No.17 Zovaber

Information on Existing Water Sources (Gegharkunik)

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

No.17 Community Zovaber
District Sevan
Marz Gegharkunik

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	40	38	50.7	44	47	43.5	2,406	3.0	5.0	3.0
2	Spring	40	37	1.7	44	48	44.0	2,164	2.0	2.5	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	Not acceptable
Notes	Water quality is poor due to damaged transmission pipes.
Alternative sources if any	There are no other drinking water sources in the village area.

No.17 Community Zovaber
District Sevan
Marz Gegharkunik
Sampling date 13/Jul/2007

	Parameters analysed	Units	No.1	No.2			Guidelines	
							WHO	Armenia
a	pH		7.9	7.8			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	9.7	6.2				
c	TDS	Mg/L	95	56			1000	1000
1	Al:Aluminum	Mg/L	n.d	nd			0.10	0.50
2	B:Boron	Mg/L	n.d	nd			0.70	0.50
3	Cl:Chloride	Mg/L	5	5			250	350
4	Cr:Chrome	Mg/L	<0.01	<0.01			0.05	0.05
5	Cu:Copper	Mg/L	n.d	nd			2	1
6	F:Fluoride	Mg/L	1.13	0.53			1.50	
7	Hardness	Mg/L	175	105			500	700
8	Fe:Iron	Mg/L	n.d	nd			0.30	0.30
9	Mn:Manganese	Mg/L	n.d	nd			0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d	nd			0.070	0.250
11	Ni:Nickel	Mg/L	n.d	0.016			0.020	0.100
12	Nitrate(NO3+)	Mg/L	2.2	2.7			50.0	45.0
13	SO4:Sulfate	Mg/L	25.0	2.0			250.0	500.0
14	Zn:Zink	Mg/L	n.d	nd			3.0	5.0
15	As:Arsenic	Mg/L	n.d	nd			0.0	0.1
16	Ba:Barium	Mg/L	0.01	0.01			0.70	0.10
17	Be:Berillium	Mg/L	0.00005	0.00005			NA	0.00020
18	Cd:Cadmium	Mg/L	n.d	nd			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	nd			NA	7.0
23	CN:Cyanide	Mg/L	n.d	nd			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.17 Community Zovaber
District Sevan
Marz Gegharkunik

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	01	16	40	-	Not identified
2	02	13	40	-	Not identified
3	03	06	45	-	Not identified
4	04	06	45	-	Not identified
5	05	14	-	2.1	Not identified
6	06	06	200	2.3	Not identified
7	07	17	200	2.1	Not identified
8	08	14	45	-	Not identified

No. 17 **Marz** Gegharkunik **Community** Zovaber

1. ACCESSIBILITY TO THE SITE

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

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°38′50.7″	44°47′43.5″	2,406	1981	Concrete	3.0	Yes
2	Spring	40°37′01.7″	44°48′44.0″	2,164	1958	Concrete	2.0	No

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	16,000	100	Polyethylene	3.0	1981	Medium	Yes
	4,000	50	Steel				
2	12,000	100	Cast iron	2.0	1958	Huge	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°34′16.7″	44°47′31.1″	1,847	Reinforced concrete	Rectangular	12x18x5	700	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	8,000	100	Steel	1970	Little	No
2	2,000	50	Steel	1970	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							Yes

8, PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
6	1970	1970	No	0	No

9. DRAINAGE SYSTEM

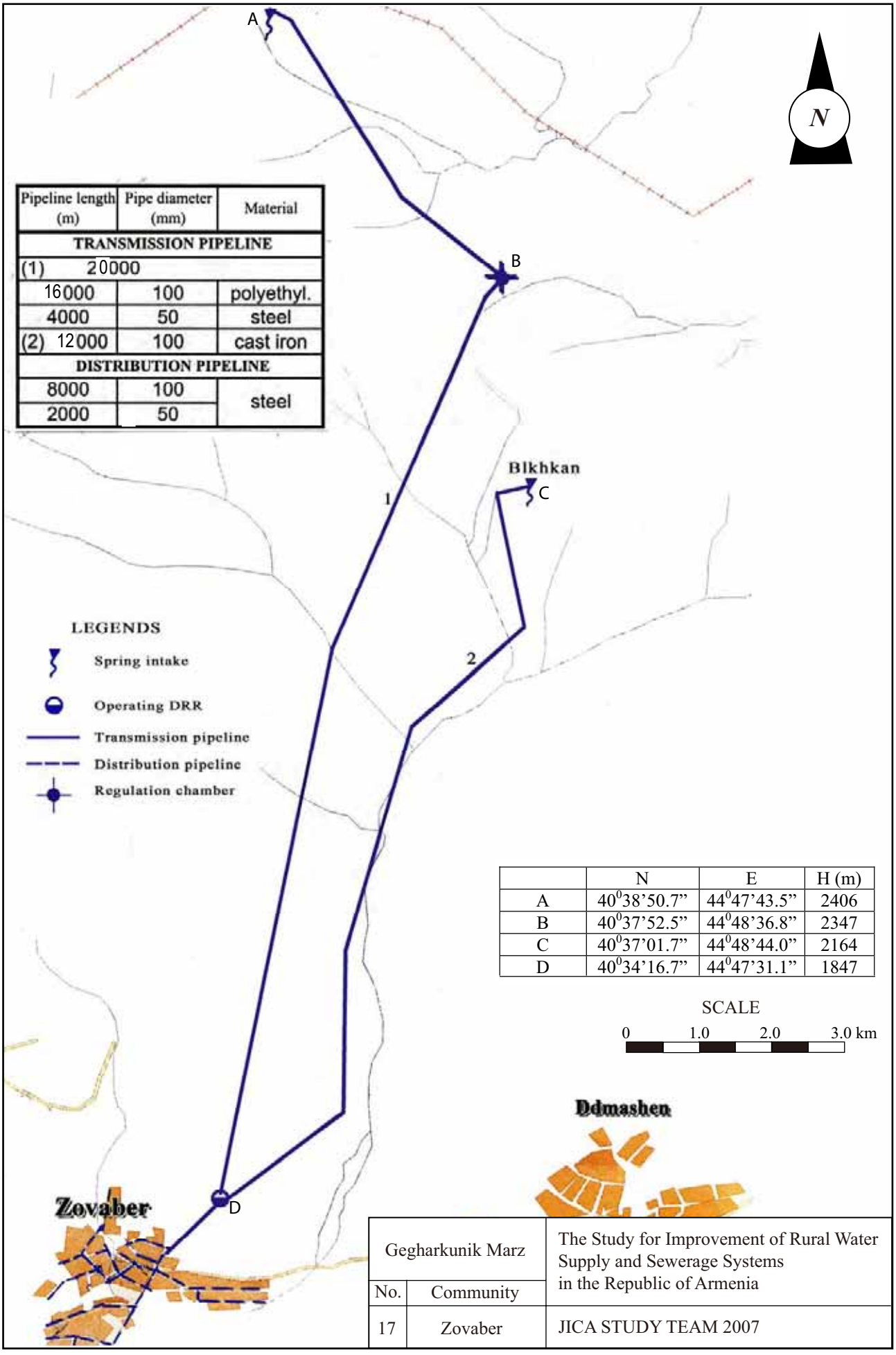
Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Gegharkunik**
Number and Name of Community	**No.17 Zovaber**
District	**Sevan**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	1,633
A2	Actual population in 2007	1,500
A3	Number of households	420
A4.1	Elderly people	623
A4.2	Population in labor force (age from 16 to 62)	730
A4.3	Children	462
A5.1	Pensioners	280
A5.2	Unemployed	540
A5.3	Receiving benefits	48
A6	Average monthly income of household (AMD)	27,000
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	258
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	7,500
	Annual Budget of the community 2005, in thousand AMD	8,300
	Annual Budget of the community 2006, in thousand AMD	6,000
	Annual Budget of the community 2007, in thousand AMD	5,500
	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	300
	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:	potatoes,cabbage, cereals, dairy, meat
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1.Yes 2.No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	2007
D5	Present condition of the water supply volume of Domestic use	insufficient
D6	Present condition of the water supply volume of Irrigation water	insufficient
D7	Number of house connection to drinking water system	250
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?	irregularly till 1hour
D10.2	How is the regime of water supply in your community in the wet season?	regularly 1hour
D11	What time of day water is given?	8^{00}-12^{00}, 8^{00}-16^{00}
D12	Are you pleased with duration of domestic water supply?	generaly displeased
D13	Are hours of water supply convenient?	generaly 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?	2 hrs
D14.2	Estimate quantity of domestic water use of each household (litter per day)	500
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	600 - 700
D16	Drinking water monthly water fee per household	150 drams per capita/month
D17	How often do you usually pay water fees?	each month
D18	Water fee structure 1Flate rate, 2 Having water tariff	flat rate
D19	Where do you acquire the irrigation water?	from Hrazdan river by pipelines
D20	Are you satisfied with irrigation water supply volume?	almost sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Kirakosyan Hayk
E2	Position	administration deputy head
E3	Telephone	(091)732831
E4	Quantity and present condition of the water supply facilities: spring/ intake	1-deteriorated,
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	1-partially rehabilitated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1-partially rehabilitated
E7	Quantity and present condition of the water supply facilities: net/distribution	rehabilitated
E8	Quantity and present condition of the water supply facilities: public tap	rehabilitated
E9	Quantity and present condition of the water supply facilities: pump	rehabilitated
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community and residents
E12	How do you repair the water supply facilities?	by ourselves, inviting a specialist
E13	Who is in charge of the repair work in the community?	administrarion deputy head
E14	How you prepare O&M costs?	administration budget, water fee
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	300,000
	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?	from dotations
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

