No.27 Pemzashen

Information on Existing Water Sources (Shirak)

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

No.27 Community Pemzashen
District Artik
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	34	10.5	43	56	31.7	1,939	20.0	40.0	30.0
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	Internal network of the Community passes through the cemetery, losses in water supply system are 40%
Alternative sources if any	

No.27 Community Pemzashen
District Artik
Marz Shirak
Sampling date 27/Jul/2007

	Parameters analysed	Units	No.1				Guidelines	
							WHO	Armenia
a	pH		7.6				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	7.9					
c	TDS	Mg/L	42				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	<0.01				0.05	0.05
5	Cu:Copper	Mg/L	n.d				2	1
6	F:Fluoride	Mg/L	0.24				1.50	
7	Hardness	Mg/L	105				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	<0.02				0.070	0.250
11	Ni:Nickel	Mg/L	n.d				0.020	0.100
12	Nitrate(NO3+)	Mg/L	3.5				50.0	45.0
13	SO4:Sulfate	Mg/L	4.0				250.0	500.0
14	Zn:Zink	Mg/L	n.d				3.0	5.0
15	As:Arsenic	Mg/L	n.d				0.0	0.1
16	Ba:Barium	Mg/L	0.01				0.70	0.10
17	Be:Berillium	Mg/L	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.27 Community Pemzashen
District Artik
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	07	47,48,48,47,49	Not Identified	Not Identified
2	03	29	52,54,49,59,50,52	0,3;0,4;0,4;0,4;0,4;0,4;0,4;0,4;0,4;0,3	Not Identified
3	04	04	54,57,50,48	0,4;0,4;0,3;0,3	Not Identified
4	06	04	55,61,50,48	0,4;0,4;0,4;0,4;	Not Identified
5	06	15	58,62,55,53	0,3;0,3;0,4;0,4;0,4	Not Identified
6	07	11	50,51,57,65,62,	0,4;0,4;0,4;0,4;0,4;0,4	Not Identified
7	08	21	59,62,55,54,60,67	0,6;0,4;0,4;0,4;0,4;0,4	
8	08	22	52,50,48,45,51,48	0,3	

No. 27 **Marz** Shirak **Community** Pemzashen

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°34′10,5″	43°56′31,7″	1,939	1828	Masonry	30.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	500	200	Steel/iron	18.0	1960	Medium	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°34′30,3″	43°56′21″	1,888	Concrete	Rectangular	10×15×3	400	Yes

5. CHLORINATION EQUIPMENT

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

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	2,800	200	AsbestosCement	1955	Medium	Yes
2	1,200	150	AsbestosCement		Medium	Yes
3	900	150	Ductile Iron		Medium	Yes
4	650	100	AsbestosCement		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							No

8, PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
21	1955		No	0	Yes

9. DRAINAGE SYSTEM

Existence (Y/N)	Rehabilitation Necessity (Y/N)	Remarks
Yes	Yes	DN200-300

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Shirak**
Number and Name of Community	**No.27 Pemzashen**
District	**Artik**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	4,100
A2	Actual population in 2007	4,200
A3	Number of households	1,150
A4.1	Elderly people	800
A4.2	Population in labor force (age from 16 to 62)	2,000
A4.3	Children	1,000
A5.1	Pensioners	457
A5.2	Unemployed	35
A5.3	Receiving benefits	206
A6	Average monthly income of household (AMD)	15,000
A7	Number of medical ambulance staion/first and health post	absent (1 clinic)
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	600
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	4,568
	Annual Budget of the community 2005, in thousand AMD	6,281
	Annual Budget of the community 2006, in thousand AMD	7,417
	Annual Budget of the community 2007, in thousand AMD	2,083
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	300
	Amount spent in drinking water sector 2005, in thousand AMD	400
	Amount spent in drinking water sector 2006, in thousand AMD	350
	Amount spent in drinking water sector 2007, in thousand AMD	200
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	agricultural and livestock goods, tuff stone mininig
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	1455
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	330
D8	How many house connection household set the water meter	0
D9	Number of public taps	30
D10.1	How is the regime of water supply in your community in the dry season?	regularly-3hrs
D10.2	How is the regime of water supply in your community in the wet season?	regularly-3hrs
D11	What time of day water is given?	9.00-11.00. 11.00-14.00, 14.00-17.00, 17.00-20.00
D12	Are you pleased with duration of domestic water supply?	mainly displeased
D13	Are hours of water supply convenient?	-
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	300
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	400
D16	Drinking water monthly water fee per household	20AMD per capita/ month
D17	How often do you usually pay water fees?	monthly
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	Ishiryan Dzora
E2	Position	utility department head
E3	Telephone	(094)845929
E4	Quantity and present condition of the water supply facilities: spring/ intake	1good
E5	Quantity and present condition of the water supply facilities:	2-deteriorated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1 excellent
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?	hired specialist from
E14	How you prepare O&M costs?	community budget
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	720,000
	Repair cost(AMD)	200,000
	Others(AMD)	0
	Total (AMD)	920,000
E16	Do the residents participate in the O&M works?	no
E17	What kind of OM method is preferable to you?	water fee
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	yes
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	absent
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Shirak
No.27 Pemzashen

N

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
500	200	steel/iron
DISTRIBUTION PIPELINE		
2800	200	iron/asbestos
1200	150	iron/asbestos
900	150	iron
650	100	asbestos

	N	E	H (m)
A	40°34′10.5″	43°56′31.7″	1939
B	40°34′30.3″	43°56′21.0″	1888
C	40°34′44.8″	43°56′21.3″	1875

SCALE

0 50 100 150 200 250 300 m

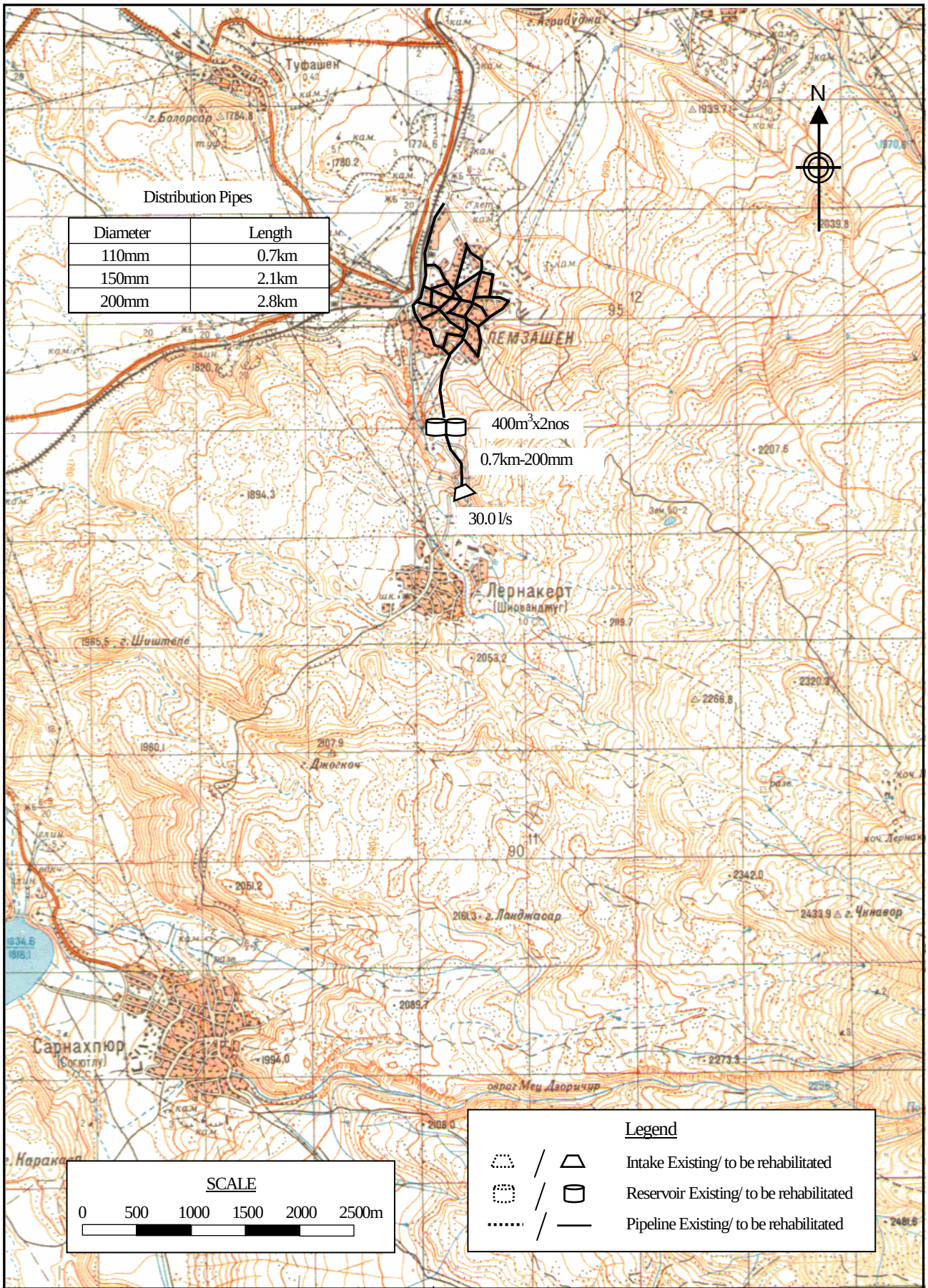
Shirak Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
27	Pemzashen	JICA STUDY TEAM 2007

Marz : **Shirak** No.27
Name : **Pemzashen**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	4,200	persons	420.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	600	pupils	6.0	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	1	nos	0.5	
	6 Livestocks (87lit/household)	1,150	household	100.1	
	Sub-total			526.6	
	Unaccouted for water (20%)			105.3	
1	Average Daily Water Demand			631.9	m3/day
2	Maximum Daily Water Demand			758.3	m3/day
3	Maximum Hourly Water Demand			61.6	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	1	30.0	lit/sec		2,592.0	m3/day
`	Total					2,592.0	m3/day
	2 Required reservoir volume					739	m3

