (AMD)	300,000
E16	Do the residents participate in the O&M works?	earthwork, welding, manpower
E17	What kind of OM method is preferable to you?	residents 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.	yes
F1.2	Virgin forests, tropical forests	absent
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	yes
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	not identified
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	not identified
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Shirak
No.3 Ardenis



	N	E	H (m)
A	41°05′06.0″	43°43′07.9″	2118
B	41°05′01.07″	43°43′12.6″	2112
C	41°05′01.1″	43°43′08.5″	2103
D	41°04′49.3″	43°43′19.0″	2052

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 500	80	steel
(2) 1000	50	steel
DISTRIBUTION PIPELINE		
700	80	steel

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

Marz : **Shirak** No.3
Name : **Ardenis**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	320	persons	32.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	30	pupils	0.3	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	7 Livestocks (87lit/household)	45	household	3.9	
	Sub-total			36.2	
	Unaccouted for water (20%)			7.2	
1	Average Daily Water Demand			43.4	m3/day
2	Maximum Daily Water Demand			52.1	m3/day
3	Maximum Hourly Water Demand			9.9	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	2	5.0	lit/sec		432.0	m3/day
`	Total					432.0	m3/day
	2 Required reservoir volume					119	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		
	150m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter	700	m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	25	nos
6	Water meter installation	45	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	Shirak	
No. 03	Ardenis	JICA STUDY TEAM

Marz : **Shirak**
No. : **3**
Name : **Ardenis**

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	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		m	5,520	
		75mm		m	7,160	
		90mm	700	m	8,040	5,628,000
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					5,628,000
5	House Connection		25	nos	74,000	1,850,000
6	Water Meter Installation		45	nos	80,000	3,600,000
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	280	m	3,600	1,008,000
	Total				AMD	31,480,500
					Equivalent to USD	103,039
					Equivalent to JPY	10,870,623
					AMD	USD
	Investment Cost per household		45	HH	699,567	2,290
	Investment Cost per person		320	persons	98,377	322

SHIRAK MARZ
Amasia District
No 3 Ardenis

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		13.2																																							
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		73.68	0.00	0.00	0.00	0.48	0.48	0.49	0.83	0.86	0.89	0.92	1.38	1.42	1.47	1.52	1.57	1.62	1.67	1.73	1.78	1.84	1.90	1.97	2.03	2.10	2.17	2.24	2.31	2.39	2.47	2.55	2.63	2.72	2.81	2.90	3.00	3.10	3.20	3.30	3.41	3.53
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				80																																					
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		3.48			0.00	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	0.14	0.14	0.15	0.15	0.16
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		5.82			0.00	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	0.13	0.14	0.14	0.15	0.15	0.16	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
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	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	0.13	0.14	0.14	0.15	0.15	0.16	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
5. Pump replacement		0.00																0.00															0.00									
Sub-total		27.00	0.00	0.00	0.24	0.38	0.40	0.40	0.41	0.43	0.45	0.46	0.47	0.49	0.51	0.52	0.54	0.56	0.59	0.60	0.61	0.64	0.66	0.68	0.70	0.72	0.75	0.78	0.79	0.83	0.86	0.89	0.92	0.95	0.98	1.01	1.05	1.07	1.10	1.15	1.18	1.23
C Gross Income (A-B)		46.68	0.00	0.00	-0.24	0.10	0.08	0.09	0.42	0.43	0.44	0.46	0.91	0.93	0.96	1.00	1.03	1.06	1.08	1.13	1.17	1.20	1.24	1.29	1.33	1.38	1.42	1.46	1.52	1.56	1.61	1.66	1.71	1.77	1.83	1.89	1.95	2.03	2.10	2.15	2.23	2.30
D Depreciation cost		29.75						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
E Interest paid		11.20	0.02	0.04	0.06	0.46	0.47	0.48	0.48	0.48	0.48	0.48	0.48	0.46	0.45	0.44	0.42	0.41	0.39	0.38	0.36	0.35	0.33	0.32	0.30	0.29	0.27	0.26	0.24	0.22	0.21	0.19	0.18	0.16	0.14	0.12	0.11	0.09	0.07	0.05	0.04	0.02
F Net Income		5.73	-0.02	-0.04	-0.30	-0.36	-0.39	-1.24	-0.91	-0.90	-0.89	-0.87	-0.42	-0.38	-0.34	-0.29	-0.24	-0.20	-0.16	-0.10	-0.04	0.00	0.06	0.12	0.18	0.24	0.30	0.35	0.43	0.49	0.55	0.62	0.68	0.76	0.84	0.92	0.99	1.09	1.18	1.25	1.34	1.43
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		5.73	-0.02	-0.04	-0.30	-0.36	-0.39	-1.24	-0.91	-0.90	-0.89	-0.87	-0.42	-0.38	-0.34	-0.29	-0.24	-0.20	-0.16	-0.10	-0.04	0.00	0.06	0.12	0.18	0.24	0.30	0.35	0.43	0.49	0.55	0.62	0.68	0.76	0.84	0.92	0.99	1.09	1.18	1.25	1.34	1.43
OM Cost Recovery Ratio (A/B)		273%	0%	0%	0%	126%	120%	123%	202%	200%	198%	200%	294%	290%	288%	292%	291%	289%	283%	288%	292%	288%	288%	290%	290%	292%	289%	287%	292%	288%	287%	287%	286%	286%	287%	287%	286%	290%	291%	287%	289%	287%