Gegharkunik
No.17 Zovaber



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 20000		
16000	100	polyethyl.
4000	50	steel
(2) 12000	100	cast iron
DISTRIBUTION PIPELINE		
8000	100	steel
2000	50	

	N	E	H (m)
A	40°38'50.7"	44°47'43.5"	2406
B	40°37'52.5"	44°48'36.8"	2347
C	40°37'01.7"	44°48'44.0"	2164
D	40°34'16.7"	44°47'31.1"	1847

SCALE

0 1.0 2.0 3.0 km

Gegharkunik Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
17	Zovaber	JICA STUDY TEAM 2007

Marz : **Gegharkunik** No.17
Name : **Zovaber**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	1,500	persons	150.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	258	pupils	2.6	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	420	household	36.5	
	Sub-total			189.1	
	Unaccouted for water (20%)			37.8	
1	Average Daily Water Demand			226.9	m3/day
2	Maximum Daily Water Demand			272.3	m3/day
3	Maximum Hourly Water Demand			26.5	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	2	5.0	lit/sec		432.0	m3/day
`	Total					432.0	m3/day
	2 Required reservoir volume					319	m3

C	**WATER SUPPLY FACILITIES REHABILITATION PLAN**		
No	Item	Quantity	Unit
1	Intake		
	1m3	1	nos
	2m3		nos
	3m3		nos
	4m3		nos
2	Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter	11,000	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	350m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter	2,000	m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	170	nos
6	Water meter installation	420	nos
7	Public tap	5	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	Gegharkunik	
No. 17	Zovaber	JICA STUDY TEAM

Marz : **Gegharkunik**
No. : **17**
Name : **Zovaber**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	1	nos	367,700	367,700
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					367,700
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	11,000	m	9,680	106,480,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					106,480,000
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	1	nos	33,528,700	33,528,700
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					33,528,700
4	Distribution Pipe					
		50mm	2,000	m	5,520	11,040,000
		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					11,040,000
5	House Connection		170	nos	74,000	12,580,000
6	Water Meter Installation		420	nos	80,000	33,600,000
7	Public Tap		5	nos	90,000	450,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	800	m	3,600	2,880,000
	Total				AMD	201,426,400
					Equivalent to USD	659,290
					Equivalent to JPY	69,555,136
					AMD	USD
	Investment Cost per household		420	HH	479,587	1,570
	Investment Cost per person		1,500	persons	134,284	440

