

No.30 Jrarat

Information on Existing Water Sources (Shirak)

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

No.30 Community Jrarat
District Akhuryan
Marz Shirak

No	Water source	Latitude			Longitude			Atitude (m)	Yeild(L/sec)		
		deg	min	sec	deg	min	sec		Min	Max	At site
1	Spring	40	44	7.3	44	3	1.5	1,964	1.0	3.0	2.5
2	Spring	40	44	58.7	44	3	25.6	2,148	1.0	3.0	1.5
3	Spring	40	45	4.9	44	3	18.0	-			
4	Spring	40	44	31.5	44	1	44.8	1,879	1.0	3.0	1.3
5	Spring	40	44	32.6	44	1	38.6	1,873	1.0	3.0	2.7
6											
7											
8											
9											
10											
<i>Notes:</i>											
<i>Latitude, Longitude, Atitude:</i>				<i>Measured at site</i>							
<i>Yield (Min, Max):</i>				<i>Interviewed to the Community</i>							
<i>Yield (at site):</i>				<i>Measured / estimated at site in summer of 2007</i>							

Users Acceptnce for water quality	Acceptable
Notes	
Alternative sources if any	

No.30 Community Jrarat
District Akhuryan
Marz Shirak
Sampling date 11/Jul/2007

	Parameters analysed	Units	No.1	No.2	No.3	No.4	Guidelines	
							WHO	Armenia
<i>a</i>	pH		7.9	7.6	8.1	8.5	6.5-8	6.0 - 9.0
<i>b</i>	Temperature	Deg.C	14.1	13.9	11.9	13.8		
<i>c</i>	TDS	Mg/L	93	139	133	164	1000	1000
1	Al:Aluminum	Mg/L	n.d	n.d	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	6	5	4	250	350
4	Cr:Chrome	Mg/L	<0.01	<0.01	n.d	<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	0.13	0.15	0.15	0.15	1.50	
7	Hardness	Mg/L	185	260	270	270	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	n.d	n.d	n.d	n.d	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	3.1	2.7	5.3	1.3	50.0	45.0
13	SO4:Sulfate	Mg/L	3.0	3.5	3.0	3.0	250.0	500.0
14	Zn:Zink	Mg/L	n.d	n.d	n.d	n.d	3.0	5.0
15	As:Arsenic	Mg/L	n.d	n.d	n.d	n.d	0.0	0.1
16	Ba:Barium	Mg/L	0.01	<0.01	0.01	0.01	0.70	0.10
17	Be:Berillium	Mg/L	n.d	n.d	n.d	n.d	NA	0.00020
18	Cd:Cadmium	Mg/L	n.d	n.d	n.d	n.d	0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001	<0.001	<0.001	<0.001	0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002	n.d	n.d	0.00041	0.00100	0.00050
21	Se:Selenium	Mg/L	<0.001	<0.001	<0.001	<0.001	0.010	0.010
22	Sr:Strontium	Mg/L	<0.7	<0.7	n.d	<0.7	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

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

No.30	Community	Jrarat
	District	Akhuryan
	Marz	Shirak

[illegible]

No. 30 Marz Shirak Community Jarat**1. ACCESSIBILITY TO THE SITE**

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Possible	Possible	
	Intake	Possible	Possible	
	Intake	Possible	Possible	
	Intake	Possible	Possible	
2	Transmission pipeline	Possible	Possible	Pipeline is generally along or close to 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°44'07,3"	44°03'01,5"	1964	1850	Other	2.5	Yes
2	Spring	40°44'58,7"	44°03'25,6"	2148	1850	Steel	1.5	Yes
3	Spring	40°45'04,9"	44°03'18,0"	-	-	-	-	Yes
4	Spring	40°44'31,5"	44°01'44,8"	1879	2003	Masonry	1.3	No
5	Spring	40°44'32,6"	40°01'38,6"	1873	1850	Other	2.7	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	Steel	1.3	1965	Medium	Yes
2	80	150	Steel	1.4	1960	Little	Yes
3	50	70	Steel	1.3	2003	no	No
4	2,000	100	Steel	2.6	1965	Little	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°44'12,5"	40°02'19,8"	1,896	Concrete	Rectangular	12×12×12	500	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	1,000	75	Steel	1965	Little	Yes
2	4,000	75	Steel	1960	Huge	Yes
3	700	75	Steel	1960	no	No
4	2,000	100	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)
4	1960		Yes	50	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.30 Jrarat
District	Akhurian

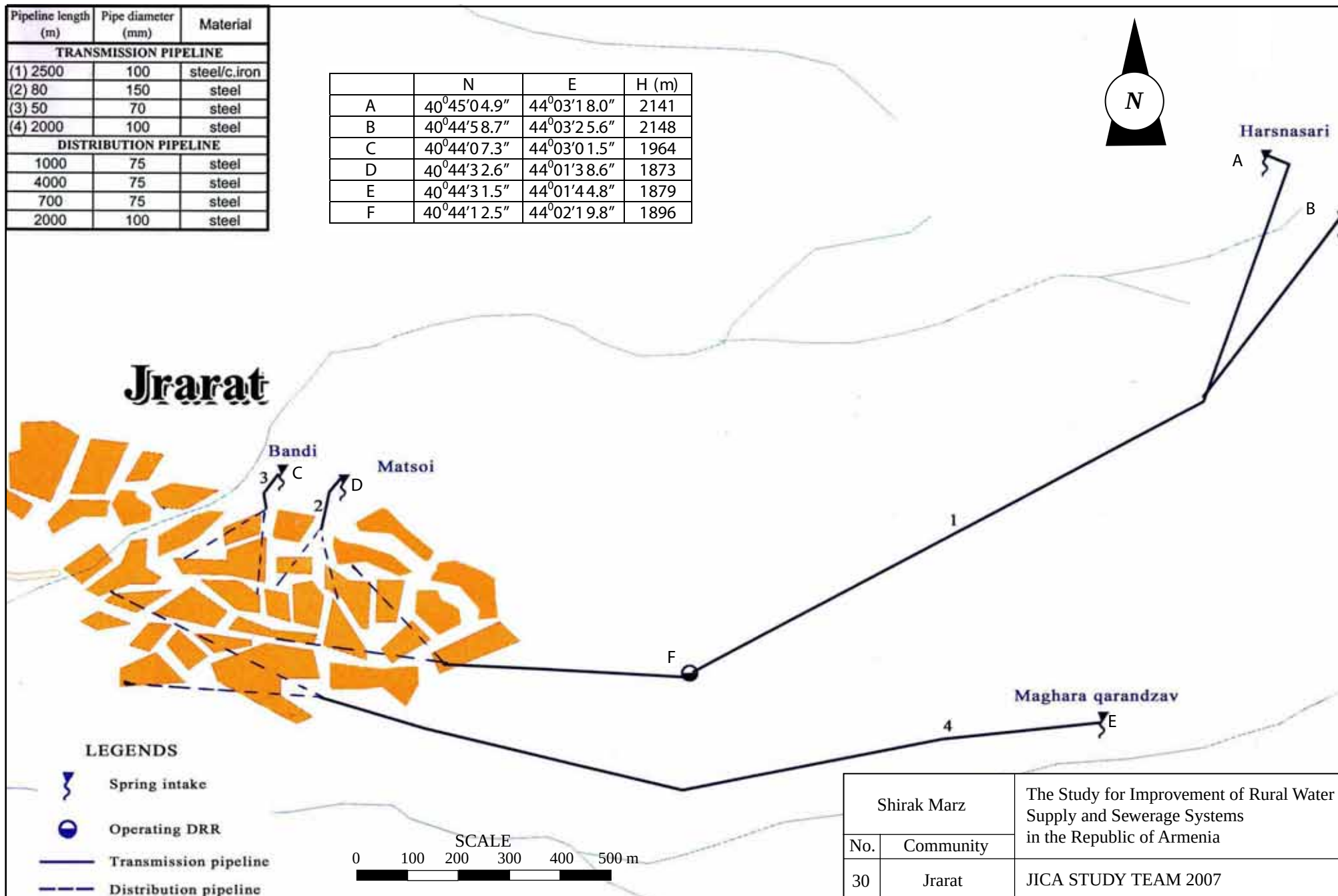
No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	1,302
A2	Actual population in 2007	1,108
A3	Number of households	304
A4.1	Elderly people	149
A4.2	Population in labor force (age from 16 to 62)	756
A4.3	Children	254
A5.1	Pensioners	178
A5.2	Unemployed	0
A5.3	Receiving benefits	56
A6	Average monthly income of household (AMD)	30,000
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	220
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	2,890
	Annual Budget of the community 2005, in thousand AMD	3,231
	Annual Budget of the community 2006, in thousand AMD	5,749
	Annual Budget of the community 2007, in thousand AMD	2,757
	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	300
	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:	dairy, wool
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	0973
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	300
D8	How many house connection household set the water meter	0
D9	Number of public taps	6
D10.1	How is the regime of water supply in your community in the dry season?	regularly-7hrs
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?	7.00-10.00, 13.00-15.00, 19.00-22.00
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)	400