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	5.73	-0.02	-0.04	-0.30	-0.36	-0.39	-1.24	-0.91	-0.90	-0.89	-0.87	-0.42	-0.38	-0.34	-0.29	-0.24	-0.20	-0.16	-0.10	-0.04	0.00	0.06	0.12	0.18	0.24	0.30	0.35	0.43	0.49	0.55	0.62	0.68	0.76	0.84	0.92	0.99	1.09	1.18	1.25	1.34	1.43
2. Depreciation cost	29.75	0.00	0.00	0.00	0.00	0.00	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
3. Interest Paid	11.20	0.02	0.04	0.06	0.46	0.47	0.48	0.48	0.48	0.48	0.48	0.48	0.46	0.45	0.44	0.42	0.41	0.39	0.38	0.36	0.35	0.33	0.32	0.30	0.29	0.27	0.26	0.24	0.22	0.21	0.19	0.18	0.16	0.14	0.12	0.11	0.09	0.07	0.05	0.04	0.02
Sub-total	46.68	0.00	0.00	-0.24	0.10	0.08	0.09	0.42	0.43	0.44	0.46	0.91	0.93	0.96	1.00	1.03	1.06	1.08	1.13	1.17	1.20	1.24	1.29	1.33	1.38	1.42	1.46	1.52	1.56	1.61	1.66	1.71	1.77	1.83	1.89	1.95	2.03	2.10	2.15	2.23	2.30
B Finances																																									
1. Project Loan	47.83	2.36	1.67	2.24	39.95	0.97	0.36	0.28																																	
2. Local fund	16.02	0.79	0.56	0.74	13.69	0.17	0.04	0.03																																	
Sub-total	63.85	3.15	2.23	2.98	53.64	1.14	0.40	0.31																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.24	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	13.77	0.02	0.04	0.06	0.36	0.39	0.39	0.06	0.05	0.04	0.02	0.94	0.92	0.89	0.86	0.82	0.80	0.77	0.72	0.68	0.65	0.61	0.56	0.52	0.47	0.43	0.40	0.33	0.29	0.24	0.19	0.15	0.08	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	14.01	0.02	0.04	0.30	0.36	0.39	0.39	0.06	0.05	0.04	0.02	0.94	0.92	0.89	0.86	0.82	0.80	0.77	0.72	0.68	0.65	0.61	0.56	0.52	0.47	0.43	0.40	0.33	0.29	0.24	0.19	0.15	0.08	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Cash Inflow	124.54	3.17	2.27	3.04	54.10	1.61	0.88	0.79	0.48	0.48	0.48	1.85	1.85	1.85	1.86	1.85	1.86	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.86	1.85	1.85	1.85	1.85	1.86	1.85	1.85	1.89	1.95	2.03	2.10	2.15	2.23	2.30
APPLICATION OF FUNDS																																								
D Project disbursement	63.85	3.15	2.23	2.98	53.64	1.14	0.40	0.31																																	
E Total debt services																																								
1. Loan repayment	47.81											1.37	1.39	1.40	1.42	1.43	1.45	1.46	1.47	1.49	1.50	1.52	1.53	1.55	1.56	1.58	1.60	1.61	1.63	1.64	1.66	1.68	1.69	1.71	1.73	1.75	1.76	1.78	1.80	1.82	1.83
2. Interest paid	11.20	0.02	0.04	0.06	0.46	0.47	0.48	0.48	0.48	0.48	0.48	0.48	0.46	0.45	0.44	0.42	0.41	0.39	0.38	0.36	0.35	0.33	0.32	0.30	0.29	0.27	0.26	0.24	0.22	0.21	0.19	0.18	0.16	0.14	0.12	0.11	0.09	0.07	0.05	0.04	0.02
Sub-total	59.01	0.02	0.04	0.06	0.46	0.47	0.48	0.48	0.48	0.48	0.48	1.85	1.85	1.85	1.86	1.85	1.86	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.86	1.85	1.85	1.85	1.85	1.86	1.85	1.85	1.85	1.86	1.85	1.85	1.85	1.86	1.85
Total Cash Outflow	122.86	3.17	2.27	3.04	54.10	1.61	0.88	0.79	0.48	0.48	0.48	1.85	1.85	1.85	1.86	1.85	1.86	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.86	1.85	1.85	1.85	1.85	1.86	1.85	1.85	1.85	1.86	1.85	1.85	1.85	1.86	1.85
F Net Surplus Cash (A+C2)-E	1.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.09	0.18	0.25	0.30	0.37	0.45
Project Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	79%	0%	0%	0%	22%	17%	19%	88%	90%	92%	96%	49%	50%	52%	54%	56%	57%	58%	61%	63%	65%	67%	70%	72%	75%	77%	78%	82%	84%	87%	90%	92%	96%	99%	102%	105%	110%	114%	116%	120%	124%
Cost recovery by water fee + subsidy ((A+C2)/E)	103%	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%	102%	105%	110%	114%	116%	120%	124%

SHIRAK MARZ
Amasia District
No 3 Ardenis

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	73.68	84.0%
	Subsidy	14.01	16.0%
	Total	87.69	100.0%
2	**Expenditure**		
	OM cost	27.00	30.8%
	Loan repayment	47.81	54.5%
	Interest paid	11.20	12.8%
	Surplus cash	1.68	1.9%
	Total	87.69	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	42.93	2.30	1.64	2.11	35.41	0.88	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	1.85			0.00	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
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	2.96			0.00	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Pump replacement																	0.00															0.00								
Sub-total	13.93			0.24	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
Total Outflow	56.86	2.30	1.64	2.35	35.78	1.25	0.70	0.63	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
B BENEFIT																																								
1. Water Tariff	46.35	0.00	0.00	0.00	0.48	0.48	0.49	0.83	0.86	0.89	0.92	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38
2. Subsidy	5.56	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.46	0.44	0.42	0.40	0.39	0.38	0.34	0.32	0.30	0.28	0.24	0.22	0.18	0.16	0.14	0.09	0.07	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Inflow	51.91	0.00	0.00	0.24	0.48	0.48	0.49	0.83	0.86	0.89	0.92	1.84	1.84	1.82	1.80	1.78	1.77	1.76	1.72	1.70	1.68	1.66	1.62	1.60	1.56	1.54	1.52	1.47	1.45	1.41	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38
NET BENEFIT	-4.95	-2.30	-1.64	-2.1	-35.3	-0.8	-0.21	0.20	0.49	0.52	0.55	1.47	1.47	1.45	1.43	1.41	1.40	1.39	1.35	1.33	1.31	1.29	1.25	1.23	1.19	1.17	1.15	1.10	1.08	1.04	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01

FIRR = -0.62%

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	-18.55	-2.53	-1.80	-2.3	-38.8	-0.9	-0.24	0.17	0.49	0.52	0.55	1.47	1.47	1.45	1.43	1.41	1.40	1.39	1.35	1.33	1.31	1.29	1.25	1.23	1.19	1.17	1.15	1.10	1.08	1.04	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
	2	Capital cost 20% up	-22.57	-2.76	-1.97	-2.5	-42.4	-0.9	-0.28	0.15	0.49	0.52	0.55	1.47	1.47	1.45	1.43	1.41	1.40	1.39	1.35	1.33	1.31	1.29	1.25	1.23	1.19	1.17	1.15	1.10	1.08	1.04	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
2	1	OM cost 10% up	-15.50	-2.30	-1.64	-2.1	-35.3	-0.8	-0.25	0.16	0.45	0.48	0.51	1.43	1.43	1.41	1.39	1.37	1.36	1.35	1.31	1.29	1.27	1.25	1.21	1.19	1.15	1.13	1.11	1.06	1.04	1.00	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
	2	OM cost 20% up	-16.48	-2.30	-1.64	-2.2	-35.4	-0.8	-0.28	0.13	0.42	0.45	0.48	1.40	1.40	1.38	1.36	1.34	1.33	1.32	1.28	1.26	1.24	1.22	1.18	1.16	1.12	1.10	1.08	1.03	1.01	0.97	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
3	1	Revenue 10% down	-18.07	-2.30	-1.64	-2.1	-35.3	-0.8	-0.26	0.12	0.40	0.43	0.46	1.29	1.29	1.27	1.25	1.23	1.22	1.21	1.18	1.16	1.14	1.12	1.09	1.07	1.03	1.02	1.00	0.95	0.94	0.90	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
	2	Revenue 20% down	-21.61	-2.30	-1.64	-2.2	-35.4	-0.9	-0.31	0.03	0.32	0.34	0.37	1.10	1.10	1.09	1.07	1.05	1.05	1.04	1.01	0.99	0.97	0.96	0.93	0.91	0.88	0.86	0.85	0.81	0.79	0.76	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-1.08%	-4.30	-23.23%
	2	Capital cost 20% up	-1.50%	-5.88	-16.99%
2	1	OM cost 10% up	-0.80%	-2.28	-43.90%
	2	OM cost 20% up	-0.99%	-3.74	-26.76%
3	1	Revenue 10% down	-1.33%	-5.35	-18.68%
	2	Revenue 20% down	-2.13%	-7.10	-14.09%