GEGHARKUNIK MARZ
Sevan District
No 17 Zovaber

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		69.0																																							
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		387.19	0.00	0.00	2.48	2.48	2.48	2.57	4.35	4.49	4.64	4.79	7.18	7.42	7.67	7.92	8.18	8.45	8.73	9.02	9.31	9.62	9.94	10.27	10.61	10.96	11.32	11.69	12.08	12.48	12.89	13.31	13.75	14.21	14.68	15.16	15.66	16.18	16.71	17.26	17.83	18.42
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				415																																					
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		18.37			0.25	0.26	0.27	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.36	0.37	0.38	0.39	0.41	0.42	0.43	0.45	0.46	0.48	0.49	0.51	0.53	0.54	0.56	0.58	0.60	0.62	0.64	0.66	0.68	0.70	0.73	0.75	0.78	0.80	0.83
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		108.41			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	2.47	2.55	2.64	2.72	2.81	2.91	3.00	3.10	3.20	3.31	3.42	3.53	3.65	3.77	3.89	4.02	4.15	4.29	4.43	4.58	4.73	4.89
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					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	2.47	2.55	2.64	2.72	2.81	2.91	3.00	3.10	3.20	3.31	3.42	3.53	3.65	3.77	3.89	4.02	4.15	4.29	4.43	4.58	4.73	4.89
5. Pump replacement		0.00																0.00															0.00									
Sub-total		144.48	0.00	0.00	1.96	2.03	2.10	2.15	2.22	2.30	2.38	2.46	2.54	2.62	2.70	2.80	2.89	2.99	3.09	3.19	3.29	3.40	3.52	3.62	3.75	3.87	4.00	4.14	4.26	4.41	4.56	4.71	4.87	5.03	5.19	5.36	5.53	5.72	5.90	6.11	6.30	6.52
C Gross Income (A-B)		242.71	0.00	0.00	0.52	0.45	0.38	0.42	2.13	2.19	2.26	2.33	4.64	4.80	4.97	5.12	5.29	5.46	5.64	5.83	6.02	6.22	6.42	6.65	6.86	7.09	7.32	7.55	7.82	8.07	8.33	8.60	8.88	9.18	9.49	9.80	10.13	10.46	10.81	11.15	11.53	11.90
D Depreciation cost		191.45						5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47
E Interest paid		60.50	0.04	0.07	2.43	2.47	2.49	2.49	2.49	2.49	2.49	2.49	2.50	2.42	2.35	2.28	2.20	2.13	2.05	1.98	1.90	1.82	1.75	1.67	1.59	1.51	1.42	1.34	1.26	1.17	1.09	1.00	0.92	0.83	0.74	0.65	0.56	0.47	0.38	0.28	0.19	0.10
F Net Income		-9.24	-0.04	-0.07	-1.91	-2.02	-2.11	-7.54	-5.83	-5.77	-5.70	-5.63	-3.33	-3.09	-2.85	-2.63	-2.38	-2.14	-1.88	-1.62	-1.35	-1.07	-0.80	-0.49	-0.20	0.11	0.43	0.74	1.09	1.43	1.77	2.13	2.49	2.88	3.28	3.68	4.10	4.52	4.96	5.40	5.87	6.33
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		-9.24	-0.04	-0.07	-1.91	-2.02	-2.11	-7.54	-5.83	-5.77	-5.70	-5.63	-3.33	-3.09	-2.85	-2.63	-2.38	-2.14	-1.88	-1.62	-1.35	-1.07	-0.80	-0.49	-0.20	0.11	0.43	0.74	1.09	1.43	1.77	2.13	2.49	2.88	3.28	3.68	4.10	4.52	4.96	5.40	5.87	6.33
OM Cost Recovery Ratio (A/B)		268%	0%	0%	127%	122%	118%	120%	196%	195%	195%	195%	283%	283%	284%	283%	283%	283%	283%	283%	283%	283%	282%	284%	283%	283%	283%	282%	284%	283%	283%	283%	282%	283%	283%	283%	283%	283%	283%	282%	283%	283%