No.	Question	Answer
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	Aharon Voskanyan
E2	Position	administration head
E3	Telephone	(093) 704077
E4	Quantity and present condition of the water supply facilities: spring/ intake	7-partially repaired
E5	Quantity and present condition of the water supply facilities:	3-deteriorated, 1rehabilitated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1-partially repaired1-rehabilitated 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	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, community
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	volunteers from the
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)	100,000
	Repair cost(AMD)	200,000
	Others(AMD)	0
	Total (AMD)	300,000
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	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.30 Jrarat

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 2500	100	steel/c.iron
(2) 80	150	steel
(3) 50	70	steel
(4) 2000	100	steel
DISTRIBUTION PIPELINE		
1000	75	steel
4000	75	steel
700	75	steel
2000	100	steel

	N	E	H (m)
A	40°45'04.9"	44°03'18.0"	2141
B	40°44'58.7"	44°03'25.6"	2148
C	40°44'07.3"	44°03'01.5"	1964
D	40°44'32.6"	44°01'38.6"	1873
E	40°44'31.5"	44°01'44.8"	1879
F	40°44'12.5"	44°02'19.8"	1896

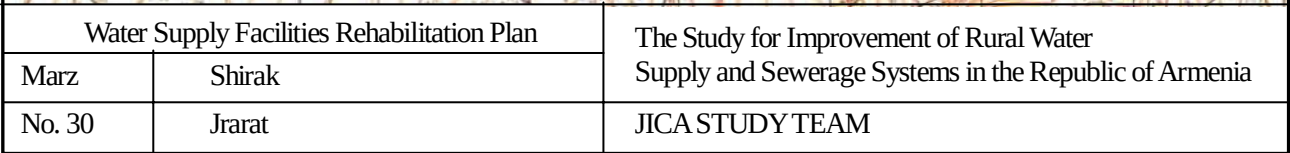


Marz : **Shirak**
Name : **Jrarat**

No.30

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	WATER DEMAND				
	1 Population	1,108	persons	110.8	
	2 Factory	-	nos	0.0	
	3 School (pupils)	220	pupils	2.2	
	4 Medical Ambulance Station	-	nos	-	
	5 Polyclinic	-	nos	-	
	6 Livestocks (87lit/household)	304	household	26.4	
	Sub-total			139.4	
	Unaccounted for water (20%)			27.9	
1	Average Daily Water Demand			167.3	m3/day
2	Maximum Daily Water Demand			200.7	m3/day
3	Maximum Hourly Water Demand			21.7	m3/hr
B.	WATER SUPPLY PLAN				
	1 Water source type	Nr.	Total vol.		
	a Spring	2	1.5	lit/sec	129.6 m3/day
	b Spring	1	2.5	lit/sec	216.0 m3/day
	c Spring	1	2.7	lit/sec	233.3 m3/day
	d Spring	1	1.3	lit/sec	112.3 m3/day
	Total	5	8.0	lit/sec	691.2 m3/day
	2 Required reservoir volume				261 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	2,800	m
	90mm diameter	1,300	m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	300m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter		m
	75mm diameter	5,000	m
	90mm diameter		m
	110mm diameter	2,000	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	4	nos
6	Water meter installation	304	nos
7	Public tap	4	nos
8	Chlorination	1	nos
9	Pumps	-	nos



STUDY FOR IMPROVEMENT OF
RURAL WATER SUPPLY AND
SEWAGE SYSTEMS IN RA

Marz : **Shirak**

No. : **30**

Name : **Jrarat**

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	2,800	m	7,160	20,048,000
		90mm	1,300	m	8,040	10,452,000
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					30,500,000
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	1	nos	29,630,400	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					29,630,400
4	Distribution Pipe					
		50mm		m	5,520	
		75mm	5,000	m	7,160	35,800,000
		90mm		m	8,040	
		110mm	2,000	m	9,680	19,360,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					55,160,000
5	House Connection		4	nos	74,000	296,000
6	Water Meter Installation		304	nos	80,000	24,320,000
7	Public Tap		4	nos	90,000	360,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	2,800	m	3,600	10,080,000
Total					AMD	152,317,200
					Equivalent to USD	498,551
					Equivalent to JPY	52,597,095
					AMD	USD
Investment Cost per household			304	HH	501,043	1,640
Investment Cost per person			1,108	persons	137,470	450

SHIRAK MARZ
Gyumri District
No 30 Jrarat

PROJECTED INCOME STATEMENT

Unit		Year																																								
Description	Total	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	1000m3/yr AMD/m3	50.9																																								
Consumption water volume																																										
Unit rate																																										
Sub-total	285.41	0.00	0.00	1.83	1.83	1.89	3.21	3.31	3.42	3.53	5.30	5.47	5.65	5.84	6.03	6.23	6.43	6.65	6.87	7.09	7.33	7.57	7.82	8.08	8.34	8.62	8.90	9.20	9.50	9.81	10.14	10.47	10.82	11.18	11.54	11.92	12.32	12.72	13.14	13.58		
B Operating Costs	person person AMD/m/p kg/yr AMD/kg	17.70																																								
1. Staff salary																																										
Inspectors																																										
Pump operators																																										
Base Salary																																										
Sub-total																																										
2. Chlorine																																										
Pouring volume																																										
Unit rate																																										
Sub-total																																										
3. Electricity (for pump)																																										
4. Maintenance cost																																										
Pump repair																																										
Pipe repair																																										
5. Pump replacement																																										
Sub-total	62.98	0.00	0.00	0.85	0.88	0.92	0.93	0.97	1.01	1.03	1.07	1.11	1.15	1.17	1.21	1.25	1.31	1.35	1.39	1.43	1.49	1.53	1.58	1.63	1.68	1.75	1.81	1.86	1.92	1.99	2.05	2.13	2.19	2.27	2.34	2.42	2.50	2.57	2.66	2.74	2.84	
C Gross Income (A-B)	222.43	0.00	0.00	0.98	0.95	0.91	0.96	2.24	2.30	2.39	2.46	4.19	4.32	4.48	4.63	4.78	4.92	5.08	5.26	5.44	5.60	5.80	5.99	6.19	6.40	6.59	6.81	7.04	7.28	7.51	7.76	8.01	8.28	8.55	8.84	9.12	9.42	9.75	10.06	10.40	10.74	
D Depreciation cost	144.55																																									
E Interest paid	45.10	0.02	0.04	1.82	1.84	1.85	1.86	1.86	1.86	1.86	1.86	1.81	1.75	1.70	1.64	1.59	1.53	1.43	1.41	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43
F Net Income	32.78	-0.02	-0.04	-0.84	-0.89	-0.94	-5.03	-3.75	-3.69	-3.60	-3.53	-1.80	-1.62	-1.40	-1.20	-0.99	-0.80	-0.58	-0.35	-0.11	0.11	0.37	0.62	0.88	1.15	1.40	1.68	1.97	2.27	2.57	2.88	3.20	3.53	3.87	4.22	4.57	4.94	5.34	5.72	6.13	6.54	
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	0.00
H Net Income after deduction of TAX	32.78	-0.02	-0.04	-0.84	-0.89	-0.94	-5.03	-3.75	-3.69	-3.60	-3.53	-1.80	-1.62	-1.40	-1.20	-0.99	-0.80	-0.58	-0.35	-0.11	0.11	0.37	0.62	0.88	1.15	1.40	1.68	1.97	2.27	2.57	2.88	3.20	3.53	3.87	4.22	4.57	4.94	5.34	5.72	6.13	6.54	
OM Cost Recovery Ratio (A/B)	453%	0%	0%	215%	208%	199%	203%	331%	328%	332%	330%	477%	476%	483%	483%	482%	476%	476%	478%	480%	476%	479%	479%	480%	481%	477%	476%	478%	479%	477%	479%	476%	478%	477%	477%	479%	478%	477%	479%	478%	480%	478%