C	**WATER SUPPLY FACILITIES REHABILITATION PLAN**		
	No Item	Quantity	Unit
	1 Intake		
	1m3		nos
	2m3	1	nos
	3m3		nos
	4m3		nos
	2 Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter	700	m
	250mm diameter		m
	3 Reservoir		
	400m3 capacity	2	nos
	4 Distribution pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter	700	m
	150mm diameter	2,100	m
	200mm diameter	2,800	m
	250mm diameter		m
	5 House connection	820	nos
	6 Water meter installation	1,150	nos
	7 Public tap	12	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. 27	Pemzashen	JICA STUDY TEAM

Marz : **Shirak**
No. : **27**
Name : **Pemzashen**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3		nos	367,700	
		2m3	1	nos	545,000	545,000
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					545,000
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm	700	m	19,440	13,608,000
		250mm		m	27,040	
	Sub-total					13,608,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3	2	nos	36,388,000	72,776,000
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					72,776,000
4	Distribution Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	700	m	9,680	6,776,000
		150mm	2,100	m	13,140	27,594,000
		200mm	2,800	m	19,440	54,432,000
		250mm		m	27,040	
	Sub-total					88,802,000
5	House Connection		820	nos	74,000	60,680,000
6	Water Meter Installation		1,150	nos	80,000	92,000,000
7	Public Tap		12	nos	90,000	1,080,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	2,240	m	3,600	8,064,000
	Total				AMD	338,055,000
					Equivalent to USD	1,106,491
					Equivalent to JPY	116,734,755
					AMD	USD
	Investment Cost per household		1,150	HH	293,961	962
	Investment Cost per person		4,200	persons	80,489	263

SHIRAK MARZ
Talin District
No 27 Pemzashen

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		192.0																																							
Unit rate	AMD/m3				40.00	40.00	40.00	41.32	70.00	72.31	74.70	77.16	115.65	119.47	123.41	127.48	131.69	136.03	140.52	145.16	149.95	154.90	160.01	165.29	170.75	176.38	182.20	188.21	194.42	200.84	207.47	214.31	221.39	228.69	236.24	244.04	252.09	260.41	269.00	277.88	287.05	296.52
Sub-total		1072.53	0.00	0.00	3.04	6.08	6.91	7.14	12.10	12.50	12.91	13.34	19.99	20.65	21.33	22.03	22.76	23.51	24.29	25.09	25.91	26.77	27.65	28.57	29.51	30.48	31.49	32.53	33.60	34.71	35.86	37.04	38.26	39.52	40.83	42.18	43.57	45.01	46.49	48.02	49.61	51.25
B Operating Costs																																									
1. Staff salary																																									
Inspectors	person				3																																				
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		53.07			0.72	0.74	0.77	0.79	0.82	0.85	0.87	0.90	0.93	0.96	1.00	1.03	1.06	1.10	1.13	1.17	1.21	1.25	1.29	1.33	1.38	1.42	1.47	1.52	1.57	1.62	1.67	1.73	1.79	1.85	1.91	1.97	2.03	2.10	2.17	2.24	2.32	2.39
2. Chlorine																																									
Pouring volume	kg/yr				1,153																																				
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		50.55			0.30	0.62	0.74	0.76	0.79	0.81	0.84	0.87	0.90	0.93	0.96	0.99	1.02	1.05	1.09	1.13	1.16	1.20	1.24	1.28	1.32	1.37	1.41	1.46	1.51	1.56	1.61	1.66	1.72	1.77	1.83	1.89	1.96	2.02	2.09	2.15	2.23	2.30
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		15.32			0.09	0.19	0.22	0.23	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	0.36	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.50	0.52	0.54	0.56	0.57	0.59	0.61	0.63	0.65	0.68	0.70
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					0.09	0.19	0.22	0.23	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	0.36	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.50	0.52	0.54	0.56	0.57	0.59	0.61	0.63	0.65	0.68	0.70
5. Pump replacement		0.00																0.00															0.00										
Sub-total		118.94	0.00	0.00	1.11	1.55	1.73	1.78	1.85	1.91	1.97	2.03	2.10	2.17	2.25	2.32	2.39	2.47	2.55	2.64	2.72	2.81	2.91	3.00	3.10	3.21	3.31	3.42	3.54	3.65	3.77	3.89	4.03	4.16	4.30	4.43	4.58	4.73	4.89	5.04	5.23	5.39
C Gross Income (A-B)		953.59	0.00	0.00	1.93	4.53	5.18	5.36	10.25	10.59	10.94	11.31	17.89	18.48	19.08	19.71	20.37	21.04	21.74	22.45	23.19	23.96	24.74	25.57	26.41	27.27	28.18	29.11	30.06	31.06	32.09	33.15	34.23	35.36	36.53	37.75	38.99	40.28	41.60	42.98	44.38	45.86
D Depreciation cost		321.30						9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18
E Interest paid		96.41	0.02	0.04	1.78	3.58	4.08	4.09	4.09	4.09	4.09	4.09	4.09	3.97	3.86	3.74	3.61	3.49	3.37	3.24	3.12	2.99	2.86	2.73	2.60	2.47	2.33	2.20	2.06	1.92	1.78	1.64	1.50	1.36	1.21	1.07	0.92	0.77	0.62	0.47	0.31	0.16
F Net Income		535.88	-0.02	-0.04	0.15	0.95	1.10	-7.91	-3.02	-2.68	-2.33	-1.96	4.62	5.33	6.04	6.79	7.58	8.37	9.19	10.03	10.89	11.79	12.70	13.66	14.63	15.62	16.67	17.73	18.82	19.96	21.13	22.33	23.55	24.82	26.14	27.50	28.89	30.33	31.80	33.33	34.89	36.52
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		535.88	-0.02	-0.04	0.15	0.95	1.10	-7.91	-3.02	-2.68	-2.33	-1.96	4.62	5.33	6.04	6.79	7.58	8.37	9.19	10.03	10.89	11.79	12.70	13.66	14.63	15.62	16.67	17.73	18.82	19.96	21.13	22.33	23.55	24.82	26.14	27.50	28.89	30.33	31.80	33.33	34.89	36.52
OM Cost Recovery Ratio (A/B)		902%	0%	0%	273%	391%	399%	401%	654%	654%	655%	657%	952%	952%	948%	950%	952%	952%	953%	950%	953%	953%	950%	952%	952%	950%	951%	951%	949%	951%	951%	952%	949%	950%	950%	952%	951%	952%	951%	953%	949%	951%

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	535.88	-0.02	-0.04	0.15	0.95	1.10	-7.91	-3.02	-2.68	-2.33	-1.96	4.62	5.33	6.04	6.79	7.58	8.37	9.19	10.03	10.89	11.79	12.70	13.66	14.63	15.62	16.67	17.73	18.82	19.96	21.13	22.33	23.55	24.82	26.14	27.50	28.89	30.33	31.80	33.33	34.89	36.52
2. Depreciation cost	321.30	0.00	0.00	0.00	0.00	0.00	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18
3. Interest Paid	96.41	0.02	0.04	1.78	3.58	4.08	4.09	4.09	4.09	4.09	4.09	4.09	3.97	3.86	3.74	3.61	3.49	3.37	3.24	3.12	2.99	2.86	2.73	2.60	2.47	2.33	2.20	2.06	1.92	1.78	1.64	1.50	1.36	1.21	1.07	0.92	0.77	0.62	0.47	0.31	0.16
Sub-total	953.59	0.00	0.00	1.93	4.53	5.18	5.36	10.25	10.59	10.94	11.31	17.89	18.48	19.08	19.71	20.37	21.04	21.74	22.45	23.19	23.96	24.74	25.57	26.41	27.27	28.18	29.11	30.06	31.06	32.09	33.15	34.23	35.36	36.53	37.75	38.99	40.28	41.60	42.98	44.38	45.86
B Finances																																									
1. Project Loan	409.23	2.36	1.67	174.36	179.52	50.68	0.36	0.28																																	
2. Local fund	139.47	0.79	0.56	59.07	61.65	17.33	0.04	0.03																																	
Sub-total	548.70	3.15	2.23	233.43	241.17	68.01	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	0.06	0.02	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	0.06	0.02	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	1502.35	3.17	2.27	235.36	245.70	73.19	5.76	10.56	10.59	10.94	11.31	17.89	18.48	19.08	19.71	20.37	21.04	21.74	22.45	23.19	23.96	24.74	25.57	26.41	27.27	28.18	29.11	30.06	31.06	32.09	33.15	34.23	35.36	36.53	37.75	38.99	40.28	41.60	42.98	44.38	45.86
APPLICATION OF FUNDS																																									
D Project disbursement	548.70	3.15	2.23	233.43	241.17	68.01	0.40	0.31																																	
E Total debt services																																									
1. Loan repayment	409.21											11.76	11.88	12.00	12.12	12.24	12.36	12.49	12.61	12.74	12.87	13.00	13.13	13.26	13.39	13.52	13.66	13.79	13.93	14.07	14.21	14.35	14.50	14.64	14.79	14.94	15.09	15.24	15.39	15.54	15.70
2. Interest paid	96.41	0.02	0.04	1.78	3.58	4.08	4.09	4.09	4.09	4.09	4.09	4.09	3.97	3.86	3.74	3.61	3.49	3.37	3.24	3.12	2.99	2.86	2.73	2.60	2.47	2.33	2.20	2.06	1.92	1.78	1.64	1.50	1.36	1.21	1.07	0.92	0.77	0.62	0.47	0.31	0.16
Sub-total	505.62	0.02	0.04	1.78	3.58	4.08	4.09	4.09	4.09	4.09	4.09	15.85	15.85	15.86	15.86	15.85	15.85	15.86	15.85	15.86	15.86	15.86	15.86	15.86	15.86	15.85	15.86	15.85	15.85	15.85	15.85	15.85	15.86	15.85	15.86	15.86	15.86	15.86	15.86	15.85	15.86
Total Cash Outflow	1054.32	3.17	2.27	235.21	244.75	72.09	4.49	4.40	4.09	4.09	4.09	15.85	15.85	15.86	15.86	15.85	15.85	15.86	15.85	15.86	15.86	15.86	15.86	15.86	15.86	15.85	15.86	15.85	15.85	15.85	15.85	15.85	15.86	15.85	15.86	15.86	15.86	15.86	15.86	15.85	15.86
F Net Surplus Cash (A+C2)-E	448.03	0.00	0.00	0.15	0.95	1.10	1.27	6.16	6.50	6.85	7.22	2.04	2.63	3.22	3.85	4.52	5.19	5.88	6.60	7.33	8.10	8.88	9.71	10.55	11.41	12.33	13.25	14.21	15.21	16.24	17.30	18.38	19.50	20.68	21.89	23.13	24.42	25.74	27.12	28.53	30.00
Project Cost Recovery Ratio (%)																																									
Cost recovery by water fee (A/E)	189%	0%	0%	108%	126%	127%	131%	251%	259%	267%	277%	113%	117%	120%	124%	129%	133%	137%	142%	146%	151%	156%	161%	167%	172%	178%	184%	190%	196%	202%	209%	216%	223%	230%	238%	246%	254%	262%	271%	280%	289%
Cost recovery by water fee + subsidy ((A+C2)/E)	189%	100%	100%	108%	126%	127%	131%	251%	259%	267%	277%	113%	117%	120%	124%	129%	133%	137%	142%	146%	151%	156%	161%	167%	172%	178%	184%	190%	196%	202%	209%	216%	223%	230%	238%	246%	254%	262%	271%	280%	289%