No.4 Arpeni

Information on Existing Water Sources (Shirak)

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

No.4 Community Arpeni
District Ashotsk
Marz Shirak

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	-	-	-	-	-	-	-	2.0	5.0	5.0
2	Spring	-	-	-	-	-	-	-	0.5	3.0	
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	The reservoir is damaged, and the 6km long road to spring intakes is impassable
Alternative sources if any	

No.4 Community Arpeni
District Ashotsk
Marz Shirak
Sampling date 04/Aug/2007

	Parameters analysed	Units	No.1	No.2			Guidelines	
							WHO	Armenia
a	pH		8.2	8.3			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	12.9	20.9				
c	TDS	Mg/L	104	96			1000	1000
1	Al:Aluminum	Mg/L	n.d	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	4			250	350
4	Cr:Chrome	Mg/L	<0.01	<0.01			0.05	0.05
5	Cu:Copper	Mg/L	n.d	n.d			2	1
6	F:Fluoride	Mg/L	0.13	0.10			1.50	
7	Hardness	Mg/L	210	180			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	n.d	n.d			0.070	0.250
11	Ni:Nickel	Mg/L	n.d	n.d			0.020	0.100
12	Nitrate(NO3+)	Mg/L	3.1	2.2			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	0.00006	0.00006			NA	0.00020
18	Cd:Cadmium	Mg/L	n.d	n.d			0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001	<0.001			0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002	<0.0002			0.00100	0.00050
21	Se:Selenium	Mg/L	<0.001	<0.001			0.010	0.010
22	Sr:Strontium	Mg/L	n.d	n.d			NA	7.0
23	CN:Cyanide	Mg/L	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.4 Community Arpeni
District Bandivan
Marz Shirak

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	05	21	-	96,96,96,96,96,0,0,0	Not Identified
2	06	15	70,78,85,80,0,0	0,4;0,4;0,9	Not Identified
3	07	27	69,82	0,4;0,9;0,9;0,9;0,4;0,4;0,0	Not Identified
4	08	24	120,112,102,116,110,0,0,0	0,9; 0,9;0,9;0,9;0,9;2,3;0,9;0,9	Not Identified
5			72;84;80;96;90;98;68;84		

No. 4 **Marz** Shirak **Community** Arpeni

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Inpossible	Inpossible	
2	Intake	Inpossible	Inpossible	
3	Transmission pipeline	Difficult	Difficult	Difficult to find the pipeline route
4	Reservoir	Possible	Possible	

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	-	-	-	1992	Concrete	5.0	Yes
2	Spring	-	-	-	1950	Concrete		Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	4,000	100	Polyethylene	3.0	1992	Medium	Yes
2	2,000	100	Steel	0.7	1950	Medium	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°55′14,5″	43°53′46,0″	1,967	Steel	Circle	×d=1m,l=20r	32	No

5. CHLORINATION

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

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	400	80	Steel	1992	Medium	Yes
2	600	100	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							Yes

8, PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
3	1950	1992	Yes	30	Yes

9. DRAINAGE SYSTEM

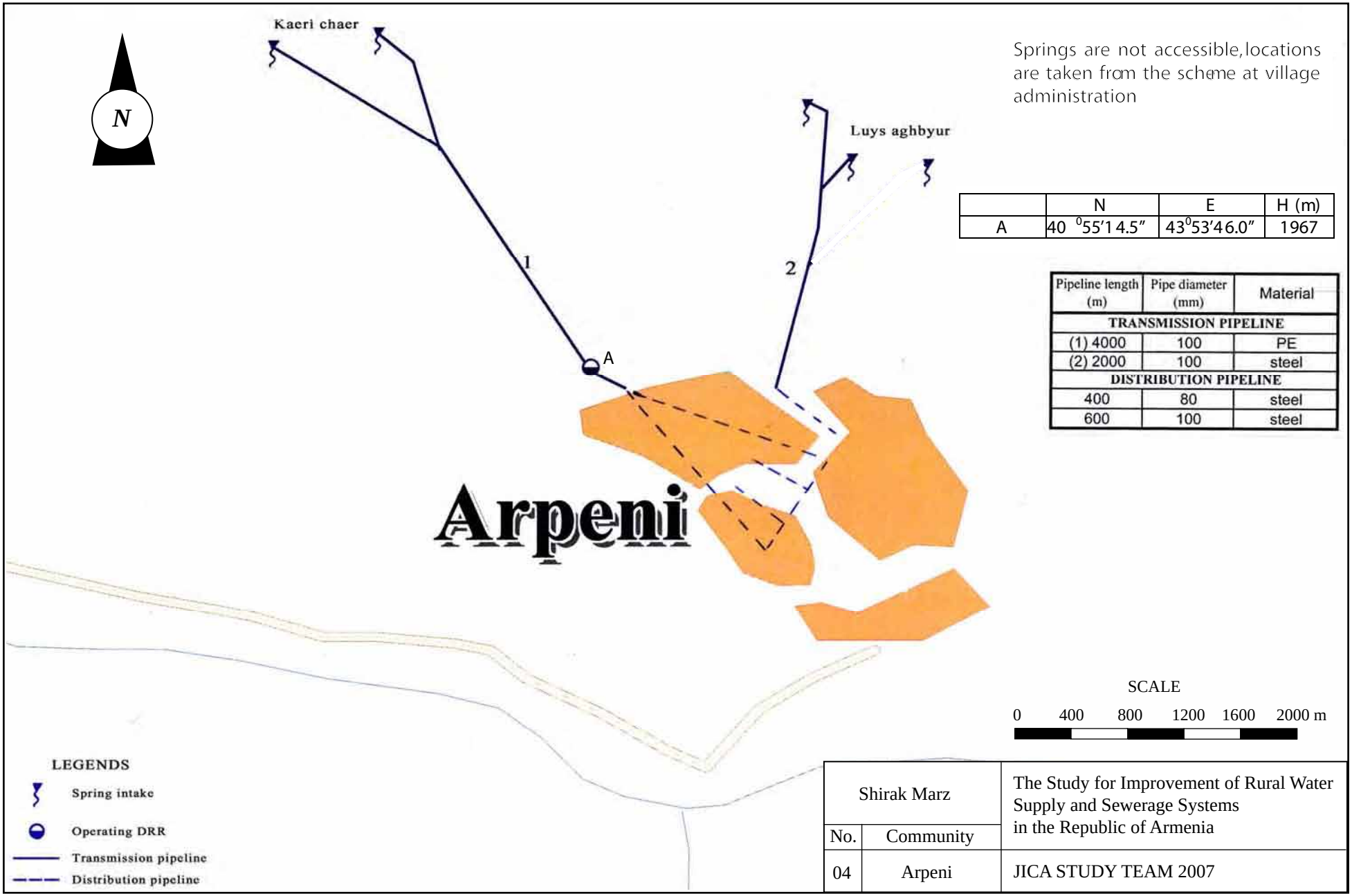
Existence (Y/N)	Rehabilitation Necessity (Y/N)	Remarks
Yes	Yes	DN100 asbestos,not operating