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	-9.24	-0.04	-0.07	-1.91	-2.02	-2.11	-7.54	-5.83	-5.77	-5.70	-5.63	-3.33	-3.09	-2.85	-2.63	-2.38	-2.14	-1.88	-1.62	-1.35	-1.07	-0.80	-0.49	-0.20	0.11	0.43	0.74	1.09	1.43	1.77	2.13	2.49	2.88	3.28	3.68	4.10	4.52	4.96	5.40	5.87	6.33
2. Depreciation cost	191.45	0.00	0.00	0.00	0.00	0.00	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47
3. Interest Paid	60.50	0.04	0.07	2.43	2.47	2.49	2.49	2.49	2.49	2.49	2.49	2.50	2.42	2.35	2.28	2.20	2.13	2.05	1.98	1.90	1.82	1.75	1.67	1.59	1.51	1.42	1.34	1.26	1.17	1.09	1.00	0.92	0.83	0.74	0.65	0.56	0.47	0.38	0.28	0.19	0.10
Sub-total	242.71	0.00	0.00	0.52	0.45	0.38	0.42	2.13	2.19	2.26	2.33	4.64	4.80	4.97	5.12	5.29	5.46	5.64	5.83	6.02	6.22	6.42	6.65	6.86	7.09	7.32	7.55	7.82	8.07	8.33	8.60	8.88	9.18	9.49	9.80	10.13	10.46	10.81	11.15	11.53	11.90
B Finances																																									
1. Project Loan	249.61	3.91	2.79	236.79	3.48	1.61	0.58	0.45																																	
2. Local fund	84.02	1.29	0.91	80.23	1.16	0.30	0.07	0.06																																	
Sub-total	333.63	5.20	3.70	317.02	4.64	1.91	0.65	0.51																																	
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	75.49	0.04	0.07	1.91	2.02	2.11	2.07	0.36	0.30	0.23	0.16	5.04	4.87	4.70	4.55	4.38	4.21	4.03	3.84	3.65	3.45	3.26	3.03	2.82	2.59	2.35	2.12	1.85	1.60	1.34	1.07	0.80	0.49	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	75.49	0.04	0.07	1.91	2.02	2.11	2.07	0.36	0.30	0.23	0.16	5.04	4.87	4.70	4.55	4.38	4.21	4.03	3.84	3.65	3.45	3.26	3.03	2.82	2.59	2.35	2.12	1.85	1.60	1.34	1.07	0.80	0.49	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Cash Inflow	651.83	5.24	3.77	319.45	7.11	4.40	3.14	3.00	2.49	2.49	2.49	9.68	9.67	9.67	9.67	9.67	9.67	9.67	9.67	9.67	9.67	9.68	9.68	9.68	9.68	9.67	9.67	9.67	9.67	9.67	9.67	9.68	9.67	9.67	9.80	10.13	10.46	10.81	11.15	11.53	11.90
APPLICATION OF FUNDS																																								
D Project disbursement	333.63	5.20	3.70	317.02	4.64	1.91	0.65	0.51																																	
E Total debt services																																								
1. Loan repayment	249.62											7.18	7.25	7.32	7.39	7.47	7.54	7.62	7.69	7.77	7.85	7.93	8.01	8.09	8.17	8.25	8.33	8.41	8.50	8.58	8.67	8.76	8.84	8.93	9.02	9.11	9.20	9.29	9.39	9.48	9.58
2. Interest paid	60.50	0.04	0.07	2.43	2.47	2.49	2.49	2.49	2.49	2.49	2.49	2.50	2.42	2.35	2.28	2.20	2.13	2.05	1.98	1.90	1.82	1.75	1.67	1.59	1.51	1.42	1.34	1.26	1.17	1.09	1.00	0.92	0.83	0.74	0.65	0.56	0.47	0.38	0.28	0.19	0.10
Sub-total	310.12	0.04	0.07	2.43	2.47	2.49	2.49	2.49	2.49	2.49	2.49	9.68	9.67	9.67	9.67	9.67	9.67	9.67	9.67	9.67	9.67	9.68	9.68	9.68	9.68	9.67	9.67	9.67	9.67	9.67	9.67	9.68	9.67	9.67	9.67	9.67	9.67	9.67	9.67	9.67	9.68
Total Cash Outflow	643.75	5.24	3.77	319.45	7.11	4.40	3.14	3.00	2.49	2.49	2.49	9.68	9.67	9.67	9.67	9.67	9.67	9.67	9.67	9.67	9.67	9.68	9.68	9.68	9.68	9.67	9.67	9.67	9.67	9.67	9.67	9.68	9.67	9.67	9.67	9.67	9.67	9.67	9.67	9.67	9.68
F Net Surplus Cash (A+C2)-E	8.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.46	0.79	1.14	1.48	1.86	2.22
Investment Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	78%	0%	0%	21%	18%	15%	17%	86%	88%	91%	94%	48%	50%	51%	53%	55%	56%	58%	60%	62%	64%	66%	69%	71%	73%	76%	78%	81%	83%	86%	89%	92%	95%	98%	101%	105%	108%	112%	115%	119%	123%
Cost recovery by water fee + subsidy ((A+C2)/E)	103%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	101%	105%	108%	112%	115%	119%	123%