SHIRAK MARZ
Talin District
No 27 Pemzashen

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	1,072.53	100.0%
	Subsidy	0.06	0.0%
	Total	1,072.59	100.0%
2	**Expenditure**		
	OM cost	118.94	11.1%
	Loan repayment	409.21	38.2%
	Interest paid	96.41	9.0%
	Surplus cash	448.03	41.8%
	Total	1,072.59	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	365.72	2.30	1.64	159.06	158.68	43.45	0.33	0.26																																	
2. Operation and Maintenance Cost																																									
Salary	27.36			0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Chlorine	26.49			0.30	0.63	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
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	7.83			0.09	0.18	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Pump replacement																	0.00															0.00									
Sub-total	61.69			1.11	1.53	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64
Total Outflow	427.41	2.30	1.64	160.17	160.21	45.09	1.97	1.90	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64
B BENEFIT																																								
1. Water Tariff	673.72	0.00	0.00	3.04	6.08	6.91	7.14	12.10	12.50	12.91	13.34	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99
2. Subsidy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Inflow	673.72	0.00	0.00	3.04	6.08	6.91	7.14	12.10	12.50	12.91	13.34	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99
NET BENEFIT	246.31	-2.30	-1.64	-157.1	-154.1	-38.2	5.17	10.20	10.86	11.27	11.70	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35

FIRR = 2.79%

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	34.18	-2.53	-1.80	-173.0	-170.0	-42.5	5.14	10.17	10.86	11.27	11.70	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35
	2	Capital cost 20% up	-0.15	-2.76	-1.97	-188.9	-185.9	-46.9	5.10	10.15	10.86	11.27	11.70	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35
2	1	OM cost 10% up	64.19	-2.30	-1.64	-157.2	-154.3	-38.3	5.01	10.04	10.70	11.11	11.54	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19
	2	OM cost 20% up	59.88	-2.30	-1.64	-157.4	-154.4	-38.5	4.84	9.87	10.53	10.94	11.37	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02
3	1	Revenue 10% down	23.02	-2.30	-1.64	-157.4	-154.7	-38.9	4.46	8.99	9.61	9.98	10.37	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35	16.35
	2	Revenue 20% down	-22.47	-2.30	-1.64	-157.7	-155.4	-39.6	3.74	7.78	8.36	8.69	9.03	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.35

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	2.24%	2.48	40.39%
	2	Capital cost 20% up	1.75%	5.97	16.75%
2	1	OM cost 10% up	2.73%	0.23	429.04%
	2	OM cost 20% up	2.66%	0.48	209.11%
3	1	Revenue 10% down	2.11%	3.21	31.15%
	2	Revenue 20% down	1.38%	10.23	9.78%

No.28 Jajur

Information on Existing Water Sources (Shirak)

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

No.28 Community Jajur
District Akhuryan
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	52	13.2	43	56	37.1	1,746	2.5	5.0	4.0
2	Spring	40	51	36.2	43	58	46.8	1,840	2.5	5.0	3.0
3	Spring	40	50	15.2	43	58	23.4	1,870	2.5	5.0	3.0
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.28 Community Jajur
District Akhuryan
Marz Shirak
Sampling date 21/Jul/2007

	Parameters analysed	Units	No.1	No.2	No.3		Guidelines	
							WHO	Armenia
a	pH		7.8	8.1	8.4		6.5-8	6.0 - 9.0
b	Temperature	Deg.C	10.2	12.3	17.2			
c	TDS	Mg/L	253	69	92		1000	1000
1	Al:Aluminum	Mg/L	0.09	n.d	n.d		0.10	0.50
2	B:Boron	Mg/L	n.d	n.d	n.d		0.70	0.50
3	Cl:Chloride	Mg/L	16	4	5		250	350
4	Cr:Chrome	Mg/L	n.d	n.d	n.d		0.05	0.05
5	Cu:Copper	Mg/L	n.d	n.d	n.d		2	1
6	F:Fluoride	Mg/L	0.12	0.15	0.12		1.50	
7	Hardness	Mg/L	580	150	165		500	700
8	Fe:Iron	Mg/L	n.d	n.d	n.d		0.30	0.30
9	Mn:Manganese	Mg/L	n.d	n.d	n.d		0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d	n.d	n.d		0.070	0.250
11	Ni:Nickel	Mg/L	n.d	n.d	n.d		0.020	0.100
12	Nitrate(NO3+)	Mg/L	13.7	7.1	4.9		50.0	45.0
13	SO4:Sulfate	Mg/L	9.0	4.0	3.5		250.0	500.0
14	Zn:Zink	Mg/L	n.d	n.d	n.d		3.0	5.0
15	As:Arsenic	Mg/L	n.d	n.d	n.d		0.0	0.1
16	Ba:Barium	Mg/L	0.21	0.01	0.01		0.70	0.10
17	Be:Berillium	Mg/L	n.d	n.d	n.d		NA	0.00020
18	Cd:Cadmium	Mg/L	0.0001	n.d	n.d		0.0030	0.0010
19	Pb:Lead	Mg/L	0.013	0.001	0.001		0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002	<0.0002	n.d		0.00100	0.00050
21	Se:Selenium	Mg/L	<0.001	<0.001	0.001		0.010	0.010
22	Sr:Strontium	Mg/L	n.d	0.1	n.d		NA	7.0
23	CN:Cyanide	Mg/L	n.d	n.d	n.d		0.070	0.035
24	Coli form bacteria	bacteria per 100 ml	n.d				-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml	n.d				0	0
26	Total bacteria	bacteria per 1 ml	n.d				-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.28 Community Jajur
District Akhuryan
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	02	0,0,0,0,80,0,0,0	Not Identified	Not Identified
2	04	09	-	0;0;0;0;0,4;0,4;0,4;0,4	Not Identified
3	06	16	70,75	0,4;0,4;0,4;0,9	Not Identified
4	08	02	55,67,63,59,63,62	0,4;0,4;0,4;0,4;0,4; 0,9;0,9;0,9	Not Identified
5	08	27	-	0,4;0,4;0,4;0,9;2,3;2,3;0,9;0,9	
6			60,56,54,60,72,76,52,56		

No. 28 **Marz** Shirak **Community** Jajur

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Possible	Difficult	
	Intake	Possible	Difficult	
	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°52′13,2″	43°56′37,1″	1,746	1955	AsbestosCement	4.0	Yes
2	Spring	40°51′36,2″	43°58′46,8″	1,840	1955	Concrete	3.0	Yes
3	Spring	40°50′15,2″	43°58′23,4″	1,870	1965	Concrete	3.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	3,500	50	Polyethylene	3.6	1997	Little	Yes
2	4,000	100	Steel/iron	1.5	1961	Medium	Yes
3	3,000	75	Steel	2	1962	Medium	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°51′26,9″	43°57′25″	1,740	Concrete	Rectangular	6×6×3	70	Yes
2	40°50′52,4″	43°57′30,9″	1,738	Concrete	Rectangular	6×6×3	70	Yes

5. CHLORINATION EQUIPMENT

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

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	3,000	100	Steel/iron	1955	Medium	Yes
2	2,000	50	Polyethylene	1955	Little	Yes
3	4,000	70	Steel	1960	Huge	Yes