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Shirak**
Number and Name of Community	**No.4 Arpeni**
District	**Ashotsk**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	435
A2	Actual population in 2007	450
A3	Number of households	89
A4.1	Elderly people	40
A4.2	Population in labor force (age from 16 to 62)	290
A4.3	Children	120
A5.1	Pensioners	60
A5.2	Unemployed	0
A5.3	Receiving benefits	12
A6	Average monthly income of household (AMD)	8,300
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	100
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	1,200
	Annual Budget of the community 2005, in thousand AMD	300
	Annual Budget of the community 2006, in thousand AMD	0
	Annual Budget of the community 2007, in thousand AMD	2,800
	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	70
D8	How many house connection household set the water meter	0
D9	Number of public taps	2
D10.1	How is the regime of water supply in your community in the dry season?	irregularly-1hour
D10.2	How is the regime of water supply in your community in the wet season?	irregularly-2hrs
D11	What time of day water is given?	9.30-10.30, 9.30-11.30
D12	Are you pleased with duration of domestic water supply?	mainly displeased
D13	Are hours of water supply convenient?	mainly 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)	400
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	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?	insufficient
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	4-partially repaired
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)	2-deteriorated
E7	Quantity and present condition of the water supply facilities: net/distribution	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?	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)	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?	residents 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	yes
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Shirak
No.4 Arpeni



	N	E	H (m)
A	40 ^{0}55'14.5"	43^{0}53'46.0"	1967

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 4000	100	PE
(2) 2000	100	steel
DISTRIBUTION PIPELINE		
400	80	steel
600	100	steel

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

Marz : **Shirak** No.4
Name : **Arpeni**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	450	persons	45.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	100	pupils	1.0	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	7 Livestocks (87lit/household)	89	household	7.7	
	Sub-total			53.7	
	Unaccouted for water (20%)			10.7	
1	Average Daily Water Demand			64.4	m3/day
2	Maximum Daily Water Demand			77.3	m3/day
3	Maximum Hourly Water Demand			14.7	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	4	5	lit/sec		432.0	m3/day
`	Total					432.0	m3/day
	2 Required reservoir volume					176	m3

C	**WATER SUPPLY FACILITIES REHABILITATION PLAN**		
No	Item	Quantity	Unit
1	Intake		
	1m3	4	nos
	2m3		nos
	3m3		nos
	4m3		nos
2	Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter	6,000	m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	50m3 capacity	1	nos
	100m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter	400	m
	110mm diameter	600	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	19	nos
6	Water meter installation	89	nos
7	Public tap	1	nos
8	Chlorination	2	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	Shirak	
No. 04	Arpeni	JICA STUDY TEAM

Marz : **Shirak**
No. : **4**
Name : **Arpeni**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	4	nos	367,700	1,470,800
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					1,470,800
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm	6,000	m	8,040	48,240,000
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					48,240,000
3	Reservoir					
		50m3	1	nos	8,363,900	8,363,900
		100m3	1	nos	12,968,300	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					21,332,200
4	Distribution Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm	400	m	8,040	3,216,000
		110mm	600	m	9,680	5,808,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					9,024,000
5	House Connection		19	nos	74,000	1,406,000
6	Water Meter Installation		89	nos	80,000	7,120,000
7	Public Tap		1	nos	90,000	90,000
8	Chlorilation Equipment		2	nos	500,000	1,000,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	400	m	3,600	1,440,000
	Total				AMD	91,123,000
					Equivalent to USD	298,255
					Equivalent to JPY	31,465,948
					AMD	USD
	Investment Cost per household		89	HH	1,023,854	3,351
	Investment Cost per person		450	persons	202,496	663

SHIRAK MARZ
Gyumri District
No 4 Arpeni

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		19.6																																							
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		109.96	0.00	0.00	0.71	0.71	0.71	0.73	1.23	1.28	1.32	1.36	2.04	2.11	2.18	2.25	2.32	2.40	2.48	2.56	2.65	2.73	2.82	2.92	3.01	3.11	3.21	3.32	3.43	3.54	3.66	3.78	3.91	4.03	4.17	4.30	4.45	4.59	4.75	4.90	5.06	5.23
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				118																																				
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		5.22			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	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.18	0.18	0.19	0.19	0.20	0.21	0.21	0.22	0.23	0.24
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		18.40			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	0.53	0.54	0.56	0.58	0.60	0.62	0.64	0.66	0.68	0.71	0.73	0.75	0.78	0.80	0.83
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					0.25	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	0.53	0.54	0.56	0.58	0.60	0.62	0.64	0.66	0.68	0.71	0.73	0.75	0.78	0.80	0.83
5. Pump replacement		0.00																0.00															0.00									
Sub-total		41.32	0.00	0.00	0.56	0.58	0.61	0.62	0.63	0.65	0.68	0.70	0.72	0.74	0.78	0.80	0.82	0.86	0.88	0.92	0.94	0.97	1.01	1.03	1.08	1.10	1.14	1.19	1.21	1.26	1.30	1.35	1.40	1.44	1.49	1.53	1.59	1.64	1.68	1.75	1.80	1.87
C Gross Income (A-B)		68.64	0.00	0.00	0.15	0.13	0.10	0.11	0.60	0.63	0.64	0.66	1.32	1.37	1.40	1.45	1.50	1.54	1.60	1.64	1.71	1.76	1.81	1.89	1.93	2.01	2.07	2.13	2.22	2.28	2.36	2.43	2.51	2.59	2.68	2.77	2.86	2.95	3.07	3.15	3.26	3.36
D Depreciation cost		86.45						2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47
E Interest paid		27.96	0.02	0.04	1.11	1.14	1.14	1.16	1.16	1.16	1.16	1.16	1.15	1.12	1.09	1.05	1.02	0.98	0.95	0.91	0.88	0.84	0.81	0.77	0.73	0.70	0.66	0.62	0.58	0.54	0.50	0.46	0.42	0.38	0.34	0.30	0.26	0.22	0.17	0.13	0.09	0.04
F Net Income		-45.77	-0.02	-0.04	-0.96	-1.01	-1.04	-3.52	-3.03	-3.00	-2.99	-2.97	-2.30	-2.22	-2.16	-2.07	-1.99	-1.91	-1.82	-1.74	-1.64	-1.55	-1.47	-1.35	-1.27	-1.16	-1.06	-0.96	-0.83	-0.73	-0.61	-0.50	-0.38	-0.26	-0.13	0.00	0.13	0.26	0.43	0.55	0.70	0.85
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		-45.77	-0.02	-0.04	-0.96	-1.01	-1.04	-3.52	-3.03	-3.00	-2.99	-2.97	-2.30	-2.22	-2.16	-2.07	-1.99	-1.91	-1.82	-1.74	-1.64	-1.55	-1.47	-1.35	-1.27	-1.16	-1.06	-0.96	-0.83	-0.73	-0.61	-0.50	-0.38	-0.26	-0.13	0.00	0.13	0.26	0.43	0.55	0.70	0.85
OM Cost Recovery Ratio (A/B)		266%	0%	0%	127%	122%	116%	118%	195%	197%	194%	194%	283%	285%	279%	281%	283%	279%	282%	278%	282%	281%	279%	283%	279%	283%	282%	279%	283%	281%	282%	280%	279%	280%	280%	281%	280%	280%	283%	280%	281%	280%