PROJECTED CASH FLOW STATEMENT

Description		Year																																									
	Total	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	32.78	-0.02	-0.04	-0.84	-0.89	-0.94	-5.03	-3.75	-3.69	-3.60	-3.53	-1.80	-1.62	-1.40	-1.20	-0.99	-0.80	-0.58	-0.35	-0.11	0.11	0.37	0.62	0.88	1.15	1.40	1.68	1.97	2.27	2.57	2.88	3.20	3.53	3.87	4.22	4.57	4.94	5.34	5.72	6.13	6.54		
2. Depreciation cost	144.55	0.00	0.00	0.00	0.00	0.00	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	
3. Interest Paid	45.10	0.02	0.04	1.82	1.84	1.85	1.86	1.86	1.86	1.86	1.86	1.86	1.81	1.75	1.70	1.64	1.59	1.53	1.48	1.42	1.36	1.30	1.24	1.18	1.12	1.06	1.00	0.94	0.88	0.81	0.75	0.68	0.62	0.55	0.49	0.42	0.35	0.28	0.21	0.14	0.07		
Sub-total	222.43	0.00	0.00	0.98	0.95	0.91	0.96	2.24	2.30	2.39	2.46	4.19	4.32	4.48	4.63	4.78	4.92	5.08	5.26	5.44	5.60	5.80	5.99	6.19	6.40	6.59	6.81	7.04	7.28	7.51	7.76	8.01	8.28	8.55	8.84	9.12	9.42	9.75	10.06	10.40	10.74		
B Finances																																											
1. Project Loan	186.21	2.36	1.67	178.48	2.09	0.97	0.36	0.28																																			
2. Local fund	62.76	0.79	0.56	60.47	0.70	0.17	0.04	0.03																																			
Sub-total	248.97	3.15	2.23	238.95	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	0.00	
2. Subsidy for debt services	32.75	0.02	0.04	0.84	0.89	0.94	0.90	0.00	0.00	0.00	0.00	3.02	2.90	2.73	2.59	2.43	2.30	2.13	1.96	1.78	1.61	1.41	1.22	1.02	0.81	0.62	0.41	0.18	0.00	0.00	0.00	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	32.75	0.02	0.04	0.84	0.89	0.94	0.90	0.00	0.00	0.00	0.00	3.02	2.90	2.73	2.59	2.43	2.30	2.13	1.96	1.78	1.61	1.41	1.22	1.02	0.81	0.62	0.41	0.18	0.00	0.00	0.00	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	504.15	3.17	2.27	240.77	4.63	2.99	2.26	2.55	2.30	2.39	2.46	7.21	7.22	7.21	7.22	7.21	7.22	7.21	7.22	7.22	7.21	7.21	7.21	7.21	7.21	7.21	7.22	7.22	7.28	7.51	7.76	8.01	8.28	8.55	8.84	9.12	9.42	9.75	10.06	10.40	10.74		
APPLICATION OF FUNDS																																											
D Project disbursement																																											
	248.97	3.15	2.23	238.95	2.79	1.14	0.40	0.31																																			
E Total debt services																																											
1. Loan repayment	186.20																																										
2. Interest paid	45.10	0.02	0.04	1.82	1.84	1.85	1.86	1.86	1.86	1.86	1.86	1.86	1.81	1.75	1.70	1.64	1.59	1.53	1.48	1.42	1.36	1.30	1.24	1.18	1.12	1.06	1.00	0.94	0.88	0.81	0.75	0.68	0.62	0.55	0.49	0.42	0.35	0.28	0.21	0.14	0.07		
Sub-total	231.30	0.02	0.04	1.82	1.84	1.85	1.86	1.86	1.86	1.86	1.86	1.86	1.81	1.75	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.71	1.71	1.71	1.71	1.71	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.71	1.71	1.71	1.71	
Total Cash Outflow	480.27	3.17	2.27	240.77	4.63	2.99	2.26	2.17	1.86	1.86	1.86	7.21	7.22	7.21	7.22	7.21	7.22	7.21	7.22	7.22	7.21	7.21	7.21	7.21	7.21	7.21	7.21	7.22	7.22	7.22	7.21	7.22	7.21	7.22	7.21	7.22	7.22	7.21	7.21	7.21	7.21	7.21	
F Net Surplus Cash ((A+C2)-E)																																											
	23.88	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.44	0.53	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.30	0.54	0.80	1.06	1.34	1.62	1.90	2.20	2.54	2.85	3.19	3.53		
Project Cost Recovery Ratio (%)																																											
Cost recovery by water fee (A/E)	96%	0%	0%	54%	52%	49%	52%	120%	124%	128%	132%	58%	60%	62%	64%	66%	68%	70%	73%	75%	78%	80%	83%	86%	89%	91%	94%	98%	101%	104%	107%	111%	115%	119%	122%	126%	130%	135%	140%	144%	149%		
Cost recovery by water fee + subsidy ((A+C2)/E)	110%	100%	100%	100%	100%	100%	100%	120%	124%	128%	132%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	101%	104%	107%	111%	115%	119%	122%	126%	130%	135%	140%	144%	149%	

SHIRAK MARZ
Gyumri District
No 30 Jrarat

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

Item	Million AMD	Rate
1 Revenue		
Water fee revenue	285.41	89.7%
Subsidy	32.75	10.3%
Total	318.16	100.0%
2 Expenditure		
OM cost	62.98	19.8%
Loan repayment	186.20	58.5%
Interest paid	45.10	14.2%
Surplus cash	23.88	7.5%
Total	318.16	100.0%

B. FIRR CALCULATION

[illegible]

C. SENSITIVITY ANALYSIS

[illegible]

No.	Description	FIRR	Sensitivity indicator	Switching value
1	1 Capital cost 10% up	-0.92%	-4.92	-20.32%
	2 Capital cost 20% up	-1.32%	-6.47	-15.46%
2	1 OM cost 10% up	-0.57%	-1.78	-56.09%
	2 OM cost 20% up	-0.67%	-3.04	-32.90%
3	1 Revenue 10% down	-1.07%	-5.66	-17.68%
	2 Revenue 20% down	-1.74%	-7.33	-13.65%

No.31 Sarnaghbyur

Information on Existing Water Sources (Shirak)

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

No.31 Community Sarnaghbyur
District Artik
Marz Shirak

No	Water source	Latitude			Longitude			Atitude (m)	Yeild(L/sec)		
		deg	min	sec	deg	min	sec		Min	Max	At site
1	Spring	40	31	42.6	43	54	52.2	1,925	1.0	2.5	5.0
2	Spring	40	31	53.3	43	54	59.6	1,944	1.0	2.5	8.5
3											
4											
5											
6											
7											
8											
9											
10											
<i>Notes:</i>											
<i>Latitude, Longitude, Atitude:</i>		<i>Measured at site</i>									
<i>Yield (Min, Max):</i>		<i>Interviewed to the Community</i>									
<i>Yield (at site):</i>		<i>Measured / estimated at site in summer of 2007</i>									

Users Acceptnce for water quality	Acceptable
Notes	
Alternative sources if any	

No.31 Community Sarnaghbyur
District Artik
Marz Shirak
Sampling date 10/Jul/2007

	Parameters analysed	Units	No.1	No.2			Guidelines	
							WHO	Armenia
<i>a</i>	pH		8.2	7.5			6.5-8	6.0 - 9.0
<i>b</i>	Temperature	Deg.C	9.6	10.1				
<i>c</i>	TDS	Mg/L	48	87			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	6			250	350
4	Cr:Chrome	Mg/L	n.d	<0.01			0.05	0.05
5	Cu:Copper	Mg/L	n.d	n.d			2	1
6	F:Fluoride	Mg/L	0.17	0.33			1.50	
7	Hardness	Mg/L	95	140			500	700
8	Fe:Iron	Mg/L	n.d	n.d			0.30	0.30
9	Mn:Manganese	Mg/L	n.d	n.d			0.40	0.10
10	Mo:Molibdenum	Mg/L	<0.02	<0.02			0.070	0.250
11	Ni:Nickel	Mg/L	n.d	n.d			0.020	0.100
12	Nitrate(NO3+)	Mg/L	4.0	5.8			50.0	45.0
13	SO4:Sulfate	Mg/L	3.0	12.0			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	0.00005	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

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

No.31	Community District Marz	Sarnaghbyur Artik Shirak
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[illegible]

No. 31 Marz Shirak Community Sarnaghbyur**1. ACCESSIBILITY TO THE SITE**

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Possible	Possible	
2	Intake	Possible	Possible	
3	Transmission pipeline			no pipeline
4	Reservoir			no reservoir

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°31'42.6"	43°54'52.2"	1,925	1970	Other	5.0	Yes
2	Spring	40°31'53.3"	43°54'59.6"	1,944	1970	Steel	8.5	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	No						

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	No							

5. CHLORINATION

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

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	2,200	100	Steel	1970	Medium	Yes
2	2,300	100	Steel	1970	Medium	Yes
3	2,500	100	Cast iron	1970	Medium	Yes
4	1,500	76	Steel	1970	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)
20	1970		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.31 Sarnaghbyur
District	Artik