7. PUMP STATION

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

8, PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
12	1960		Yes	80	Yes

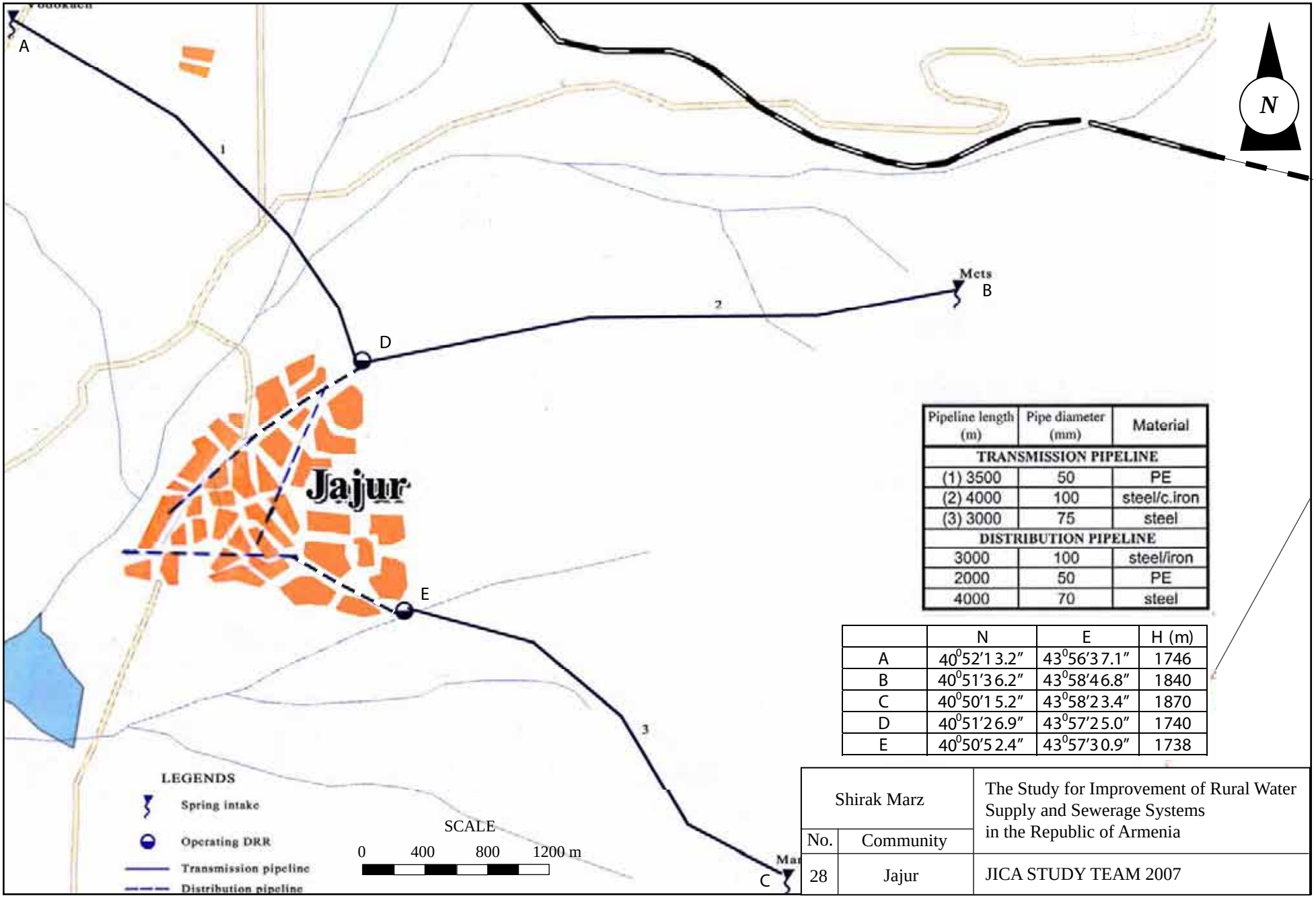
9. DRAINAGE SYSTEM

Existence (Y/N)	Rehabilitation Necessity (Y/N)	Remarks
Yes	Yes	For 30% DN300mm

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Shirak**
Number and Name of Community	**No.28 Jajur**
District	**Akhurian**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	1,100
A2	Actual population in 2007	1,160
A3	Number of households	800
A4.1	Elderly people	130
A4.2	Population in labor force (age from 16 to 62)	850
A4.3	Children	180
A5.1	Pensioners	147
A5.2	Unemployed	0
A5.3	Receiving benefits	65
A6	Average monthly income of household (AMD)	50,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	160
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	1,200
	Annual Budget of the community 2005, in thousand AMD	1,500
	Annual Budget of the community 2006, in thousand AMD	4,000
	Annual Budget of the community 2007, in thousand AMD	3,000
	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	200
	Amount spent in drinking water sector 2006, in thousand AMD	300
	Amount spent in drinking water sector 2007, in thousand AMD	200
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	dairy, meat, cereals
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	no permit issued, ongoing
D5	Present condition of the water supply volume of Domestic use	insufficient
D6	Present condition of the water supply volume of Irrigation water	insufficient
D7	Number of house connection to drinking water system	120
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?	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)	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?	from spring
D20	Are you satisfied with irrigation water supply volume?	insufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Suvaryan Sokrat
E2	Position	administration head
E3	Telephone	(091) 748651
E4	Quantity and present condition of the water supply facilities: spring/ intake	1-deteriorated
E5	Quantity and present condition of the water supply facilities:	2-deteriorated, 1-
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	partially repaired
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	residents
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	administration head
E14	How you prepare O&M costs?	community budget
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	1,000,000
	Repair cost(AMD)	200,000
	Others(AMD)	0
	Total (AMD)	1,200,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	water fee
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	yes
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 3500	50	PE
(2) 4000	100	steel/c.iron
(3) 3000	75	steel
DISTRIBUTION PIPELINE		
3000	100	steel/iron
2000	50	PE
4000	70	steel

	N	E	H (m)
A	$40^0$52′13.2″	$43^0$56′37.1″	1746
B	$40^0$51′36.2″	$43^0$58′46.8″	1840
C	$40^0$50′15.2″	$43^0$58′23.4″	1870
D	$40^0$51′26.9″	$43^0$57′25.0″	1740
E	$40^0$50′52.4″	$43^0$57′30.9″	1738

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

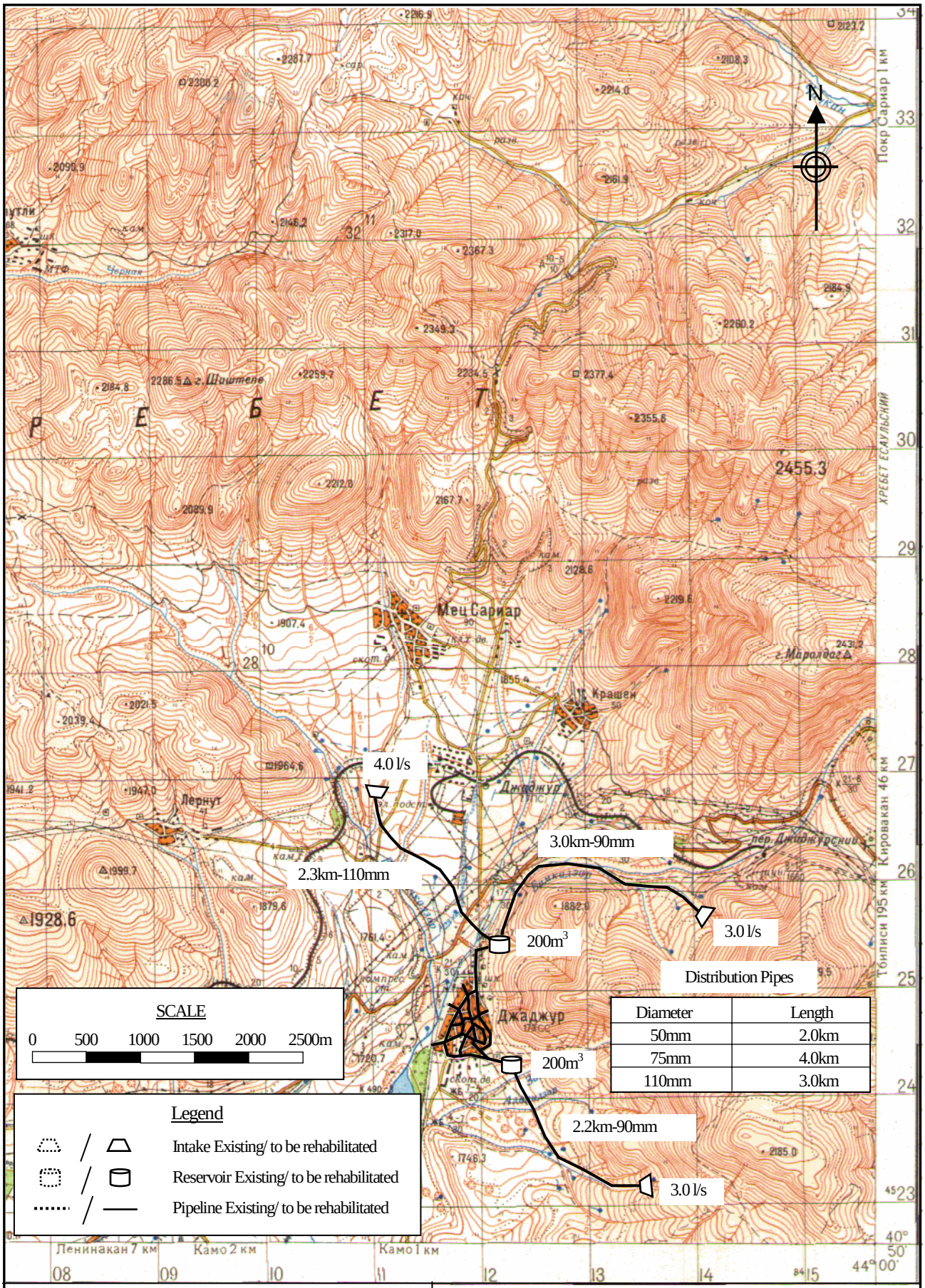
Marz : **Shirak** No.28
Name : **Jajur**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
1	Population	1,160	persons	116.0	
2	Factory	-	nos	0.0	
3	School (pupils)	160	pupils	1.6	
4	Medical Ambulance Station	-	nos	-	
5	Policlinic	-	nos	-	
6	Livestocks (87lit/household)	800	household	69.6	
	Sub-total			187.2	
	Unaccouted for water (20%)			37.4	
1	Average Daily Water Demand			224.6	m3/day
2	Maximum Daily Water Demand			269.6	m3/day
3	Maximum Hourly Water Demand			29.2	m3/hr

B	**WATER SUPPLY PLAN**						
1	Water source type	Nr.	Total vol.				
a	Spring	2	7.0	lit/sec		604.8	m3/day
b	Spring	1	3.0	lit/sec		259.2	m3/day
`	Total					864.0	m3/day
2	Required reservoir volume					350	m3