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	-45.77	-0.02	-0.04	-0.96	-1.01	-1.04	-3.52	-3.03	-3.00	-2.99	-2.97	-2.30	-2.22	-2.16	-2.07	-1.99	-1.91	-1.82	-1.74	-1.64	-1.55	-1.47	-1.35	-1.27	-1.16	-1.06	-0.96	-0.83	-0.73	-0.61	-0.50	-0.38	-0.26	-0.13	0.00	0.13	0.26	0.43	0.55	0.70	0.85
2. Depreciation cost	86.45	0.00	0.00	0.00	0.00	0.00	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47
3. Interest Paid	27.96	0.02	0.04	1.11	1.14	1.14	1.16	1.16	1.16	1.16	1.16	1.15	1.12	1.09	1.05	1.02	0.98	0.95	0.91	0.88	0.84	0.81	0.77	0.73	0.70	0.66	0.62	0.58	0.54	0.50	0.46	0.42	0.38	0.34	0.30	0.26	0.22	0.17	0.13	0.09	0.04
Sub-total	68.64	0.00	0.00	0.15	0.13	0.10	0.11	0.60	0.63	0.64	0.66	1.32	1.37	1.40	1.45	1.50	1.54	1.60	1.64	1.71	1.76	1.81	1.89	1.93	2.01	2.07	2.13	2.22	2.28	2.36	2.43	2.51	2.59	2.68	2.77	2.86	2.95	3.07	3.15	3.26	3.36
B Finances																																									
1. Project Loan	115.40	2.36	1.67	107.67	2.09	0.97	0.36	0.28																																	
2. Local fund	38.77	0.79	0.56	36.48	0.70	0.17	0.04	0.03																																	
Sub-total	154.17	3.15	2.23	144.15	2.79	1.14	0.40	0.31																																	
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	74.72	0.02	0.04	0.96	1.01	1.04	1.05	0.56	0.53	0.52	0.50	3.15	3.10	3.07	3.02	2.97	2.93	2.87	2.83	2.76	2.71	2.66	2.58	2.54	2.47	2.40	2.34	2.25	2.19	2.11	2.04	1.96	1.88	1.79	1.70	1.61	1.52	1.40	1.32	1.21	1.11
Sub-total	74.72	0.02	0.04	0.96	1.01	1.04	1.05	0.56	0.53	0.52	0.50	3.15	3.10	3.07	3.02	2.97	2.93	2.87	2.83	2.76	2.71	2.66	2.58	2.54	2.47	2.40	2.34	2.25	2.19	2.11	2.04	1.96	1.88	1.79	1.70	1.61	1.52	1.40	1.32	1.21	1.11
Total Cash Inflow	297.53	3.17	2.27	145.26	3.93	2.28	1.56	1.47	1.16	1.16	1.16	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.48	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47
APPLICATION OF FUNDS																																								
D Project disbursement	154.17	3.15	2.23	144.15	2.79	1.14	0.40	0.31																																	
E Total debt services																																									
1. Loan repayment	115.40											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	3.78	3.81	3.85	3.89	3.93	3.97	4.01	4.05	4.09	4.13	4.17	4.21	4.25	4.30	4.34	4.38	4.43
2. Interest paid	27.96	0.02	0.04	1.11	1.14	1.14	1.16	1.16	1.16	1.16	1.16	1.15	1.12	1.09	1.05	1.02	0.98	0.95	0.91	0.88	0.84	0.81	0.77	0.73	0.70	0.66	0.62	0.58	0.54	0.50	0.46	0.42	0.38	0.34	0.30	0.26	0.22	0.17	0.13	0.09	0.04
Sub-total	143.36	0.02	0.04	1.11	1.14	1.14	1.16	1.16	1.16	1.16	1.16	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.48	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47
Total Cash Outflow	297.53	3.17	2.27	145.26	3.93	2.28	1.56	1.47	1.16	1.16	1.16	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.48	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47
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)	48%	0%	0%	14%	11%	9%	9%	52%	54%	55%	57%	30%	31%	31%	32%	34%	34%	36%	37%	38%	39%	40%	42%	43%	45%	46%	48%	50%	51%	53%	54%	56%	58%	60%	62%	64%	66%	69%	70%	73%	75%
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%

SHIRAK MARZ
Gyumri District
No 4 Arpeni

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	109.96	59.5%
	Subsidy	74.72	40.5%
	Total	184.68	100.0%
2	**Expenditure**		
	OM cost	41.32	22.4%
	Loan repayment	115.40	62.5%
	Interest paid	27.96	15.1%
	Surplus cash	0.00	0.0%
	Total	184.68	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	105.59	2.30	1.64	98.25	1.93	0.88	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	2.66			0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
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	9.50			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	0.25
Pump replacement																	0.00															0.00								
Sub-total	21.28			0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
Total Outflow	126.87	2.30	1.64	98.81	2.49	1.44	0.89	0.82	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
B BENEFIT																																								
1. Water Tariff	69.25	0.00	0.00	0.71	0.71	0.71	0.73	1.23	1.28	1.32	1.36	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04
2. Subsidy	49.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	1.98	1.98	1.97	1.95	1.95	1.92	1.92	1.88	1.87	1.85	1.81	1.81	1.77	1.74	1.72	1.67	1.65	1.61	1.58	1.54	1.50	1.45	1.40	1.35	1.30	1.23	1.19	1.12	1.07
Total Inflow	119.03	0.00	0.00	0.71	0.71	0.71	0.73	1.23	1.28	1.32	1.36	4.04	4.02	4.02	4.01	3.99	3.99	3.96	3.96	3.92	3.91	3.89	3.85	3.85	3.81	3.78	3.76	3.71	3.69	3.65	3.62	3.58	3.54	3.49	3.44	3.39	3.34	3.27	3.23	3.16	3.11
NET BENEFIT	-7.84	-2.30	-1.64	-98.1	-1.8	-0.7	-0.16	0.41	0.72	0.76	0.80	3.48	3.46	3.46	3.45	3.43	3.43	3.40	3.40	3.36	3.35	3.33	3.29	3.29	3.25	3.22	3.20	3.15	3.13	3.09	3.06	3.02	2.98	2.93	2.88	2.83	2.78	2.71	2.67	2.60	2.55