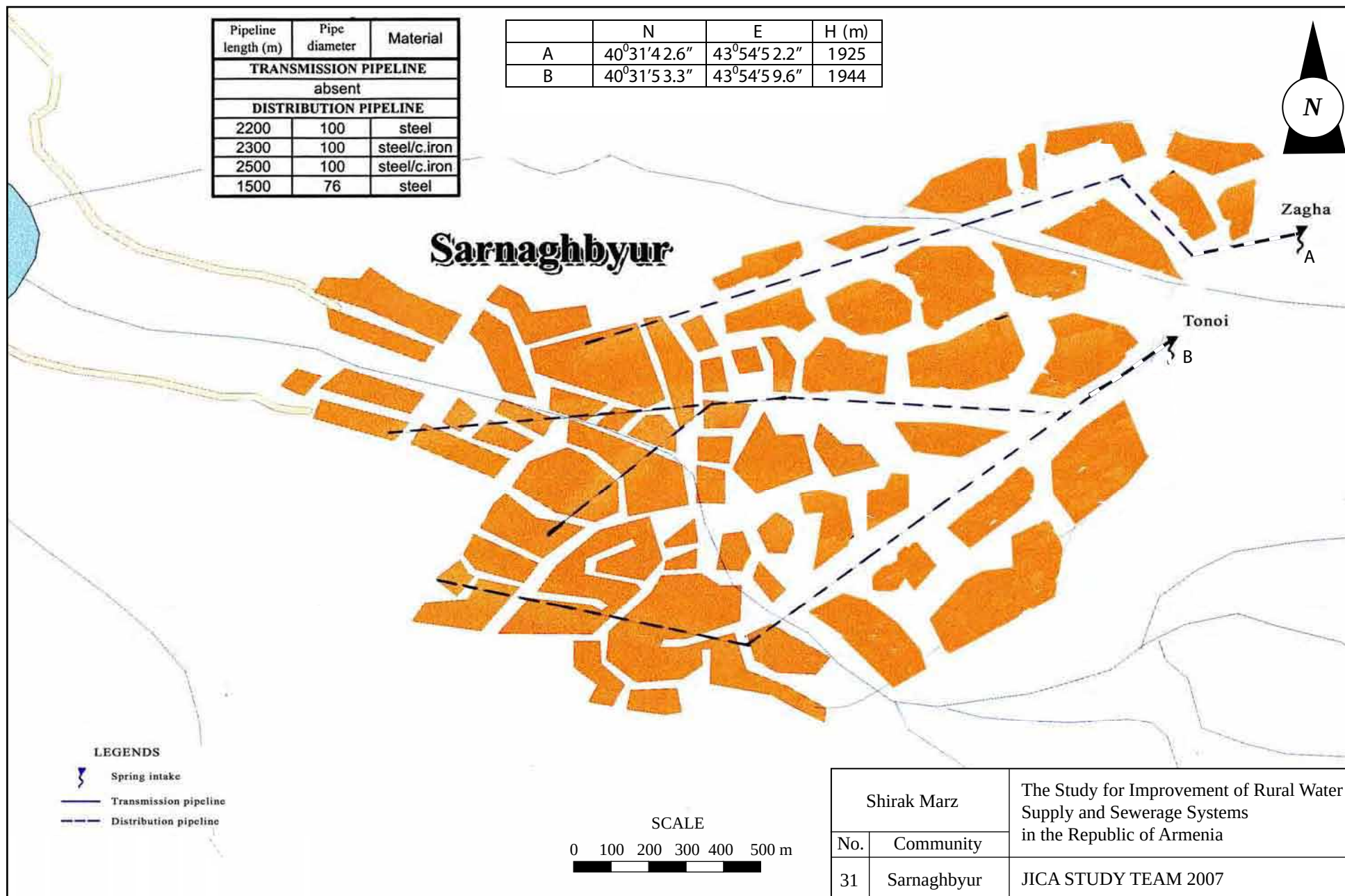
No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	3,200
A2	Actual population in 2007	3,333
A3	Number of households	800
A4.1	Elderly people	450
A4.2	Population in labor force (age from 16 to 62)	2,000
A4.3	Children	900
A5.1	Pensioners	520
A5.2	Unemployed	0
A5.3	Receiving benefits	280
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	700
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	4,000
	Annual Budget of the community 2005, in thousand AMD	4,500
	Annual Budget of the community 2006, in thousand AMD	4,800
	Annual Budget of the community 2007, in thousand AMD	2,500
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	650
	Amount spent in drinking water sector 2005, in thousand AMD	650
	Amount spent in drinking water sector 2006, in thousand AMD	650
	Amount spent in drinking water sector 2007, in thousand AMD	340
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	livestock, stonework
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	1023
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	insufficient
D7	Number of house connection to drinking water system	300
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?	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)	500

No.	Question	Answer
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?	from lake
D20	Are you satisfied with irrigation water supply volume?	insufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Madatyan Sevak
E2	Position	farmer
E3	Telephone	with the help of administration head (0242) 31239
E4	Quantity and present condition of the water supply facilities: spring/ intake	1-rehabilitated
E5	Quantity and present condition of the water supply facilities:	1-rehabilitated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1-unoperational
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?	residents, 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)	360,000
	Repair cost(AMD)	300,000
	Others(AMD)	0
	Total (AMD)	660,000
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	absent
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Shirak
No.31 Sarnaghbyur

Pipeline length (m)	Pipe diameter	Material
TRANSMISSION PIPELINE		
absent		
DISTRIBUTION PIPELINE		
2200	100	steel
2300	100	steel/c.iron
2500	100	steel/c.iron
1500	76	steel

	N	E	H (m)
A	40°31'42.6"	43°54'52.2"	1925
B	40°31'53.3"	43°54'59.6"	1944



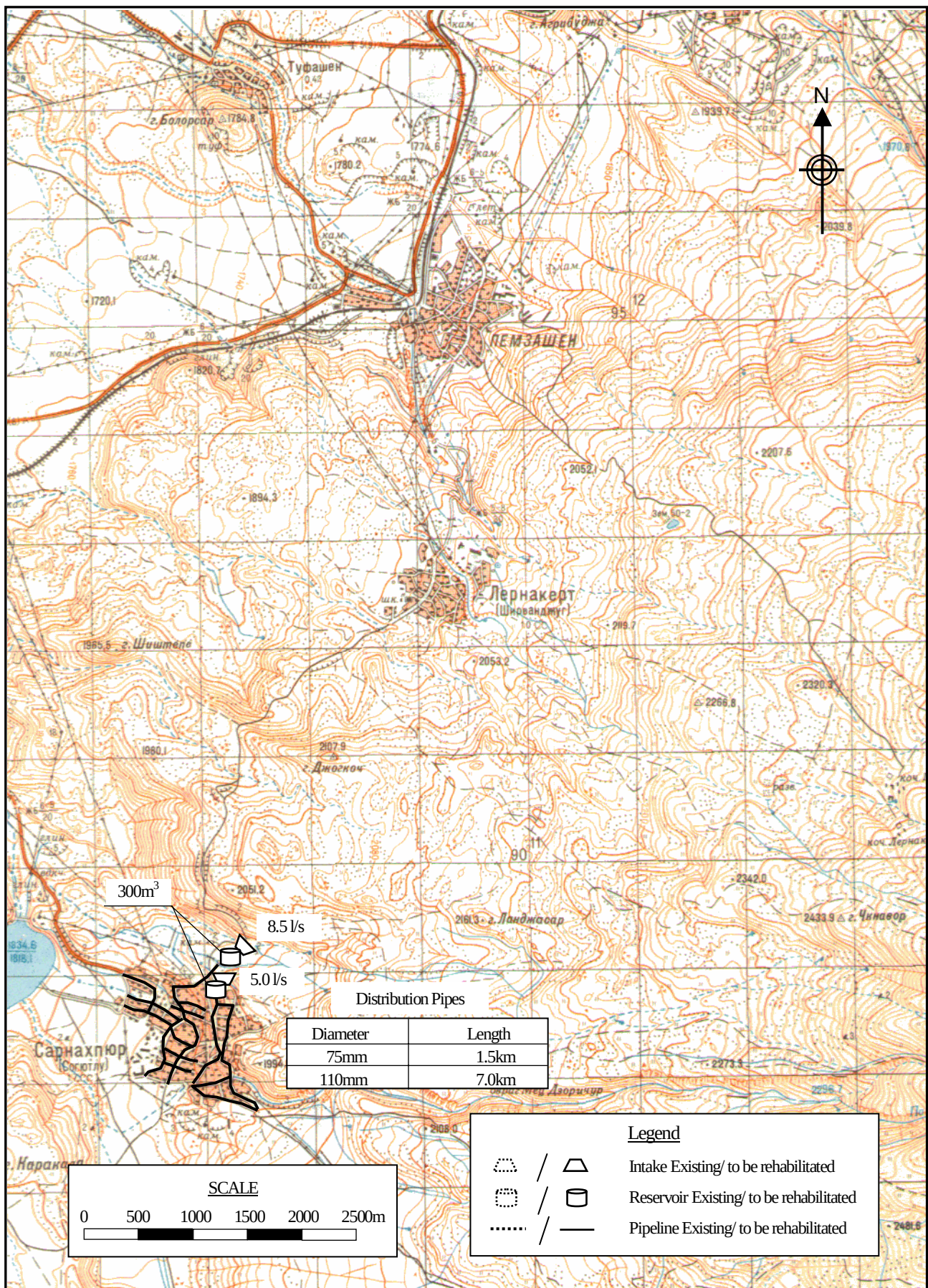
Shirak Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
31	Sarnaghbyur	JICA STUDY TEAM 2007