C WATER SUPPLY FACILITIES REHABILITATION PLAN

No	Item	Quantity	Unit
1	Intake		
	1m3	3	nos
	2m3		nos
	3m3		nos
	4m3		nos
2	Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter	5,200	m
	110mm diameter	2,300	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	200m3 capacity	2	nos
4	Distribution pipe		
	50mm diameter	2,000	m
	75mm diameter	4,000	m
	90mm diameter		m
	110mm diameter	3,000	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	680	nos
6	Water meter installation	800	nos
7	Public tap	8	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. 28	Jajur	JICA STUDY TEAM

Marz : **Shirak**
No. : **28**
Name : **Jajur**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	3	nos	367,700	1,103,100
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					1,103,100
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm	5,200	m	8,040	41,808,000
		110mm	2,300	m	9,680	22,264,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					64,072,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3	2	nos	22,524,600	45,049,200
		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					45,049,200
4	Distribution Pipe					
		50mm	2,000	m	5,520	11,040,000
		75mm	4,000	m	7,160	28,640,000
		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					68,720,000
5	House Connection		680	nos	74,000	50,320,000
6	Water Meter Installation		800	nos	80,000	64,000,000
7	Public Tap		8	nos	90,000	720,000
8	Chlorilation Equipment		2	nos	500,000	1,000,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	3,600	m	3,600	12,960,000
	Total				AMD	307,944,300
					Equivalent to USD	1,007,935
					Equivalent to JPY	106,337,142
					AMD	USD
	Investment Cost per household		800	HH	384,930	1,260
	Investment Cost per person		1,160	persons	265,469	869

SHIRAK MARZ
Gyumri District
No 28 Jajur

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		68.3																																							
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		383.28	0.00	0.00	2.46	2.46	2.46	2.54	4.30	4.45	4.59	4.74	7.11	7.35	7.59	7.84	8.10	8.37	8.64	8.93	9.22	9.53	9.84	10.16	10.50	10.85	11.20	11.57	11.96	12.35	12.76	13.18	13.61	14.06	14.53	15.01	15.50	16.01	16.54	17.09	17.65	18.23
B Operating Costs																																										
1. Staff salary																																									
Inspectors	person				2																																				
Pump operators	person				0																																				
Base Salary	AMD/m/p				20,000	20,660	21,342	22,046	22,774	23,525	24,301	25,103	25,932	26,788	27,672	28,585	29,528	30,502	31,509	32,549	33,623	34,732	35,879	37,063	38,286	39,549	40,854	42,202	43,595	45,034	46,520	48,055	49,641	51,279	52,971	54,719	56,525	58,390	60,317	62,308	64,364	66,488
Sub-total		35.40			0.48	0.50	0.51	0.53	0.55	0.56	0.58	0.60	0.62	0.64	0.66	0.69	0.71	0.73	0.76	0.78	0.81	0.83	0.86	0.89	0.92	0.95	0.98	1.01	1.05	1.08	1.12	1.15	1.19	1.23	1.27	1.31	1.36	1.40	1.45	1.50	1.54	1.60
2. Chlorine																																										
Pouring volume	kg/yr				410																																					
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		18.15			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	0.38	0.39	0.40	0.41	0.43	0.44	0.46	0.47	0.49	0.50	0.52	0.54	0.55	0.57	0.59	0.61	0.63	0.65	0.67	0.70	0.72	0.74	0.77	0.79	0.82
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		50.13			0.68	0.70	0.73	0.75	0.77	0.80	0.83	0.85	0.88	0.91	0.94	0.97	1.00	1.04	1.07	1.11	1.14	1.18	1.22	1.26	1.30	1.34	1.39	1.43	1.48	1.53	1.58	1.63	1.69	1.74	1.80	1.86	1.92	1.99	2.05	2.12	2.19	2.26
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					0.68	0.7	0.73	0.75	0.77	0.80	0.83	0.85	0.88	0.91	0.94	0.97	1.00	1.04	1.07	1.11	1.14	1.18	1.22	1.26	1.30	1.34	1.39	1.43	1.48	1.53	1.58	1.63	1.69	1.74	1.80	1.86	1.92	1.99	2.05	2.12	2.19	2.26
5. Pump replacement		0.00																0.00															0.00									
Sub-total		103.68	0.00	0.00	1.41	1.45	1.50	1.55	1.60	1.65	1.71	1.76	1.82	1.88	1.94	2.01	2.07	2.15	2.22	2.29	2.36	2.44	2.52	2.61	2.69	2.78	2.87	2.96	3.07	3.16	3.27	3.37	3.49	3.60	3.72	3.84	3.98	4.11	4.24	4.39	4.52	4.68
C Gross Income (A-B)		279.60	0.00	0.00	1.05	1.01	0.96	0.99	2.70	2.80	2.88	2.98	5.29	5.47	5.65	5.83	6.03	6.22	6.42	6.64	6.86	7.09	7.32	7.55	7.81	8.07	8.33	8.61	8.89	9.19	9.49	9.81	10.12	10.46	10.81	11.17	11.52	11.90	12.30	12.70	13.13	13.55
D Depreciation cost		292.60						8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36
E Interest paid		88.79	0.02	0.04	3.62	3.65	3.65	3.66	3.66	3.66	3.66	3.66	3.66	3.56	3.45	3.34	3.24	3.13	3.02	2.90	2.79	2.68	2.56	2.44	2.33	2.21	2.09	1.97	1.85	1.72	1.60	1.47	1.34	1.22	1.09	0.95	0.82	0.69	0.55	0.42	0.28	0.14
F Net Income		-101.79	-0.02	-0.04	-2.57	-2.64	-2.69	-11.03	-9.32	-9.22	-9.14	-9.04	-6.73	-6.45	-6.16	-5.87	-5.57	-5.27	-4.96	-4.62	-4.29	-3.95	-3.60	-3.25	-2.88	-2.50	-2.12	-1.72	-1.32	-0.89	-0.47	-0.02	0.42	0.88	1.36	1.86	2.34	2.85	3.39	3.92	4.49	5.05
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		-101.79	-0.02	-0.04	-2.57	-2.64	-2.69	-11.03	-9.32	-9.22	-9.14	-9.04	-6.73	-6.45	-6.16	-5.87	-5.57	-5.27	-4.96	-4.62	-4.29	-3.95	-3.60	-3.25	-2.88	-2.50	-2.12	-1.72	-1.32	-0.89	-0.47	-0.02	0.42	0.88	1.36	1.86	2.34	2.85	3.39	3.92	4.49	5.05
OM Cost Recovery Ratio (A/B)		370%	0%	0%	174%	170%	164%	164%	269%	270%	268%	269%	391%	391%	391%	390%	391%	389%	389%	390%	391%	391%	390%	389%	390%	390%	390%	391%	390%	391%	390%	391%	390%	391%	391%	391%	389%	390%	390%	389%	390%	390%

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	-101.79	-0.02	-0.04	-2.57	-2.64	-2.69	-11.03	-9.32	-9.22	-9.14	-9.04	-6.73	-6.45	-6.16	-5.87	-5.57	-5.27	-4.96	-4.62	-4.29	-3.95	-3.60	-3.25	-2.88	-2.50	-2.12	-1.72	-1.32	-0.89	-0.47	-0.02	0.42	0.88	1.36	1.86	2.34	2.85	3.39	3.92	4.49	5.05
2. Depreciation cost	292.60	0.00	0.00	0.00	0.00	0.00	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36
3. Interest Paid	88.79	0.02	0.04	3.62	3.65	3.65	3.66	3.66	3.66	3.66	3.66	3.66	3.56	3.45	3.34	3.24	3.13	3.02	2.90	2.79	2.68	2.56	2.44	2.33	2.21	2.09	1.97	1.85	1.72	1.60	1.47	1.34	1.22	1.09	0.95	0.82	0.69	0.55	0.42	0.28	0.14
Sub-total	279.60	0.00	0.00	1.05	1.01	0.96	0.99	2.70	2.80	2.88	2.98	5.29	5.47	5.65	5.83	6.03	6.22	6.42	6.64	6.86	7.09	7.32	7.55	7.81	8.07	8.33	8.61	8.89	9.19	9.49	9.81	10.12	10.46	10.81	11.17	11.52	11.90	12.30	12.70	13.13	13.55
B Finances																																									
1. Project Loan	366.29	2.36	1.67	358.56	2.09	0.97	0.36	0.28																																	
2. Local fund	123.77	0.79	0.56	121.48	0.70	0.17	0.04	0.03																																	
Sub-total	490.06	3.15	2.23	480.04	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	175.50	0.02	0.04	2.57	2.64	2.69	2.67	0.96	0.86	0.78	0.68	8.90	8.73	8.54	8.36	8.17	7.98	7.78	7.55	7.33	7.11	6.87	6.64	6.39	6.12	5.86	5.59	5.31	5.00	4.71	4.38	4.07	3.74	3.39	3.02	2.67	2.29	1.89	1.50	1.06	0.64
Sub-total	175.50	0.02	0.04	2.57	2.64	2.69	2.67	0.96	0.86	0.78	0.68	8.90	8.73	8.54	8.36	8.17	7.98	7.78	7.55	7.33	7.11	6.87	6.64	6.39	6.12	5.86	5.59	5.31	5.00	4.71	4.38	4.07	3.74	3.39	3.02	2.67	2.29	1.89	1.50	1.06	0.64
Total Cash Inflow	945.16	3.17	2.27	483.66	6.44	4.79	4.06	3.97	3.66	3.66	3.66	14.19	14.20	14.19	14.19	14.20	14.20	14.20	14.19	14.19	14.20	14.19	14.19	14.20	14.19	14.19	14.20	14.20	14.19	14.20	14.19	14.19	14.20	14.20	14.19	14.19	14.19	14.19	14.20	14.19	14.19
APPLICATION OF FUNDS																																								
D Project disbursement	490.06	3.15	2.23	480.04	2.79	1.14	0.40	0.31																																	
E Total debt services																																								
1. Loan repayment	366.31											10.53	10.64	10.74	10.85	10.96	11.07	11.18	11.29	11.40	11.52	11.63	11.75	11.87	11.98	12.10	12.23	12.35	12.47	12.60	12.72	12.85	12.98	13.11	13.24	13.37	13.50	13.64	13.78	13.91	14.05
2. Interest paid	88.79	0.02	0.04	3.62	3.65	3.65	3.66	3.66	3.66	3.66	3.66	3.66	3.56	3.45	3.34	3.24	3.13	3.02	2.90	2.79	2.68	2.56	2.44	2.33	2.21	2.09	1.97	1.85	1.72	1.60	1.47	1.34	1.22	1.09	0.95	0.82	0.69	0.55	0.42	0.28	0.14
Sub-total	455.10	0.02	0.04	3.62	3.65	3.65	3.66	3.66	3.66	3.66	3.66	14.19	14.20	14.19	14.19	14.20	14.20	14.20	14.19	14.19	14.20	14.19	14.19	14.20	14.19	14.19	14.20	14.20	14.19	14.20	14.19	14.19	14.20	14.20	14.19	14.19	14.19	14.19	14.20	14.19	14.19
Total Cash Outflow	945.16	3.17	2.27	483.66	6.44	4.79	4.06	3.97	3.66	3.66	3.66	14.19	14.20	14.19	14.19	14.20	14.20	14.20	14.19	14.19	14.20	14.19	14.19	14.20	14.19	14.19	14.20	14.20	14.19	14.20	14.19	14.19	14.20	14.20	14.19	14.19	14.19	14.19	14.20	14.19	14.19
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)	61%	0%	0%	29%	28%	26%	27%	74%	77%	79%	81%	37%	39%	40%	41%	42%	44%	45%	47%	48%	50%	52%	53%	55%	57%	59%	61%	63%	65%	67%	69%	71%	74%	76%	79%	81%	84%	87%	89%	93%	95%
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 28 Jajur