FIRR = -0.36%

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	-45.18	-2.53	-1.80	-107.9	-2.0	-0.8	-0.19	0.38	0.72	0.76	0.80	3.48	3.46	3.46	3.45	3.43	3.43	3.40	3.40	3.36	3.35	3.33	3.29	3.29	3.25	3.22	3.20	3.15	3.13	3.09	3.06	3.02	2.98	2.93	2.88	2.83	2.78	2.71	2.67	2.60	2.55
	2	Capital cost 20% up	-55.20	-2.76	-1.97	-117.8	-2.2	-0.9	-0.23	0.36	0.72	0.76	0.80	3.48	3.46	3.46	3.45	3.43	3.43	3.40	3.40	3.36	3.35	3.33	3.29	3.29	3.25	3.22	3.20	3.15	3.13	3.09	3.06	3.02	2.98	2.93	2.88	2.83	2.78	2.71	2.67	2.60	2.55
2	1	OM cost 10% up	-36.65	-2.30	-1.64	-98.2	-1.8	-0.8	-0.22	0.35	0.66	0.70	0.74	3.42	3.40	3.40	3.39	3.37	3.37	3.34	3.34	3.30	3.29	3.27	3.23	3.23	3.19	3.16	3.14	3.09	3.07	3.03	3.00	2.96	2.92	2.87	2.82	2.77	2.72	2.65	2.61	2.54	2.49
	2	OM cost 20% up	-38.14	-2.30	-1.64	-98.2	-1.9	-0.8	-0.27	0.30	0.61	0.65	0.69	3.37	3.35	3.35	3.34	3.32	3.32	3.29	3.29	3.25	3.24	3.22	3.18	3.18	3.14	3.11	3.09	3.04	3.02	2.98	2.95	2.91	2.87	2.82	2.77	2.72	2.67	2.60	2.56	2.49	2.44
3	1	Revenue 10% down	-43.16	-2.30	-1.64	-98.2	-1.9	-0.8	-0.23	0.29	0.59	0.63	0.66	3.08	3.06	3.06	3.05	3.03	3.03	3.00	3.00	2.97	2.96	2.94	2.91	2.91	2.87	2.84	2.82	2.78	2.76	2.73	2.70	2.66	2.63	2.58	2.54	2.49	2.45	2.38	2.35	2.28	2.24
	2	Revenue 20% down	-51.16	-2.30	-1.64	-98.2	-1.9	-0.9	-0.31	0.16	0.46	0.50	0.53	2.67	2.66	2.66	2.65	2.63	2.63	2.61	2.61	2.58	2.57	2.55	2.52	2.52	2.49	2.46	2.45	2.41	2.39	2.36	2.34	2.30	2.27	2.23	2.19	2.15	2.11	2.06	2.02	1.97	1.93

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.80%	-5.48	-18.25%
	2	Capital cost 20% up	-1.19%	-6.97	-14.35%
2	1	OM cost 10% up	-0.46%	-2.18	-45.87%
	2	OM cost 20% up	-0.56%	-3.59	-27.82%
3	1	Revenue 10% down	-0.95%	-6.21	-16.11%
	2	Revenue 20% down	-1.61%	-7.76	-12.89%

No.5 Bandivan

Information on Existing Water Sources (Shirak)

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

No.5 Community Bandivan
District Ashotsk
Marz Shirak

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	40	57	24.7	43	49	33.2	1,909	2.0	8.0	5.0
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	
Alternative sources if any	

No.5 Community Bandivan
District Ashotsk
Marz Shirak
Sampling date 06/Aug/2007

	Parameters analysed	Units	No.1				Guidelines	
							WHO	Armenia
a	pH		8.1				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	9.5					
c	TDS	Mg/L	150				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	4				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	0.12				1.50	
7	Hardness	Mg/L	300				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	4.9				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	0.02				0.70	0.10
17	Be:Berillium	Mg/L	0.00006				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	0.1				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.5 Community Bandivan
District Ashotsk
Marz Shirak

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	02	06	54-56,0,0,0	0,4,0,0,0	Not Identified
2	05	11	-	Not Identified	Not Identified
3	06	14	-	Not Identified	Not Identified
4	07	17	-	Not Identified	Not Identified
5	08	17	60,70,0,56	0,4;0,7;0;0,4	Not Identified

No. 5 **Marz** Shirak **Community** Bandivan

1. ACCESSIBILITY TO THE SITE

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

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°57′24,7″	43°49′33,2″	1,909	1991	Concrete	5.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	2,500	100	Polyethylene	4.0	1991	Little	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°57'24,2"	43°49'06,1"	1,921	Steel	Circle	3× d=1m,l=20	48	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	1,200	100	Polyethylene	1991	Little	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)
3	1991		Yes	100	No

9. DRAINAGE SYSTEM

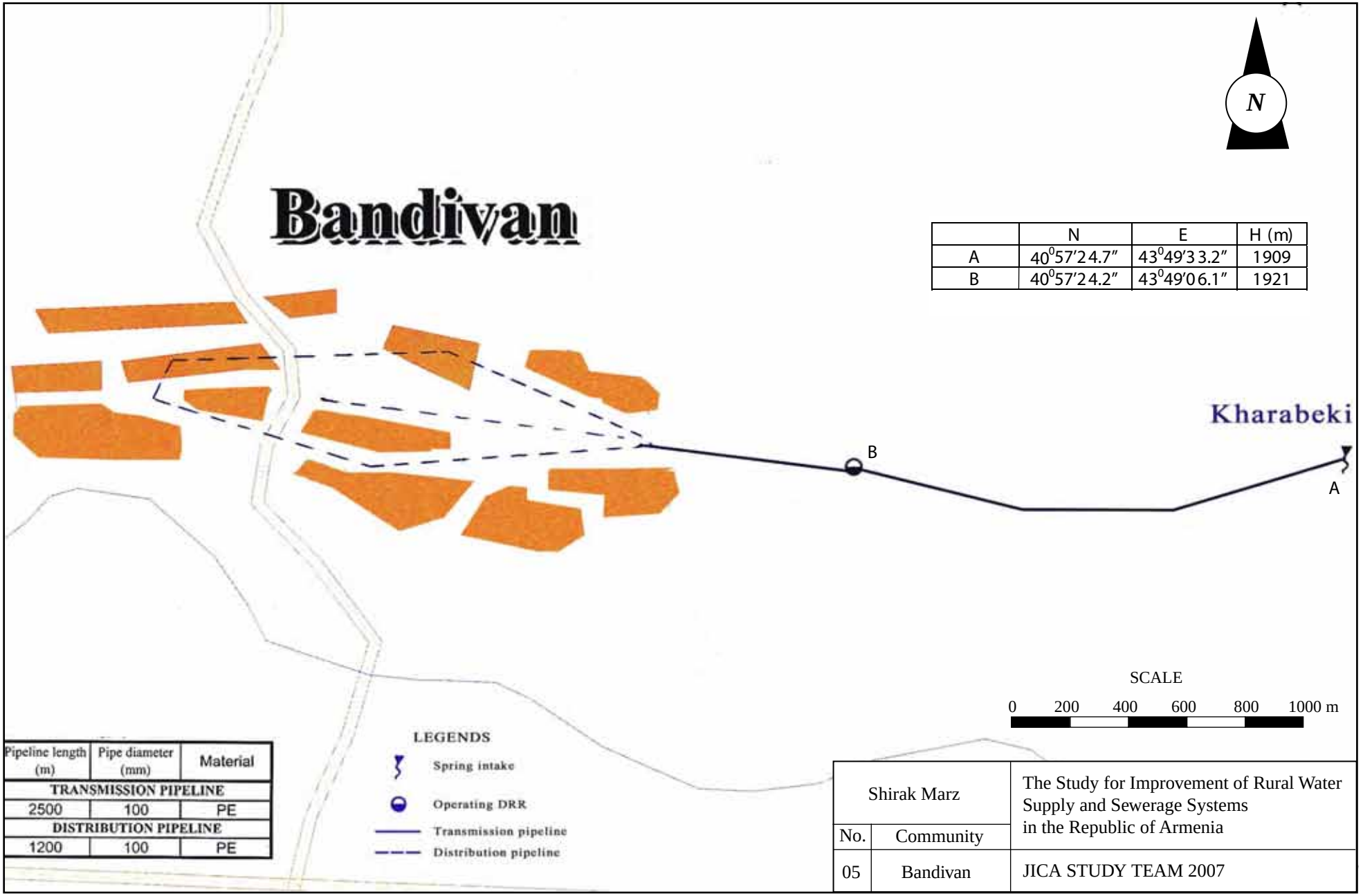
Existence (Y/N)	Rehabilitation Necessity (Y/N)	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Shirak**
Number and Name of Community	**No.5 Bandivan**
District	**Ashotsk**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	573
A2	Actual population in 2007	580
A3	Number of households	63
A4.1	Elderly people	35
A4.2	Population in labor force (age from 16 to 62)	456
A4.3	Children	89
A5.1	Pensioners	39
A5.2	Unemployed	0
A5.3	Receiving benefits	15
A6	Average monthly income of household (AMD)	60,000
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	78
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	3,000
	Annual Budget of the community 2005, in thousand AMD	4,000
	Annual Budget of the community 2006, in thousand AMD	5,000
	Annual Budget of the community 2007, in thousand AMD	800
	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	yes
D2	Water use permit number	1051
D3	Date of expiry of water use permit	29.03.06-29.03.09
D4	Planned date of obtaining water use permit	-
D5	Present condition of the water supply volume of Domestic use	sufficient
D6	Present condition of the water supply volume of Irrigation water	absent
D7	Number of house connection to drinking water system	56
D8	How many house connection household set the water meter	0
D9	Number of public taps	5
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?	fully 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	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?	absent
D20	Are you satisfied with irrigation water supply volume?	insufficient
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	absent
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)	3-rehabilitated
E7	Quantity and present condition of the water supply facilities: net/distribution	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?	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?	from different organizations
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?	residents 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	yes
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Shirak
No.5 Bandivan