Marz : **Shirak**
Name : **Sarnaghyur**

No.31

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	WATER DEMAND				
	1 Population	3,333	persons	333.3	
	2 Factory	-	nos	0.0	
	3 School (pupils)	700	pupils	7.0	
	4 Medical Ambulance Station	-	nos	-	
	5 Polyclinic	-	nos	-	
	6 Livestocks (87lit/household)	800	household	69.6	
	Sub-total			409.9	
	Unaccounted for water (20%)			82.0	
1	Average Daily Water Demand		291.9	491.9	m3/day
2	Maximum Daily Water Demand			590.3	m3/day
3	Maximum Hourly Water Demand			51.2	m3/hr
B	WATER SUPPLY PLAN				
	1 Water source type	Nr.	Total vol.		
	a Spring	1	5.0	lit/sec	432.0 m3/day
	b Spring	1	8.5	lit/sec	734.4 m3/day
	Total	2	13.5	lit/sec	1,166.4 m3/day
	2 Required reservoir volume				614 m3

C	WATER SUPPLY FACILITIES REHABILITATION PLAN				
No	Item	Quantity	Unit		
1	Intake				
	1m3	2	nos		
	2m3		nos		
	3m3		nos		
	4m3		nos		
2	Transmission pipe				
	50mm diameter		m		
	75mm diameter		m		
	90mm diameter		m		
	110mm diameter		m		
	150mm diameter		m		
	200mm diameter		m		
	250mm diameter		m		
3	Reservoir				
	300m3 capacity	2	nos		
4	Distribution pipe				
	50mm diameter		m		
	75mm diameter	1,500	m		
	90mm diameter		m		
	110mm diameter	7,000	m		
	150mm diameter		m		
	200mm diameter		m		
	250mm diameter		m		
5	House connection	500	nos		
6	Water meter installation	800	nos		
7	Public tap	8	nos		
8	Chlorination	2	nos		
9	Pumps	-	nos		



Water Supply Facilities Rehabilitation Plan

Marz	Shirak
No. 31	Sarnaghbyur

The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia

JICA STUDY TEAM

STUDY FOR IMPROVEMENT OF
RURAL WATER SUPPLY AND
SEWAGE SYSTEMS IN RA

Marz : **Shirak**
No. : **31**
Name : **Sarnaghyur**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	2	nos	367,700	735,400
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					735,400
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3	2	nos	29,630,400	59,260,800
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					59,260,800
4	Distribution Pipe					
		50mm		m	5,520	
		75mm	1,500	m	7,160	10,740,000
		90mm		m	8,040	
		110mm	7,000	m	9,680	67,760,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					78,500,000
5	House Connection		500	nos	74,000	37,000,000
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	3,400	m	3,600	12,240,000
Total					AMD	253,456,200
					Equivalent to USD	829,590
					Equivalent to JPY	87,521,698
					AMD	USD
Investment Cost per household			800	HH	316,820	1,037
Investment Cost per person			3,333	persons	76,044	249

PROJECTED INCOME STATEMENT

Unit		Year																																								
Description	Total	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	1000m3/yr AMD/m3	149.6																																								
Consumption water volume																																										
Unit rate																																										
Sub-total	835.63	0.00	0.00	2.37	4.74	5.39	5.56	9.43	9.74	10.06	10.39	15.57	16.09	16.62	17.17	17.73	18.32	18.92	19.55	20.19	20.86	21.55	22.26	22.99	23.75	24.53	25.34	26.18	27.04	27.94	28.86	29.81	30.79	31.81	32.86	33.94	35.06	36.22	37.42	38.65	39.93	
B Operating Costs		35.40																																								
1. Staff salary	person person AMD/m/p																																									
Inspectors																																										
Pump operators																																										
Base Salary	kg/yr AMD/kg																																									
Sub-total																																										
2. Chlorine																																										
Pouring volume	898																																									
Unit rate																																										
Sub-total																																										
3. Electricity (for pump)	0.00																																									
4. Maintenance cost																																										
Pump repair																																										
Pipe repair	0.00																																									
5. Pump replacement																																										
Sub-total																																										
C Gross Income (A-B)	738.96	0.00	0.00	1.52	3.48	3.99	4.11	7.93	8.20	8.47	8.73	13.86	14.33	14.79	15.28	15.78	16.31	16.84	17.40	17.97	18.57	19.18	19.81	20.47	21.14	21.84	22.56	23.31	24.07	24.87	25.70	26.54	27.41	28.32	29.26	30.21	31.21	32.24	33.31	34.41	35.54	
D Depreciation cost	240.80																																									
E Interest paid	73.05	0.02	0.04	1.35	2.70	3.09	3.10	3.10	3.10	3.10	3.10	3.01	2.92	2.83	2.74	2.64	2.55	2.46	2.36	2.26	2.17	2.07	1.98	1.88	1.78	1.66	1.56	1.46	1.35	1.24	1.14	1.03	0.92	0.81	0.70	0.58	0.48	0.38	0.28	0.18		
F Net Income	425.11	-0.02	-0.04	0.17	0.78	0.90	-5.87	-2.05	-1.78	-1.51	-1.25	3.88	4.44	4.99	5.57	6.16	6.79	7.41	8.06	8.73	9.43	10.13	10.86	11.62	12.39	13.19	14.02	14.87	15.73	16.64	17.58	18.52	19.50	20.52	21.57	22.63	23.75	24.89	26.08	27.29	28.54	
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	0.00
H Net Income after deduction of TAX	425.11	-0.02	-0.04	0.17	0.78	0.90	-5.87	-2.05	-1.78	-1.51	-1.25	3.88	4.44	4.99	5.57	6.16	6.79	7.41	8.06	8.73	9.43	10.13	10.86	11.62	12.39	13.19	14.02	14.87	15.73	16.64	17.58	18.52	19.50	20.52	21.57	22.63	23.75	24.89	26.08	27.29	28.54	
OM Cost Recovery Ratio (A/B)	86.4%	0%	0%	280%	375%	385%	383%	629%	632%	633%	626%	911%	914%	908%	908%	909%	911%	910%	909%	909%	911%	909%	909%	912%	910%	912%	912%	912%	910%	910%	913%	912%	911%	911%	913%	910%	911%	910%	910%	912%	910%	