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	383.28	68.6%
	Subsidy	175.50	31.4%
	Total	558.78	100.0%
2	**Expenditure**		
	OM cost	103.68	18.6%
	Loan repayment	366.31	65.6%
	Interest paid	88.79	15.9%
	Surplus cash	0.00	0.0%
	Total	558.78	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	334.36	2.30	1.64	327.02	1.93	0.88	0.33	0.26																																
2. Operation and Maintenance Cost																																								
Salary	18.24			0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
Chlorine	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
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	25.84			0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Pump replacement																	0.00															0.00								
Sub-total	53.58			1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41
Total Outflow	387.94	2.30	1.64	328.43	3.34	2.29	1.74	1.67	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41
B BENEFIT																																								
1. Water Tariff	241.30	0.00	0.00	2.46	2.46	2.46	2.54	4.30	4.45	4.59	4.74	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11	7.11
2. Subsidy	102.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.24	5.17	5.09	5.02	4.93	4.85	4.76	4.65	4.54	4.43	4.31	4.20	4.06	3.91	3.77	3.62	3.46	3.28	3.11	2.91	2.73	2.52	2.30	2.07	1.85	1.60	1.34	1.08	0.78	0.50
Total Inflow	343.38	0.00	0.00	2.46	2.46	2.46	2.54	4.30	4.45	4.59	4.74	12.35	12.28	12.20	12.13	12.04	11.96	11.87	11.76	11.65	11.54	11.42	11.31	11.17	11.02	10.88	10.73	10.57	10.39	10.22	10.02	9.84	9.63	9.41	9.18	8.96	8.71	8.45	8.19	7.89	7.61
NET BENEFIT	-44.56	-2.30	-1.64	-326.0	-0.9	0.2	0.80	2.63	3.04	3.18	3.33	10.94	10.87	10.79	10.72	10.63	10.55	10.46	10.35	10.24	10.13	10.01	9.90	9.76	9.61	9.47	9.32	9.16	8.98	8.81	8.61	8.43	8.22	8.00	7.77	7.55	7.30	7.04	6.78	6.48	6.20
FIRR =	**-0.69%**																																								

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	-153.05	-2.53	-1.80	-358.7	-1.1	0.1	0.77	2.60	3.04	3.18	3.33	10.94	10.87	10.79	10.72	10.63	10.55	10.46	10.35	10.24	10.13	10.01	9.90	9.76	9.61	9.47	9.32	9.16	8.98	8.81	8.61	8.43	8.22	8.00	7.77	7.55	7.30	7.04	6.78	6.48	6.20
	2	Capital cost 20% up	-184.79	-2.76	-1.97	-391.4	-1.3	0.0	0.73	2.58	3.04	3.18	3.33	10.94	10.87	10.79	10.72	10.63	10.55	10.46	10.35	10.24	10.13	10.01	9.90	9.76	9.61	9.47	9.32	9.16	8.98	8.81	8.61	8.43	8.22	8.00	7.77	7.55	7.30	7.04	6.78	6.48	6.20
2	1	OM cost 10% up	-125.07	-2.30	-1.64	-326.1	-1.0	0.0	0.66	2.49	2.90	3.04	3.19	10.80	10.73	10.65	10.58	10.49	10.41	10.32	10.21	10.10	9.99	9.87	9.76	9.62	9.47	9.33	9.18	9.02	8.84	8.67	8.47	8.29	8.08	7.86	7.63	7.41	7.16	6.90	6.64	6.34	6.06
	2	OM cost 20% up	-128.82	-2.30	-1.64	-326.3	-1.2	-0.1	0.52	2.35	2.76	2.90	3.05	10.66	10.59	10.51	10.44	10.35	10.27	10.18	10.07	9.96	9.85	9.73	9.62	9.48	9.33	9.19	9.04	8.88	8.70	8.53	8.33	8.15	7.94	7.72	7.49	7.27	7.02	6.76	6.50	6.20	5.92
3	1	Revenue 10% down	-144.68	-2.30	-1.64	-326.2	-1.1	-0.1	0.55	2.20	2.60	2.72	2.86	9.71	9.64	9.57	9.51	9.43	9.35	9.27	9.17	9.08	8.98	8.87	8.77	8.64	8.51	8.38	8.25	8.10	7.94	7.79	7.61	7.45	7.26	7.06	6.85	6.65	6.43	6.20	5.96	5.69	5.44
	2	Revenue 20% down	-168.04	-2.30	-1.64	-326.5	-1.4	-0.3	0.29	1.77	2.15	2.26	2.38	8.47	8.41	8.35	8.29	8.22	8.16	8.09	8.00	7.91	7.82	7.73	7.64	7.53	7.41	7.29	7.17	7.05	6.90	6.77	6.61	6.46	6.29	6.12	5.93	5.76	5.56	5.35	5.14	4.90	4.68

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-1.14%	-3.93	-25.44%
	2	Capital cost 20% up	-1.55%	-5.51	-18.15%
2	1	OM cost 10% up	-0.78%	-1.12	-89.14%
	2	OM cost 20% up	-0.87%	-2.03	-49.34%
3	1	Revenue 10% down	-1.29%	-4.60	-21.75%
	2	Revenue 20% down	-1.94%	-6.42	-15.58%

No.29 Jajur Kayaran

Information on Existing Water Sources (Shirak)

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

No.29 Community Jajur kayaran
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	Existing pipeline	40	52	59.1	43	57	55.6	1,895	-	-	4.0
2	Spring	40	52	53.7	43	57	46.1	1,878	3.0	6.0	2.0
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 Community uses No.24 Krashen Community's water pipeline, since the quality of the Community's spring water does not meet the required standards.
Alternative sources if any	

No.29 Community Jajur kayaran
District Ashotsk
Marz Shirak
Sampling date 24/Jul/2007

	Parameters analysed	Units	No.1				Guidelines	
							WHO	Armenia
a	pH		7.9				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	12.4					
c	TDS	Mg/L	62				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	n.d				0.05	0.05
5	Cu:Copper	Mg/L	n.d				2	1
6	F:Fluoride	Mg/L	0.10				1.50	
7	Hardness	Mg/L	295				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	2.2				50.0	45.0
13	SO4:Sulfate	Mg/L	5.0				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	0.11				0.70	0.10
17	Be:Berillium	Mg/L	n.d				NA	0.00020
18	Cd:Cadmium	Mg/L	n.d				0.0030	0.0010
19	Pb:Lead	Mg/L	0.001				0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002				0.00100	0.00050
21	Se:Selenium	Mg/L	<0.001				0.010	0.010
22	Sr:Strontium	Mg/L	0.3				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.29 Community Jajur Kayaran
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	03	15	76,90,80,80	23,23,23,23	Not Identified
2	04	09	-	0,4;0,9;0,9;0,9;0,9;0,9;0,9	Not Identified
3	06	16	0,30,10,40	0,9;0,9;2,3;2,3	Not Identified
4	07	25	82,88,86,102	0,4;0,4;0,4;0,4	Not Identified
5	08	02	57,63,62,70,69,75	0,9;0,9;0,9;2,3;2,3;2,3	Not Identified
6	08	27	60,54,68,56,72,66	0,4;0,9;0,9;0,4;0,9;0,9	Not Identified

No. 29 **Marz** Shirak **Community** Jajur Kayaran

1. ACCESSIBILITY TO THE SITE

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

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Fed from mai	40°52′59,1″	43°57′55,6″	1,895	1962	Steel	4.0	Yes
2	Spring	40°52′53,7″	43°57′46,1″	1,878	1990	Concrete	2.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	950	150	Steel/iron	3.2	1965	Little	Yes
2	70	100	Steel	2.0	1990	no	No

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	800	50	Steel	1955	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)
3	1955		Yes	100	Yes