	N	E	H (m)
A	40°57′24.7″	43°49′33.2″	1909
B	40°57′24.2″	43°49′06.1″	1921

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
2500	100	PE
DISTRIBUTION PIPELINE		
1200	100	PE

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

Marz : **Shirak** No.5
Name : **Badivan**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	580	persons	58.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	78	pupils	0.8	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	7 Livestocks (87lit/household)	63	household	5.5	
	Sub-total			64.3	
	Unaccouted for water (20%)			12.9	
1	Average Daily Water Demand			77.2	m3/day
2	Maximum Daily Water Demand			92.6	m3/day
3	Maximum Hourly Water Demand			12.5	m3/hr

B WATER SUPPLY PLAN

		Nr.	Total vol.			
1	Water source type					
a	Spring	1	5.0	lit/sec	432.0	m3/day
`	Total				432.0	m3/day
2	Required reservoir volume				150	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		m
	110mm diameter	1,000	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	100m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter	1,200	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	7	nos
6	Water meter installation	63	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	Shirak	
No. 05	Bandivan	JICA STUDY TEAM

Marz : **Shirak**
No. : **5**
Name : **Badivan**

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		m	8,040	
		110mm	1,000	m	9,680	9,680,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					9,680,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3	1	nos	12,968,300	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					12,968,300
4	Distribution Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	1,200	m	9,680	11,616,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					11,616,000
5	House Connection		7	nos	74,000	518,000
6	Water Meter Installation		63	nos	80,000	5,040,000
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	480	m	3,600	1,728,000
	Total				AMD	42,508,000
					Equivalent to USD	139,133
					Equivalent to JPY	14,678,561
					AMD	USD
	Investment Cost per household		63	HH	674,730	2,208
	Investment Cost per person		580	persons	73,290	240

SHIRAK MARZ
Amasia District
No 5 Bandivan

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		23.5																																							
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		130.80	0.00	0.00	0.00	0.84	0.84	0.87	1.48	1.53	1.58	1.63	2.44	2.52	2.61	2.69	2.78	2.87	2.97	3.07	3.17	3.27	3.38	3.49	3.61	3.73	3.85	3.98	4.11	4.24	4.38	4.53	4.68	4.83	4.99	5.15	5.32	5.50	5.68	5.87	6.06	6.26
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				141																																					
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		6.15			0.00	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.11	0.12	0.12	0.12	0.13	0.13	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	0.26	0.26	0.27	0.28
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		9.43			0.00	0.13	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.17	0.18	0.19	0.19	0.20	0.20	0.21	0.22	0.23	0.23	0.24	0.25	0.26	0.27	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.36	0.37	0.38	0.39	0.40	0.42	0.43
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	0.13	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.17	0.18	0.19	0.19	0.20	0.20	0.21	0.22	0.23	0.23	0.24	0.25	0.26	0.27	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.36	0.37	0.38	0.39	0.40	0.42	0.43
5. Pump replacement		0.00																0.00															0.00									
Sub-total		33.28	0.00	0.00	0.24	0.47	0.49	0.49	0.52	0.53	0.55	0.57	0.59	0.60	0.63	0.65	0.66	0.70	0.71	0.74	0.76	0.80	0.81	0.84	0.87	0.90	0.93	0.96	0.98	1.02	1.06	1.09	1.13	1.17	1.20	1.25	1.29	1.33	1.37	1.41	1.46	1.51
C Gross Income (A-B)		97.52	0.00	0.00	-0.24	0.37	0.35	0.38	0.96	1.00	1.03	1.06	1.85	1.92	1.98	2.04	2.12	2.17	2.26	2.33	2.41	2.47	2.57	2.65	2.74	2.83	2.92	3.02	3.13	3.22	3.32	3.44	3.55	3.66	3.79	3.90	4.03	4.17	4.31	4.46	4.60	4.75
D Depreciation cost		40.25						1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
E Interest paid		14.08	0.02	0.04	0.06	0.59	0.59	0.60	0.60	0.60	0.60	0.60	0.60	0.59	0.57	0.55	0.53	0.52	0.50	0.48	0.46	0.44	0.42	0.40	0.38	0.36	0.34	0.32	0.30	0.28	0.26	0.24	0.22	0.20	0.18	0.16	0.14	0.11	0.09	0.07	0.05	0.02
F Net Income		43.19	-0.02	-0.04	-0.30	-0.22	-0.24	-1.37	-0.79	-0.75	-0.72	-0.69	0.10	0.18	0.26	0.34	0.44	0.50	0.61	0.70	0.80	0.88	1.00	1.10	1.21	1.32	1.43	1.55	1.68	1.79	1.91	2.05	2.18	2.31	2.46	2.59	2.74	2.91	3.07	3.24	3.40	3.58
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		43.19	-0.02	-0.04	-0.30	-0.22	-0.24	-1.37	-0.79	-0.75	-0.72	-0.69	0.10	0.18	0.26	0.34	0.44	0.50	0.61	0.70	0.80	0.88	1.00	1.10	1.21	1.32	1.43	1.55	1.68	1.79	1.91	2.05	2.18	2.31	2.46	2.59	2.74	2.91	3.07	3.24	3.40	3.58
OM Cost Recovery Ratio (A/B)		393%	0%	0%	0%	179%	171%	178%	285%	289%	287%	286%	414%	420%	414%	414%	421%	410%	418%	415%	417%	409%	417%	415%	415%	414%	414%	415%	419%	416%	413%	416%	414%	413%	416%	412%	412%	414%	415%	416%	415%	415%