GEGHARKUNIK MARZ
Sevan District
No 17 Zovaber

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	387.19	83.7%
	Subsidy	75.49	16.3%
	Total	462.68	100.0%
2	**Expenditure**		
	OM cost	144.48	31.2%
	Loan repayment	249.62	54.0%
	Interest paid	60.50	13.1%
	Surplus cash	8.08	1.7%
	Total	462.68	100.0%

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

Description	Total	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A COST																																									
1. Investment Cost	228.21	3.82	2.73	216.04	3.21	1.46	0.53	0.42																																	
2. Operation and Maintenance Cost																																									
Salary	9.12			0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Chlorine	9.87			0.25	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Electricity	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mantenance cost	55.86			1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47
Pump replacement	0.00																0.00															0.00										
Sub-total	74.85			1.96	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97
Total Outflow	303.06	3.82	2.73	218.00	5.18	3.43	2.50	2.39	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97
B BENEFIT																																								
1. Water Tariff	243.68	0.00	0.00	2.48	2.48	2.48	2.57	4.35	4.49	4.64	4.79	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18
2. Subsidy	29.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.54	2.45	2.35	2.27	2.18	2.08	1.98	1.86	1.75	1.63	1.51	1.36	1.23	1.08	0.93	0.78	0.59	0.43	0.25	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Inflow	273.00	0.00	0.00	2.48	2.48	2.48	2.57	4.35	4.49	4.64	4.79	9.72	9.63	9.53	9.45	9.36	9.26	9.16	9.04	8.93	8.81	8.69	8.54	8.41	8.26	8.11	7.96	7.77	7.61	7.43	7.25	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18
NET BENEFIT	-30.06	-3.82	-2.73	-215.5	-2.7	-1.0	0.07	1.96	2.52	2.67	2.82	7.75	7.66	7.56	7.48	7.39	7.29	7.19	7.07	6.96	6.84	6.72	6.57	6.44	6.29	6.14	5.99	5.80	5.64	5.46	5.28	5.21	5.21	5.21	5.21	5.21	5.21	5.21	5.21	5.21	5.21