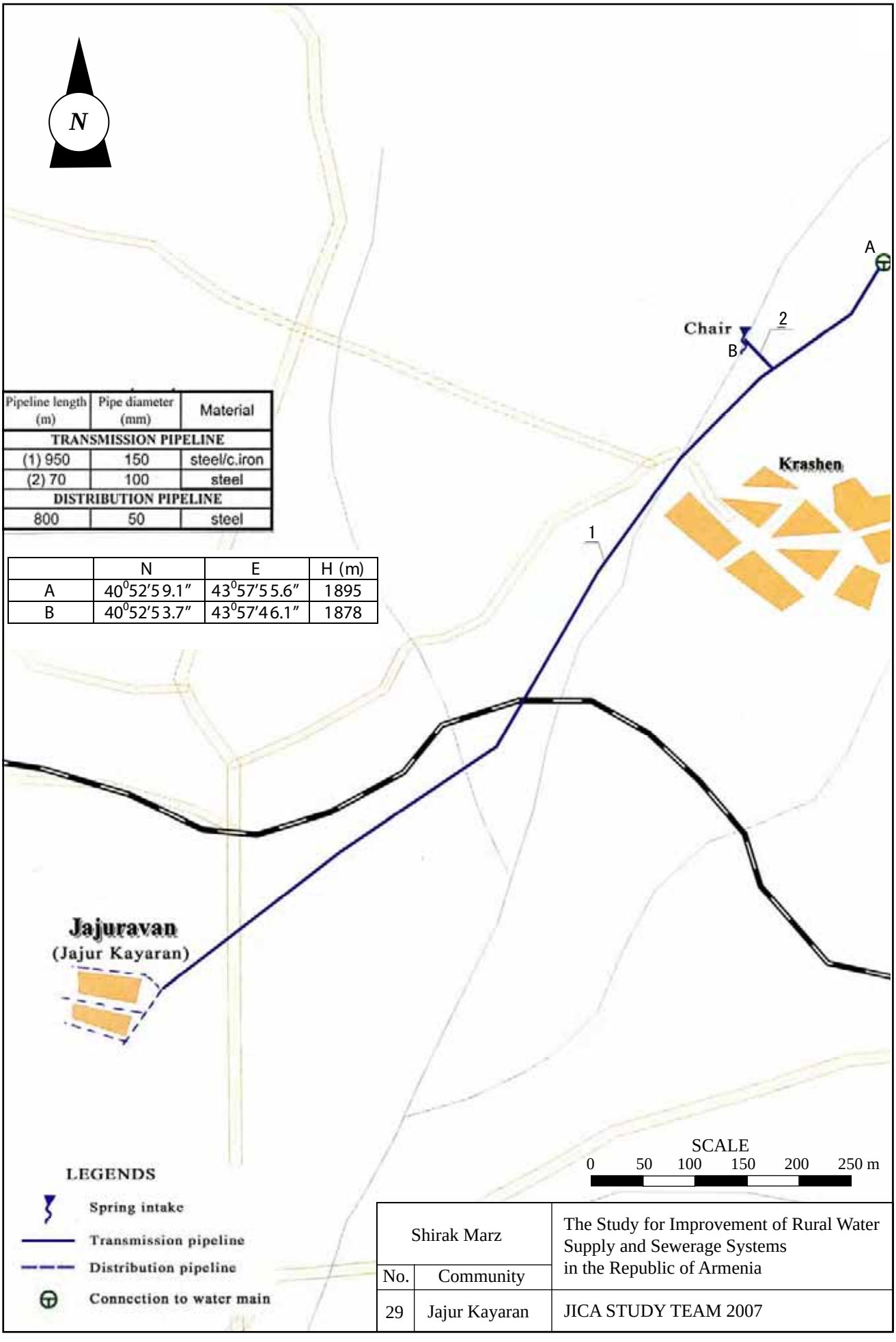
9. DRAINAGE SYSTEM

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.29 Jajur Kayaran**
District	**Ashotsk**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	304
A2	Actual population in 2007	293
A3	Number of households	68
A4.1	Elderly people	50
A4.2	Population in labor force (age from 16 to 62)	160
A4.3	Children	70
A5.1	Pensioners	60
A5.2	Unemployed	1
A5.3	Receiving benefits	17
A6	Average monthly income of household (AMD)	10,000
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 (elementary)
A10	Number of pupils	12
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	1,600
	Annual Budget of the community 2005, in thousand AMD	1,600
	Annual Budget of the community 2006, in thousand AMD	1,600
	Annual Budget of the community 2007, in thousand AMD	2,100
	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:	livestock
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	1022
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	almost sufficient
D6	Present condition of the water supply volume of Irrigation water	absent
D7	Number of house connection to drinking water system	10
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?	24 hrs
D10.2	How is the regime of water supply in your community in the wet season?	24 hrs
D11	What time of day water is given?	-
D12	Are you pleased with duration of domestic water supply?	mainly pleased
D13	Are hours of water supply convenient?	-
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	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	difficult to answer
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	Pahikyan Qerob
E2	Position	administration head
E3	Telephone	(093) 492254
E4	Quantity and present condition of the water supply facilities: spring/ intake	1-deteriorated
E5	Quantity and present condition of the water supply facilities:	1-partially repaired
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	absent
E7	Quantity and present condition of the water supply facilities: net/distribution	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	partially repaired
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community, residents
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	administration head
E14	How you prepare O&M costs?	donation from residents
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	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	absent
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 950	150	steel/c.iron
(2) 70	100	steel
DISTRIBUTION PIPELINE		
800	50	steel

	N	E	H (m)
A	40°52′59.1″	43°57′55.6″	1895
B	40°52′53.7″	43°57′46.1″	1878

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

Marz : **Shirak** No.29
Name : **Jajur Kayan**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	293	persons	29.3	
	2 Factory	-	nos	0.0	
	3 School (pupils)	12	pupils	0.1	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	68	household	5.9	
	Sub-total			35.3	
	Unaccouted for water (20%)			7.1	
1	Average Daily Water Demand			42.4	m3/day
2	Maximum Daily Water Demand			50.8	m3/day
3	Maximum Hourly Water Demand			11.0	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Existing pipeline	1	4.0	lit/sec		345.6	m3/day
	b Spring	1	2.0	lit/sec		172.8	m3/day
`	Total					518.4	m3/day
	2 Required reservoir volume					132	m3

C	**WATER SUPPLY FACILITIES REHABILITATION PLAN**		
	No Item	Quantity	Unit
	1 Intake		
	1m3	2	nos
	2m3		nos
	3m3		nos
	4m3		nos
	2 Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter	1,600	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
	3 Reservoir		
	150m3 capacity	1	nos
	4 Distribution pipe		
	50mm diameter	800	m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
	5 House connection	58	nos
	6 Water meter installation	68	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. 29	Jajur Kayaran	JICA STUDY TEAM

Marz : **Shirak**
No. : **29**
Name : **Jajur Kayan**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	2	nos	367,700	735,400
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					735,400
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	1,600	m	9,680	15,488,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					15,488,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3	1	nos	18,804,500	18,804,500
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					18,804,500
4	Distribution Pipe					
		50mm	800	m	5,520	4,416,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					4,416,000
5	House Connection		58	nos	74,000	4,292,000
6	Water Meter Installation		68	nos	80,000	5,440,000
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	320	m	3,600	1,152,000
	Total				AMD	50,917,900
					Equivalent to USD	166,660
					Equivalent to JPY	17,582,608
					AMD	USD
	Investment Cost per household		68	HH	748,793	2,451
	Investment Cost per person		293	persons	173,781	569

SHIRAK MARZ
Gyumri District
No 29 Jajur Kayaran

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		12.9																																							
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		72.29	0.00	0.00	0.46	0.46	0.46	0.48	0.81	0.84	0.87	0.89	1.34	1.39	1.43	1.48	1.53	1.58	1.63	1.68	1.74	1.80	1.86	1.92	1.98	2.05	2.11	2.18	2.25	2.33	2.41	2.49	2.57	2.65	2.74	2.83	2.92	3.02	3.12	3.22	3.33	3.44
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				78																																				
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		3.47			0.05	0.05	0.05	0.05	0.05	0.06	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	0.10	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
3. Electricity (for pump)		0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. Maintenance cost		4.42			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	0.11	0.12	0.12	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.18	0.18	0.19	0.19	0.20
Pump repair					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe repair					0.06	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	0.11	0.12	0.12	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.18	0.18	0.19	0.19	0.20
5. Pump replacement		0.00																0.00															0.00									
Sub-total		25.59	0.00	0.00	0.35	0.36	0.37	0.38	0.39	0.41	0.42	0.44	0.45	0.46	0.47	0.50	0.51	0.53	0.54	0.57	0.58	0.60	0.62	0.64	0.66	0.68	0.71	0.74	0.75	0.79	0.81	0.83	0.87	0.89	0.92	0.95	0.98	1.02	1.04	1.09	1.11	1.16
C Gross Income (A-B)		46.70	0.00	0.00	0.11	0.10	0.09	0.10	0.42	0.43	0.45	0.45	0.89	0.93	0.96	0.98	1.02	1.05	1.09	1.11	1.16	1.20	1.24	1.28	1.32	1.37	1.40	1.44	1.50	1.54	1.60	1.66	1.70	1.76	1.82	1.88	1.94	2.00	2.08	2.13	2.22	2.28
D Depreciation cost		48.30						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	1.38	1.38	1.38	1.38	1.38	1.38
E Interest paid		16.70	0.02	0.04	0.65	0.67	0.68	0.69	0.69	0.69	0.69	0.69	0.69	0.67	0.65	0.63	0.61	0.59	0.57	0.55	0.52	0.50	0.48	0.46	0.44	0.42	0.39	0.37	0.35	0.32	0.30	0.28	0.25	0.23	0.20	0.18	0.15	0.13	0.10	0.08	0.05	0.03
F Net Income		-18.30	-0.02	-0.04	-0.54	-0.57	-0.59	-1.97	-1.65	-1.64	-1.62	-1.62	-1.18	-1.12	-1.07	-1.03	-0.97	-0.92	-0.86	-0.82	-0.74	-0.68	-0.62	-0.56	-0.50	-0.43	-0.37	-0.31	-0.23	-0.16	-0.08	0.00	0.07	0.15	0.24	0.32	0.41	0.49	0.60	0.67	0.79	0.87
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		-18.30	-0.02	-0.04	-0.54	-0.57	-0.59	-1.97	-1.65	-1.64	-1.62	-1.62	-1.18	-1.12	-1.07	-1.03	-0.97	-0.92	-0.86	-0.82	-0.74	-0.68	-0.62	-0.56	-0.50	-0.43	-0.37	-0.31	-0.23	-0.16	-0.08	0.00	0.07	0.15	0.24	0.32	0.41	0.49	0.60	0.67	0.79	0.87
OM Cost Recovery Ratio (A/B)		282%	0%	0%	131%	128%	124%	126%	208%	205%	207%	202%	298%	302%	304%	296%	300%	298%	302%	295%	300%	300%	300%	300%	300%	301%	297%	295%	300%	295%	298%	300%	295%	298%	298%	298%	298%	296%	300%	295%	300%	297%