Unit: million AMD

Description		Year																																									
	Total	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	425.11	-0.02	-0.04	0.17	0.78	0.90	-5.87	-2.05	-1.78	-1.51	-1.25	3.88	4.44	4.99	5.57	6.16	6.79	7.41	8.06	8.73	9.43	10.13	10.86	11.62	12.39	13.19	14.02	14.87	15.73	16.64	17.58	18.52	19.50	20.52	21.57	22.63	23.75	24.89	26.08	27.29	28.54		
2. Depreciation cost	240.80	0.00	0.00	0.00	0.00	0.00	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	
3. Interest Paid	73.05	0.02	0.04	1.35	2.70	3.09	3.10	3.10	3.10	3.10	3.10	3.10	3.01	2.92	2.83	2.74	2.64	2.55	2.46	2.36	2.26	2.17	2.07	1.97	1.87	1.77	1.66	1.56	1.46	1.35	1.24	1.14	1.03	0.92	0.81	0.70	0.58	0.47	0.35	0.24	0.12		
Sub-total	738.96	0.00	0.00	1.52	3.48	3.99	4.11	7.93	8.20	8.47	8.73	13.86	14.33	14.79	15.28	15.78	16.31	16.84	17.40	17.97	18.57	19.18	19.81	20.47	21.14	21.84	22.56	23.31	24.07	24.87	25.70	26.54	27.41	28.32	29.26	30.21	31.21	32.24	33.31	34.41	35.54		
B Finances																																											
1. Project Loan	309.80	2.36	1.67	131.27	135.11	38.75	0.36	0.28																																			
2. Local fund	106.14	0.79	0.56	44.47	46.40	13.85	0.04	0.03																																			
Sub-total	415.94	3.15	2.23	175.74	181.51	52.60	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	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	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	0.00	
Total Cash Inflow	1154.96	3.17	2.27	177.26	184.99	56.59	4.51	8.24	8.20	8.47	8.73	13.86	14.33	14.79	15.28	15.78	16.31	16.84	17.40	17.97	18.57	19.18	19.81	20.47	21.14	21.84	22.56	23.31	24.07	24.87	25.70	26.54	27.41	28.32	29.26	30.21	31.21	32.24	33.31	34.41	35.54		
APPLICATION OF FUNDS																																											
D Project disbursement																																											
	415.94	3.15	2.23	175.74	181.51	52.60	0.40	0.31																																			
E Total debt services																																											
1. Loan repayment	309.85											8.91	9.00	9.09	9.18	9.27	9.36	9.45	9.55	9.64	9.74	9.84	9.94	10.04	10.14	10.24	10.34	10.44	10.55	10.65	10.76	10.87	10.98	11.09	11.20	11.31	11.42	11.54	11.65	11.77	11.89		
2. Interest paid	73.05	0.02	0.04	1.35	2.70	3.09	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.01	2.92	2.83	2.74	2.64	2.55	2.46	2.36	2.26	2.17	2.07	1.97	1.87	1.77	1.66	1.56	1.46	1.35	1.24	1.14	1.03	0.92	0.81	0.70	0.58	0.47	0.35	0.24	0.12	
Sub-total	382.90	0.02	0.04	1.35	2.70	3.09	3.10	3.10	3.10	3.10	3.10	12.01	12.01	12.01	12.01	12.01	12.00	12.00	12.01	12.00	12.00	12.01	12.01	12.01	12.01	12.01	12.01	12.01	12.00	12.00	12.01	12.00	12.01	12.01	12.01	12.01	12.01	12.01	12.01	12.01	12.01	12.01	12.01
Total Cash Outflow	798.84	3.17	2.27	177.09	184.21	55.69	3.50	3.41	3.10	3.10	3.10	12.01	12.01	12.01	12.01	12.01	12.00	12.00	12.01	12.00	12.00	12.01	12.01	12.01	12.01	12.01	12.01	12.00	12.00	12.01	12.00	12.01	12.01	12.01	12.01	12.01	12.01	12.01	12.01	12.01	12.01	12.01	12.01
F Net Surplus Cash (A+C2)-E		356.12	0.00	0.00	0.17	0.78	0.90	1.01	4.83	5.10	5.37	5.63	1.85	2.32	2.78	3.27	3.77	4.31	4.84	5.39	5.97	6.57	7.17	7.80	8.46	9.13	9.83	10.56	11.31	12.06	12.87	13.70	14.53	15.40	16.31	17.25	18.20	19.21	20.23	21.31	22.40	23.53	
Project Cost Recovery Ratio (%)																																											
Cost recovery by water fee (A/E)	193%	0%	0%	113%	129%	129%	133%	256%	265%	273%	282%	115%	119%	123%	127%	131%	136%	140%	145%	150%	155%	160%	165%	170%	176%	182%	188%	194%	200%	207%	214%	221%	228%	236%	244%	252%	260%	268%	278%	287%	296%		
Cost recovery by water fee + subsidy ((A+C2)/E)	193%	100%	100%	113%	129%	129%	133%	256%	265%	273%	282%	115%	119%	123%	127%	131%	136%	140%	145%	150%	155%	160%	165%	170%	176%	182%	188%	194%	200%	207%	214%	221%	228%	236%	244%	252%	260%	268%	278%	287%	296%		

SHIRAK MARZ
Talin District
No 31 Sarnaghbyur

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

Item	Million AMD	Rate
1 Revenue		
Water fee revenue	835.63	100.0%
Subsidy	0.06	0.0%
Total	835.69	100.0%
2 Expenditure		
OM cost	96.67	11.6%
Loan repayment	309.85	37.1%
Interest paid	73.05	8.7%
Surplus cash	356.12	42.6%
Total	835.69	100.0%

B. FIRR CALCULATION

[illegible]

C. SENSITIVITY ANALYSIS

[illegible]

No.	Description	FIRR	Sensitivity indicator	Switching value
1	Capital cost 10% up	2.37%	2.36	42.43%
2	Capital cost 20% up	1.88%	5.61	17.83%
2	OM cost 10% up	2.86%	0.24	422.90%
2	OM cost 20% up	2.79%	0.49	206.03%
3	Revenue 10% down	2.24%	3.07	32.59%
2	Revenue 20% down	1.50%	9.55	10.47%

No.32 Sarapat

Information on Existing Water Sources (Shirak)

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

No.32 Community Sarapat
District Ashotsk
Marz Shirak

No	Water source	Latitude			Longitude			Atitude (m)	Yeild(L/sec)		
		deg	min	sec	deg	min	sec		Min	Max	At site
1	Spring	40	56	37.9	44	3	37.9	2,050	1.0	4.0	2.0
2											
3											
4											
5											
6											
7											
8											
9											
10											
Notes:											
Latitude, Longitude, Atitude:		Measured at site									
Yield (Min, Max):		Interviewed to the Community									
Yield (at site):		Measured / estimated at site in summer of 2007									

Users Acceptnce for water quality	Acceptable
Notes	
Alternative sources if any	

No.32 Community Sarapat
District Ashotsk
Marz Shirak
Sampling date 31/Jul/2007

	Parameters analysed	Units	No.1				Guidelines	
							WHO	Armenia
a	pH		8.4				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	7.4					
c	TDS	Mg/L	136				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	0.10				1.50	
7	Hardness	Mg/L	290				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	0.00006				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	<0.7				NA	7.0
23	CN:Cyanide	Mg/L	n.d				0.070	0.035
24	Coli form bacteria	bacteria per 100 ml					-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
26	Total bacteria	bacteria per 1 ml					-	50

Information on Existing Water Sources

Existing Bacteriological Test

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

No.32	Community	Sarapat
	District	Ashotsk
	Marz	Shirak

[illegible]

No. 32 Marz Shirak Community Sarapat**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°56'37,9"	44°03'37,9"	2,050	1962	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	4,000	100	Polyethylene	1.8	1990	Little	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°56'17,5"	44°02'42,6"	2,001	Concrete	Circle	×d=1m,l=20m	48	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	200	100	Polyethylene	1960	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)
8	1960		No	0	Yes

9. DRAINAGE SYSTEM

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

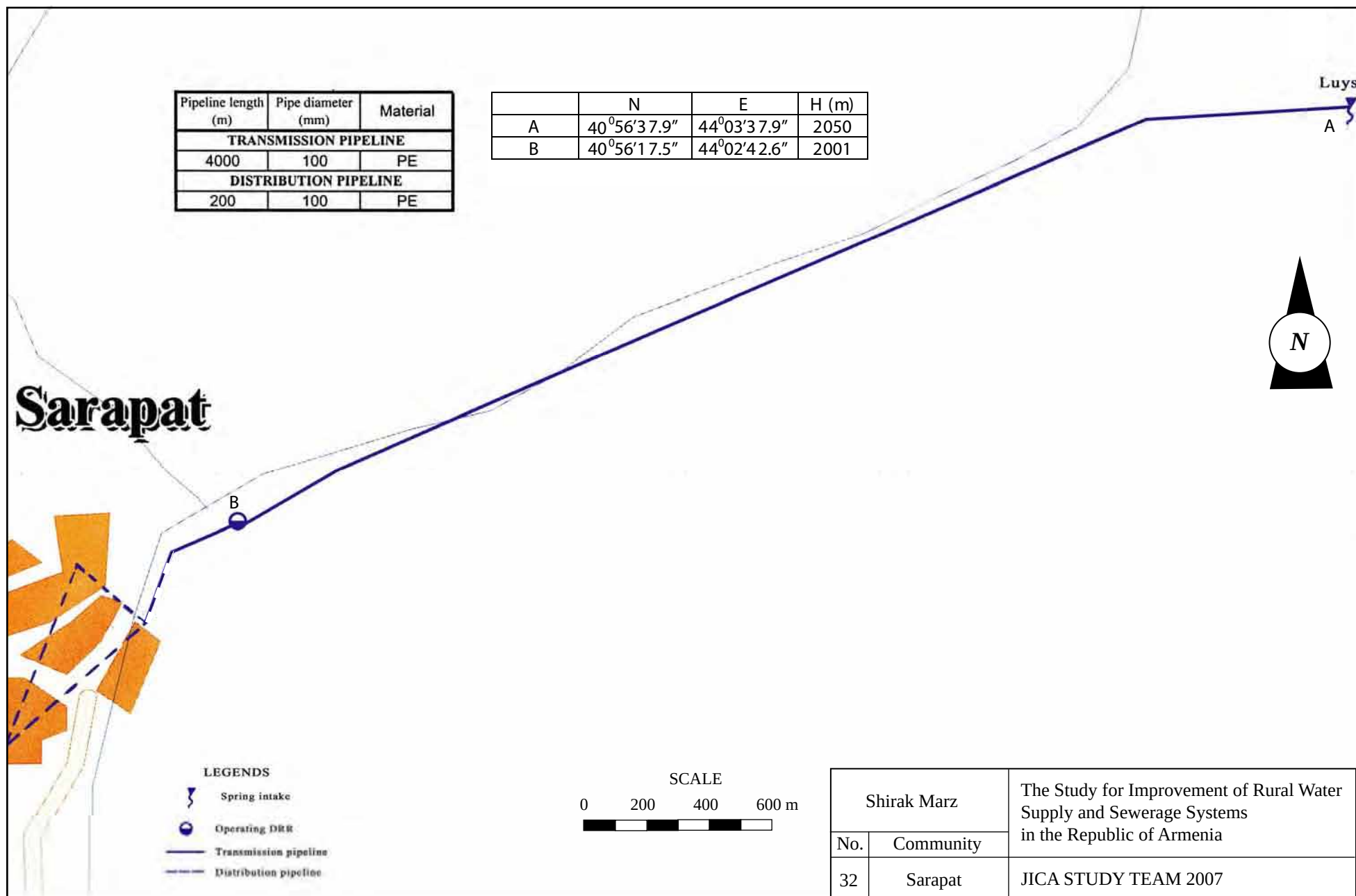
Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	Shirak
Number and Name of Community	No.32 Sarapat
District	Ashotsk