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	43.19	-0.02	-0.04	-0.30	-0.22	-0.24	-1.37	-0.79	-0.75	-0.72	-0.69	0.10	0.18	0.26	0.34	0.44	0.50	0.61	0.70	0.80	0.88	1.00	1.10	1.21	1.32	1.43	1.55	1.68	1.79	1.91	2.05	2.18	2.31	2.46	2.59	2.74	2.91	3.07	3.24	3.40	3.58
2. Depreciation cost	40.25	0.00	0.00	0.00	0.00	0.00	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
3. Interest Paid	14.08	0.02	0.04	0.06	0.59	0.59	0.60	0.60	0.60	0.60	0.60	0.60	0.59	0.57	0.55	0.53	0.52	0.50	0.48	0.46	0.44	0.42	0.40	0.38	0.36	0.34	0.32	0.30	0.28	0.26	0.24	0.22	0.20	0.18	0.16	0.14	0.11	0.09	0.07	0.05	0.02
Sub-total	97.52	0.00	0.00	-0.24	0.37	0.35	0.38	0.96	1.00	1.03	1.06	1.85	1.92	1.98	2.04	2.12	2.17	2.26	2.33	2.41	2.47	2.57	2.65	2.74	2.83	2.92	3.02	3.13	3.22	3.32	3.44	3.55	3.66	3.79	3.90	4.03	4.17	4.31	4.46	4.60	4.75
B Finances																																									
1. Project Loan	60.39	2.36	1.67	2.24	52.51	0.97	0.36	0.28																																	
2. Local fund	20.35	0.79	0.56	0.74	18.02	0.17	0.04	0.03																																	
Sub-total	80.74	3.15	2.23	2.98	70.53	1.14	0.40	0.31																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.24	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	2.85	0.02	0.04	0.06	0.22	0.24	0.22	0.00	0.00	0.00	0.00	0.49	0.42	0.36	0.30	0.22	0.17	0.08	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
Sub-total	3.09	0.02	0.04	0.30	0.22	0.24	0.22	0.00	0.00	0.00	0.00	0.49	0.42	0.36	0.30	0.22	0.17	0.08	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
Total Cash Inflow	181.35	3.17	2.27	3.04	71.12	1.73	1.00	1.27	1.00	1.03	1.06	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.41	2.47	2.57	2.65	2.74	2.83	2.92	3.02	3.13	3.22	3.32	3.44	3.55	3.66	3.79	3.90	4.03	4.17	4.31	4.46	4.60	4.75
APPLICATION OF FUNDS																																								
D Project disbursement	80.74	3.15	2.23	2.98	70.53	1.14	0.40	0.31																																	
E Total debt services																																								
1. Loan repayment	60.42											1.74	1.75	1.77	1.79	1.81	1.82	1.84	1.86	1.88	1.90	1.92	1.94	1.96	1.98	2.00	2.02	2.04	2.06	2.08	2.10	2.12	2.14	2.16	2.18	2.20	2.23	2.25	2.27	2.29	2.32
2. Interest paid	14.08	0.02	0.04	0.06	0.59	0.59	0.60	0.60	0.60	0.60	0.60	0.60	0.59	0.57	0.55	0.53	0.52	0.50	0.48	0.46	0.44	0.42	0.40	0.38	0.36	0.34	0.32	0.30	0.28	0.26	0.24	0.22	0.20	0.18	0.16	0.14	0.11	0.09	0.07	0.05	0.02
Sub-total	74.50	0.02	0.04	0.06	0.59	0.59	0.60	0.60	0.60	0.60	0.60	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34
Total Cash Outflow	155.24	3.17	2.27	3.04	71.12	1.73	1.00	0.91	0.60	0.60	0.60	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34
F Net Surplus Cash (A+C2)-E	26.11	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.40	0.43	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.13	0.23	0.31	0.40	0.49	0.58	0.68	0.79	0.88	0.98	1.10	1.21	1.32	1.45	1.56	1.69	1.83	1.97	2.12	2.26	2.41
Project Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	131%	0%	0%	0%	63%	59%	63%	160%	167%	172%	177%	79%	82%	85%	87%	91%	93%	97%	100%	103%	106%	110%	113%	117%	121%	125%	129%	134%	138%	142%	147%	152%	156%	162%	167%	172%	178%	184%	191%	197%	203%
Cost recovery by water fee + subsidy ((A+C2)/E)	135%	100%	100%	100%	100%	100%	100%	160%	167%	172%	177%	100%	100%	100%	100%	100%	100%	100%	100%	103%	106%	110%	113%	117%	121%	125%	129%	134%	138%	142%	147%	152%	156%	162%	167%	172%	178%	184%	191%	197%	203%

SHIRAK MARZ
Amasia District
No 5 Bandivan

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	130.80	97.7%
	Subsidy	3.09	2.3%
	Total	133.89	100.0%
2	**Expenditure**		
	OM cost	33.28	24.9%
	Loan repayment	60.42	45.1%
	Interest paid	14.08	10.5%
	Surplus cash	26.11	19.5%
	Total	133.89	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	53.96	2.30	1.64	2.11	46.44	0.88	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	3.33			0.00	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
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	4.81			0.00	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	0.13
Pump replacement																	0.00															0.00								
Sub-total	17.26			0.24	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Total Outflow	71.22	2.30	1.64	2.35	46.90	1.34	0.79	0.72	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
B BENEFIT																																							
1. Water Tariff	81.97	0.00	0.00	0.00	0.84	0.84	0.87	1.48	1.53	1.58	1.63	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44
2. Subsidy	0.24	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	82.21	0.00	0.00	0.24	0.84	0.84	0.87	1.48	1.53	1.58	1.63	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44
NET BENEFIT	10.99	-2.30	-1.64	-2.1	-46.1	-0.5	0.08	0.76	1.07	1.12	1.17	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98

FIRR = 0.94%

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	-12.11	-2.53	-1.80	-2.3	-50.7	-0.6	0.05	0.73	1.07	1.12	1.17	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98
	2	Capital cost 20% up	-17.17	-2.76	-1.97	-2.5	-55.3	-0.7	0.01	0.71	1.07	1.12	1.17	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98
2	1	OM cost 10% up	-8.27	-2.30	-1.64	-2.1	-46.1	-0.5	0.03	0.71	1.02	1.07	1.12	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93
	2	OM cost 20% up	-9.47	-2.30	-1.64	-2.2	-46.2	-0.6	-0.01	0.67	0.98	1.03	1.08	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89
3	1	Revenue 10% down	-12.61	-2.30	-1.64	-2.1	-46.1	-0.6	-0.01	0.61	0.92	0.96	1.01	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74
	2	Revenue 20% down	-18.16	-2.30	-1.64	-2.2	-46.2	-0.7	-0.09	0.46	0.76	0.80	0.84	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	0.45%	10.87	9.20%
	2	Capital cost 20% up	0.02%	613.22	0.16%
2	1	OM cost 10% up	0.80%	1.79	56.00%
	2	OM cost 20% up	0.66%	4.39	22.79%
3	1	Revenue 10% down	0.25%	27.91	3.58%
	2	Revenue 20% down	-0.52%	-28.27	-3.54%