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	-18.30	-0.02	-0.04	-0.54	-0.57	-0.59	-1.97	-1.65	-1.64	-1.62	-1.62	-1.18	-1.12	-1.07	-1.03	-0.97	-0.92	-0.86	-0.82	-0.74	-0.68	-0.62	-0.56	-0.50	-0.43	-0.37	-0.31	-0.23	-0.16	-0.08	0.00	0.07	0.15	0.24	0.32	0.41	0.49	0.60	0.67	0.79	0.87
2. Depreciation cost	48.30	0.00	0.00	0.00	0.00	0.00	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	1.38	1.38	1.38	1.38	1.38	1.38
3. Interest Paid	16.70	0.02	0.04	0.65	0.67	0.68	0.69	0.69	0.69	0.69	0.69	0.69	0.67	0.65	0.63	0.61	0.59	0.57	0.55	0.52	0.50	0.48	0.46	0.44	0.42	0.39	0.37	0.35	0.32	0.30	0.28	0.25	0.23	0.20	0.18	0.15	0.13	0.10	0.08	0.05	0.03
Sub-total	46.70	0.00	0.00	0.11	0.10	0.09	0.10	0.42	0.43	0.45	0.45	0.89	0.93	0.96	0.98	1.02	1.05	1.09	1.11	1.16	1.20	1.24	1.28	1.32	1.37	1.40	1.44	1.50	1.54	1.60	1.66	1.70	1.76	1.82	1.88	1.94	2.00	2.08	2.13	2.22	2.28
B Finances																																									
1. Project Loan	68.89	2.36	1.67	61.16	2.09	0.97	0.36	0.28																																	
2. Local fund	22.99	0.79	0.56	20.70	0.70	0.17	0.04	0.03																																	
Sub-total	91.88	3.15	2.23	81.86	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	38.89	0.02	0.04	0.54	0.57	0.59	0.59	0.27	0.26	0.24	0.24	1.78	1.74	1.71	1.69	1.65	1.62	1.58	1.56	1.50	1.47	1.43	1.39	1.35	1.30	1.27	1.23	1.17	1.13	1.07	1.01	0.97	0.91	0.85	0.79	0.72	0.67	0.59	0.54	0.45	0.39
Sub-total	38.89	0.02	0.04	0.54	0.57	0.59	0.59	0.27	0.26	0.24	0.24	1.78	1.74	1.71	1.69	1.65	1.62	1.58	1.56	1.50	1.47	1.43	1.39	1.35	1.30	1.27	1.23	1.17	1.13	1.07	1.01	0.97	0.91	0.85	0.79	0.72	0.67	0.59	0.54	0.45	0.39
Total Cash Inflow	177.47	3.17	2.27	82.51	3.46	1.82	1.09	1.00	0.69	0.69	0.69	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.66	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.66	2.67	2.67	2.67	2.67	2.67
APPLICATION OF FUNDS																																								
D Project disbursement	91.88	3.15	2.23	81.86	2.79	1.14	0.40	0.31																																	
E Total debt services																																								
1. Loan repayment	68.89											1.98	2.00	2.02	2.04	2.06	2.08	2.10	2.12	2.14	2.17	2.19	2.21	2.23	2.25	2.28	2.30	2.32	2.35	2.37	2.39	2.42	2.44	2.47	2.49	2.51	2.54	2.57	2.59	2.62	2.64
2. Interest paid	16.70	0.02	0.04	0.65	0.67	0.68	0.69	0.69	0.69	0.69	0.69	0.69	0.67	0.65	0.63	0.61	0.59	0.57	0.55	0.52	0.50	0.48	0.46	0.44	0.42	0.39	0.37	0.35	0.32	0.30	0.28	0.25	0.23	0.20	0.18	0.15	0.13	0.10	0.08	0.05	0.03
Sub-total	85.59	0.02	0.04	0.65	0.67	0.68	0.69	0.69	0.69	0.69	0.69	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.66	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.66	2.67	2.67	2.67	2.67	2.67
Total Cash Outflow	177.47	3.17	2.27	82.51	3.46	1.82	1.09	1.00	0.69	0.69	0.69	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.66	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.66	2.67	2.67	2.67	2.67	2.67
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)	55%	0%	0%	17%	15%	13%	14%	61%	62%	65%	65%	33%	35%	36%	37%	38%	39%	41%	42%	44%	45%	46%	48%	49%	51%	52%	54%	56%	58%	60%	62%	64%	66%	68%	70%	73%	75%	78%	80%	83%	85%
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 29 Jajur Kayaran

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	72.29	65.0%
	Subsidy	38.89	35.0%
	Total	111.18	100.0%
2	**Expenditure**		
	OM cost	25.59	23.0%
	Loan repayment	68.89	62.0%
	Interest paid	16.70	15.0%
	Surplus cash	0.00	0.0%
	Total	111.18	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	63.18	2.30	1.64	55.84	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	1.90			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	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	2.28			0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Pump replacement																	0.00															0.00								
Sub-total	13.30			0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
Total Outflow	76.48	2.30	1.64	56.19	2.28	1.23	0.68	0.61	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
B BENEFIT																																								
1. Water Tariff	45.47	0.00	0.00	0.46	0.46	0.46	0.48	0.81	0.84	0.87	0.89	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
2. Subsidy	24.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09	1.07	1.06	1.06	1.04	1.03	1.01	1.01	0.98	0.97	0.95	0.93	0.91	0.88	0.88	0.86	0.82	0.81	0.77	0.73	0.72	0.68	0.65	0.61	0.57	0.54	0.49	0.46	0.40	0.36
Total Inflow	69.81	0.00	0.00	0.46	0.46	0.46	0.48	0.81	0.84	0.87	0.89	2.43	2.41	2.40	2.40	2.38	2.37	2.35	2.35	2.32	2.31	2.29	2.27	2.25	2.22	2.22	2.20	2.16	2.15	2.11	2.07	2.06	2.02	1.99	1.95	1.91	1.88	1.83	1.80	1.74	1.70
NET BENEFIT	-6.67	-2.30	-1.64	-55.7	-1.8	-0.8	-0.20	0.20	0.49	0.52	0.54	2.08	2.06	2.05	2.05	2.03	2.02	2.00	2.00	1.97	1.96	1.94	1.92	1.90	1.87	1.87	1.85	1.81	1.80	1.76	1.72	1.71	1.67	1.64	1.60	1.56	1.53	1.48	1.45	1.39	1.35

FIRR = -0.53%

C. SENSITIVITY ANALYSIS

No.		Description	PV 1.75%	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	1	Capital cost 10% up	-28.11	-2.53	-1.80	-61.3	-2.0	-0.9	-0.23	0.17	0.49	0.52	0.54	2.08	2.06	2.05	2.05	2.03	2.02	2.00	2.00	1.97	1.96	1.94	1.92	1.90	1.87	1.87	1.85	1.81	1.80	1.76	1.72	1.71	1.67	1.64	1.60	1.56	1.53	1.48	1.45	1.39	1.35
	2	Capital cost 20% up	-34.11	-2.76	-1.97	-66.9	-2.2	-0.9	-0.27	0.15	0.49	0.52	0.54	2.08	2.06	2.05	2.05	2.03	2.02	2.00	2.00	1.97	1.96	1.94	1.92	1.90	1.87	1.87	1.85	1.81	1.80	1.76	1.72	1.71	1.67	1.64	1.60	1.56	1.53	1.48	1.45	1.39	1.35
2	1	OM cost 10% up	-23.04	-2.30	-1.64	-55.8	-1.9	-0.8	-0.24	0.17	0.46	0.49	0.51	2.05	2.03	2.02	2.02	2.00	1.99	1.97	1.97	1.94	1.93	1.91	1.89	1.87	1.84	1.84	1.82	1.78	1.77	1.73	1.69	1.68	1.64	1.61	1.57	1.53	1.50	1.45	1.42	1.36	1.32
	2	OM cost 20% up	-23.98	-2.30	-1.64	-55.8	-1.9	-0.8	-0.27	0.13	0.42	0.45	0.47	2.01	1.99	1.98	1.98	1.96	1.95	1.93	1.93	1.90	1.89	1.87	1.85	1.83	1.80	1.80	1.78	1.74	1.73	1.69	1.65	1.64	1.60	1.57	1.53	1.49	1.46	1.41	1.38	1.32	1.28
3	1	Revenue 10% down	-26.83	-2.30	-1.64	-55.8	-1.9	-0.8	-0.25	0.12	0.41	0.43	0.45	1.84	1.82	1.81	1.81	1.79	1.78	1.77	1.77	1.74	1.73	1.71	1.69	1.68	1.65	1.65	1.63	1.59	1.59	1.55	1.51	1.50	1.47	1.44	1.41	1.37	1.34	1.30	1.27	1.22	1.18
	2	Revenue 20% down	-31.55	-2.30	-1.64	-55.8	-1.9	-0.9	-0.30	0.04	0.32	0.35	0.36	1.59	1.58	1.57	1.57	1.55	1.55	1.53	1.53	1.51	1.50	1.48	1.47	1.45	1.43	1.43	1.41	1.38	1.37	1.34	1.31	1.30	1.27	1.24	1.21	1.18	1.15	1.11	1.09	1.04	1.01

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.97%	-4.55	-21.98%
	2	Capital cost 20% up	-1.37%	-6.13	-16.32%
2	1	OM cost 10% up	-0.64%	-1.72	-58.24%
	2	OM cost 20% up	-0.75%	-2.95	-33.95%
3	1	Revenue 10% down	-1.14%	-5.34	-18.74%
	2	Revenue 20% down	-1.81%	-7.07	-14.14%