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	131
A2	Actual population in 2007	126
A3	Number of households	38
A4.1	Elderly people	27
A4.2	Population in labor force (age from 16 to 62)	82
A4.3	Children	17
A5.1	Pensioners	28
A5.2	Unemployed	0
A5.3	Receiving benefits	3
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	10
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	8,424
	Annual Budget of the community 2005, in thousand AMD	9,354
	Annual Budget of the community 2006, in thousand AMD	10,520
	Annual Budget of the community 2007, in thousand AMD	12,020
	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	780
	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	1324
D3	Date of expiry of water use permit	13.02.07-13.02.10
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	6
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

No.	Question	Answer
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	nobody
E2	Position	
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:	1partially repaired
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	3-deteriorated
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	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?	community budget
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	780,000
	Others(AMD)	0
	Total (AMD)	780,000
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.32 Sarapat

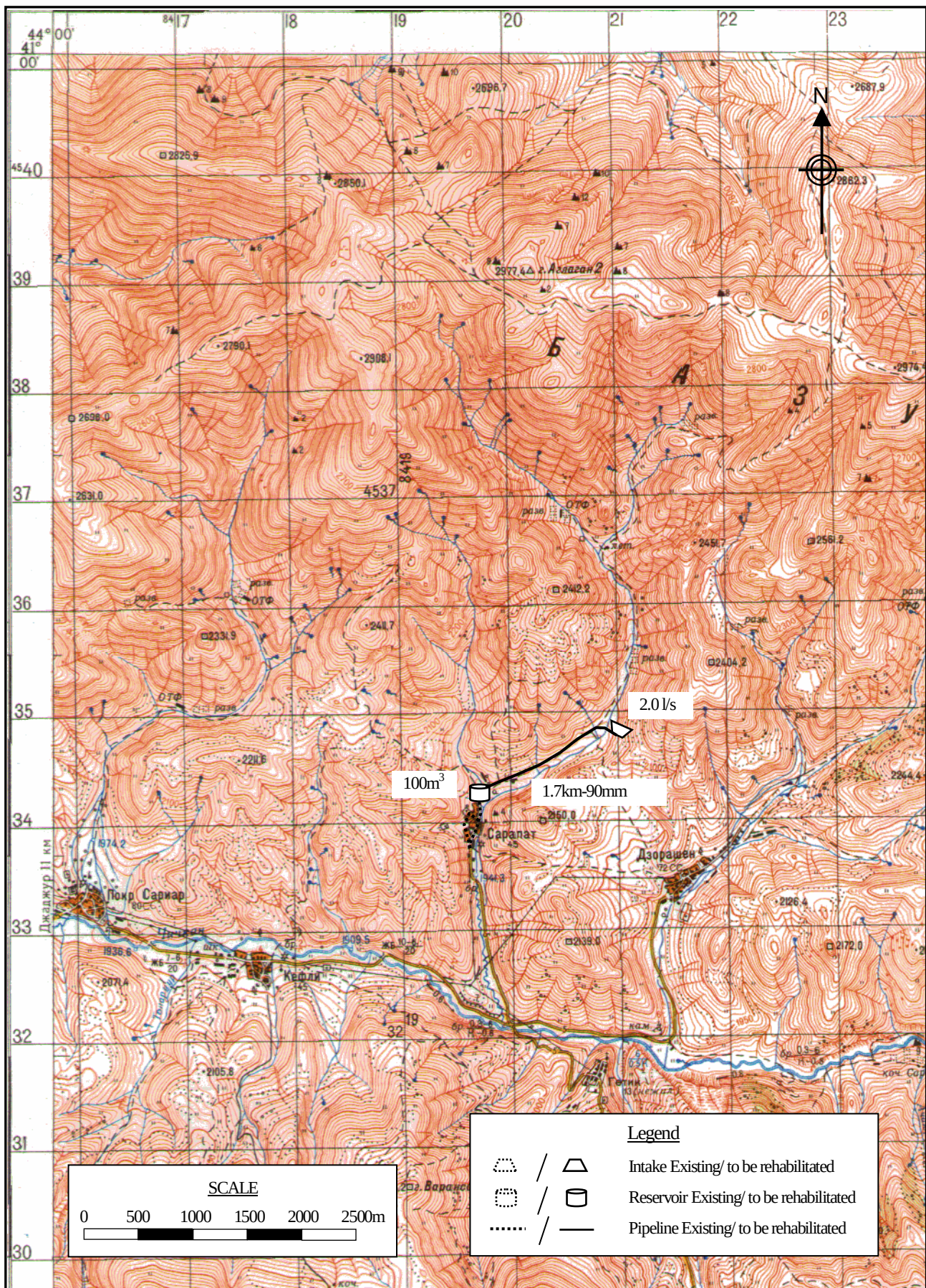


Marz : **Shirak**
Name : **Sarapat**

No.32

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	WATER DEMAND				
	1 Population	126	persons	12.6	
	2 Factory	-	nos	0.0	
	3 School (pupils)	10	pupils	0.1	
	4 Medical Ambulance Station	-	nos	-	
	5 Polyclinic	-	nos	-	
	6 Livestocks (87lit/household)	38	household	3.3	
	Sub-total			16.0	
	Unaccounted for water (20%)			3.2	
1	Average Daily Water Demand			19.2	m3/day
2	Maximum Daily Water Demand			23.0	m3/day
3	Maximum Hourly Water Demand			5.6	m3/hr
B	WATER SUPPLY PLAN				
	1 Water source type	Nr.	Total vol.		
	a Spring	1	2.0	lit/sec	172.8 m3/day
	Total				172.8 m3/day
	2 Required reservoir volume				67 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	1,700	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		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	23	nos
6	Water meter installation	38	nos
7	Public tap	1	nos
8	Chlorination	1	nos
9	Pumps	-	nos



Water Supply Facilities Rehabilitation Plan

Marz Shirak

No. 32 Sarapat

The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia

JICA STUDY TEAM

Marz : **Shirak**
No. : **32**
Name : **Sarapat**

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	1,700	m	8,040	13,668,000
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					13,668,000
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		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					
5	House Connection		23	nos	74,000	1,702,000
6	Water Meter Installation		38	nos	80,000	3,040,000
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			m	3,600	
Total					AMD	32,336,000
					Equivalent to USD	105,839
					Equivalent to JPY	11,166,038
					AMD	USD
Investment Cost per household			38	HH	850,947	2,785
Investment Cost per person			126	persons	256,635	840

SHIRAK MARZ
Gyumri District
No 32 Sarapat

PROJECTED INCOME STATEMENT

Unit: million AMD

Unit		Year																																							
Description	Total	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	1000m3/yr AMD/m3	5.8																																							
Consumption water volume																																									
Unit rate																																									
Sub-total	32.76	0.00	0.00	0.21	0.21	0.22	0.37	0.38	0.39	0.41	0.61	0.63	0.65	0.67	0.69	0.71	0.74	0.76	0.79	0.81	0.84	0.87	0.90	0.93	0.96	0.99	1.02	1.06	1.09	1.13	1.16	1.20	1.24	1.28	1.32	1.37	1.41	1.46	1.51	1.56	
B Operating Costs	person person AMD/m/p kg/yr AMD/kg	17.70																																							
1. Staff salary																																									
Inspectors			1																																						
Pump operators			0																																						
Base Salary			20,000																																						
Sub-total			20,660																																						
2. Chlorine																																									
Pouring volume			36																																						
Unit rate			600																																						
Sub-total			620																																						
3. Electricity (for pump)	0.00	0.02																																							
4. Maintenance cost	11.07	0.15																																							
Pump repair	0.00																																								
Pipe repair	0.15																																								
5. Pump replacement	0.00																																								
Sub-total	30.37	0.00	0.00	0.41	0.42	0.44	0.45	0.46	0.49	0.50	0.52	0.53	0.55	0.57	0.58	0.60	0.63	0.65	0.67	0.69	0.72	0.74	0.76	0.79	0.81	0.84	0.88	0.90	0.93	0.96	0.99	1.02	1.06	1.10	1.13	1.16	1.20	1.24	1.29	1.32	1.37
C Gross Income (A-B)	2.39	0.00	0.00	-0.20	-0.21	-0.23	-0.23	-0.09	-0.11	-0.11	-0.11	0.08	0.08	0.08	0.09	0.09	0.08	0.09	0.09	0.10	0.09	0.10	0.11	0.11	0.12	0.12	0.11	0.12	0.13	0.13	0.14	0.14	0.14	0.15	0.16	0.17	0.17	0.17	0.19	0.19	
D Depreciation cost	30.80																																								
E Interest paid	11.46	0.02	0.04	0.43	0.46	0.46	0.47	0.47	0.47	0.47	0.46	0.45	0.43	0.42	0.40	0.39	0.38	0.36	0.35	0.33	0.32	0.30	0.29	0.27	0.25	0.24	0.22	0.21	0.19	0.17	0.16	0.14	0.12	0.11	0.09	0.07	0.05	0.04	0.02		
F Net Income	-39.87	-0.02	-0.04	-0.63	-0.67	-0.69	-1.58	-1.44	-1.46	-1.46	-1.46	-1.27	-1.26	-1.25	-1.22	-1.21	-1.20	-1.18	-1.17	-1.14	-1.14	-1.11	-1.09	-1.07	-1.05	-1.03	-1.02	-1.00	-0.97	-0.96	-0.93	-0.91	-0.90	-0.88	-0.85	-0.83	-0.80	-0.78	-0.76	-0.73	-0.71
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	
H Net Income after deduction of TAX	-39.87	-0.02	-0.04	-0.63	-0.67	-0.69	-1.58	-1.44	-1.46	-1.46	-1.46	-1.27	-1.26	-1.25	-1.22	-1.21	-1.20	-1.18	-1.17	-1.14	-1.14	-1.11	-1.09	-1.07	-1.05	-1.03	-1.02	-1.00	-0.97	-0.96	-0.93	-0.91	-0.90	-0.88	-0.85	-0.83	-0.80	-0.78	-0.76	-0.73	-0.71
OM Cost Recovery Ratio (A/B)	108%	0%	0%	51%	50%	48%	49%	80%	78%	78%	79%	115%	115%	114%	116%	115%	113%	114%	113%	114%	113%	114%	114%	114%	115%	114%	113%	113%	114%	114%	114%	114%	113%	113%	113%	114%	114%	114%	113%	114%	114%

PROJECTED CASH FLOW STATEMENT

Unit: million AMD

Description		Year																																							
	Total	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	-39.87	-0.02	-0.04	-0.63	-0.67	-0.69	-1.58	-1.44	-1.46	-1.46	-1.27	-1.26	-1.25	-1.22	-1.21	-1.20	-1.18	-1.17	-1.14	-1.14	-1.11	-1.09	-1.07	-1.05	-1.03	-1.02	-1.00	-0.97	-0.96	-0.93	-0.91	-0.90	-0.88	-0.85	-0.83	-0.80	-0.78	-0.76	-0.73	-0.71	
2. Depreciation cost	30.80	0.00	0.00	0.00	0.00	0.00	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
3. Interest Paid	11.46	0.02	0.04	0.43	0.46	0.46	0.47	0.47	0.47	0.47	0.47	0.46	0.45	0.43	0.42	0.40	0.39	0.38	0.36	0.35	0.33	0.32	0.30	0.29	0.27	0.25	0.24	0.22	0.21	0.19	0.17	0.16	0.14	0.12	0.11	0.09	0.07	0.05	0.04	0.02	
Sub-total	2.39	0.00	0.00	-0.20	-0.21	-0.23	-0.23	-0.09	-0.11	-0.11	-0.11	0.08	0.08	0.08	0.09	0.09	0.08	0.09	0.09	0.10	0.09	0.10	0.11	0.11	0.12	0.12	0.11	0.12	0.13	0.13	0.14	0.14	0.14	0.14	0.15	0.16	0.17	0.17	0.17	0.19	0.19
B Finances																																									
1. Project Loan	47.38	2.36	1.67	39.65	2.09	0.97	0.36	0.28																																	
2. Local fund	15.71	0.79	0.56	13.42	0.70	0.17	0.04	0.03																																	
Sub-total	63.09	3.15	2.23	53.07	2.79	1.14	0.40	0.31																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	1.29	0.00	0.00	0.20	0.21	0.23	0.23	0.09	0.11	0.11	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2. Subsidy for debt services	55.18	0.02	0.04	0.43	0.46	0.46	0.47	0.47	0.47	0.47	0.47	1.75	1.76	1.76	1.74	1.75	1.75	1.75	1.75	1.74	1.75	1.73	1.73	1.73	1.72	1.72	1.72	1.72	1.70	1.71	1.70	1.69	1.70	1.70	1.68	1.68	1.67	1.66	1.65	1.65	
Sub-total	56.47	0.02	0.04	0.63	0.67	0.69	0.70	0.56	0.58	0.58	0.58	1.75	1.76	1.76	1.74	1.75	1.75	1.75	1.75	1.74	1.75	1.73	1.73	1.73	1.72	1.72	1.72	1.72	1.70	1.71	1.70	1.69	1.70	1.70	1.68	1.68	1.67	1.66	1.65	1.65	
Total Cash Inflow	121.95	3.17	2.27	53.50	3.25	1.60	0.87	0.78	0.47	0.47	0.47	1.83	1.84	1.84	1.83	1.84	1.83	1.84	1.84	1.84	1.84	1.83	1.84	1.84	1.84	1.84	1.84	1.83	1.84	1.83	1.84	1.84	1.83	1.84	1.84	1.83	1.84	1.83	1.83	1.84	1.84
APPLICATION OF FUNDS																																									
D Project disbursement																																									
	63.09	3.15	2.23	53.07	2.79	1.14	0.40	0.31																																	
E Total debt services																																									
1. Loan repayment	47.40											1.36	1.38	1.39	1.40	1.42	1.43	1.45	1.46	1.48	1.49	1.50	1.52	1.54	1.55	1.57	1.58	1.60	1.61	1.63	1.65	1.66	1.68	1.70	1.71	1.73	1.75	1.76	1.78	1.80	1.82
2. Interest paid	11.46	0.02	0.04	0.43	0.46	0.46	0.47	0.47	0.47	0.47	0.47	0.47	0.46	0.45	0.43	0.42	0.40	0.39	0.38	0.36	0.35	0.33	0.32	0.30	0.29	0.27	0.25	0.24	0.22	0.21	0.19	0.17	0.16	0.14	0.12	0.11	0.09	0.07	0.05	0.04	0.02
Sub-total	58.86	0.02	0.04	0.43	0.46	0.46	0.47	0.47	0.47	0.47	0.47	1.83	1.84	1.84	1.83	1.84	1.83	1.84	1.84	1.84	1.84	1.83	1.84	1.84	1.84	1.84	1.84	1.83	1.84	1.83	1.84	1.84	1.83	1.84	1.84	1.83	1.84	1.83	1.83	1.84	1.84
Total Cash Outflow	121.95	3.17	2.27	53.50	3.25	1.60	0.87	0.78	0.47	0.47	0.47	1.83	1.84	1.84	1.83	1.84	1.84	1.84	1.84	1.84	1.84	1.83	1.84	1.84	1.84	1.84	1.83	1.84	1.83	1.84	1.84	1.83	1.84	1.84	1.83	1.84	1.84	1.83	1.83	1.84	1.84
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	
Project Cost Recovery Ratio (%)																																									
Cost recovery by water fee (A/E)	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%	4%	4%	5%	5%	4%	5%	5%	5%	5%	5%	6%	6%	7%	7%	6%	7%	7%	8%	8%	8%	8%	8%	9%	9%	9%	9%	10%	10%	
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%	

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

B. FIRR CALCULATION

C. SENSITIVITY ANALYSIS

No.	Description	FIRR	Sensitivity indicator	Switching value
1	Capital cost 10% up	0.20%	21.50	4.65%
2	Capital cost 20% up	-0.18%	-43.92	-2.28%
1	OM cost 10% up	0.48%	3.03	33.02%
2	OM cost 20% up	0.33%	8.79	11.37%
3	Revenue 10% down	0.00%	-5678.40	-0.02%
2	Revenue 20% down	-0.69%	-18.94	-5.28%