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	-104.14	-4.20	-3.00	-237.1	-3.0	-1.1	0.02	1.92	2.52	2.67	2.82	7.75	7.66	7.56	7.48	7.39	7.29	7.19	7.07	6.96	6.84	6.72	6.57	6.44	6.29	6.14	5.99	5.80	5.64	5.46	5.28	5.21	5.21	5.21	5.21	5.21	5.21	5.21	5.21	5.21
	2	Capital cost 20% up	-125.81	-4.58	-3.28	-258.7	-3.3	-1.2	-0.04	1.88	2.52	2.67	2.82	7.75	7.66	7.56	7.48	7.39	7.29	7.19	7.07	6.96	6.84	6.72	6.57	6.44	6.29	6.14	5.99	5.80	5.64	5.46	5.28	5.21	5.21	5.21	5.21	5.21	5.21	5.21	5.21	5.21
2	1	OM cost 10% up	-87.73	-3.82	-2.73	-215.7	-2.9	-1.1	-0.13	1.76	2.32	2.47	2.62	7.55	7.46	7.36	7.28	7.19	7.09	6.99	6.87	6.76	6.64	6.52	6.37	6.24	6.09	5.94	5.79	5.60	5.44	5.26	5.08	5.01	5.01	5.01	5.01	5.01	5.01	5.01	5.01	5.01
	2	OM cost 20% up	-92.97	-3.82	-2.73	-215.9	-3.1	-1.3	-0.32	1.57	2.13	2.28	2.43	7.36	7.27	7.17	7.09	7.00	6.90	6.80	6.68	6.57	6.45	6.33	6.18	6.05	5.90	5.75	5.60	5.41	5.25	5.07	4.89	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
3	1	Revenue 10% down	-101.14	-3.82	-2.73	-215.8	-2.9	-1.2	-0.19	1.53	2.07	2.21	2.34	6.78	6.70	6.61	6.54	6.45	6.36	6.27	6.17	6.07	5.96	5.85	5.72	5.60	5.46	5.33	5.19	5.02	4.88	4.72	4.56	4.49	4.49	4.49	4.49	4.49	4.49	4.49	4.49	4.49
	2	Revenue 20% down	-119.81	-3.82	-2.73	-216.0	-3.2	-1.4	-0.44	1.09	1.62	1.74	1.86	5.81	5.73	5.65	5.59	5.52	5.44	5.36	5.26	5.17	5.08	4.98	4.86	4.76	4.64	4.52	4.40	4.25	4.12	3.97	3.83	3.77	3.77	3.77	3.77	3.77	3.77	3.77	3.77	3.77

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-1.14%	-3.96	-25.26%
	2	Capital cost 20% up	-1.54%	-5.54	-18.06%
2	1	OM cost 10% up	-0.87%	-2.08	-48.04%
	2	OM cost 20% up	-1.05%	-3.47	-28.79%
3	1	Revenue 10% down	-1.38%	-5.02	-19.93%
	2	Revenue 20% down	-2.15%	-6.81	-14.68%

No.18 Tazaqyugh

Information on Existing Water Sources (Gegharkunik)

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

No.18 Community Tazagyugh
District Martuni
Marz Gegharkunik

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	40	3	42.9	45	4	51.6	2,710	5.0	17.0	17.0
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	The spring intake has been repaired by Social Fund.
Alternative sources if any	"Hovei" spring which is located At 5km distance from the village, has 7l/sec discharge.

No.18 Community Tazagyugh
District Martuni
Marz Gegharkunik
Sampling date 28/Jul/2007

	Parameters analysed	Units	No.1 Arkhashani aghbyurner	No.2 Gortsogh aghbyur			Guidelines	
							WHO	Armenia
a	pH		7.4	7.4			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	6	5.9				
c	TDS	Mg/L	50	11			1000	1000
1	Al:Aluminum	Mg/L	nd	0.01			0.10	0.50
2	B:Boron	Mg/L	nd	n.d			0.70	0.50
3	Cl:Chloride	Mg/L	4	4			250	350
4	Cr:Chrome	Mg/L	<0,001	<0.01			0.05	0.05
5	Cu:Copper	Mg/L	nd	n.d			2	1
6	F:Fluoride	Mg/L	0.64	0.54			1.50	
7	Hardness	Mg/L	95	25			500	700
8	Fe:Iron	Mg/L	nd	0.02			0.30	0.30
9	Mn:Manganese	Mg/L	nd	n.d			0.40	0.10
10	Mo:Molibdenum	Mg/L	nd	n.d			0.070	0.250
11	Ni:Nickel	Mg/L	nd	n.d			0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.8	1.3			50.0	45.0
13	SO4:Sulfate	Mg/L	8.0	2.0			250.0	500.0
14	Zn:Zink	Mg/L	nd	n.d			3.0	5.0
15	As:Arsenic	Mg/L	nd	n.d			0.0	0.1
16	Ba:Barium	Mg/L	0.01	0.01			0.70	0.10
17	Be:Berillium	Mg/L	nd	n.d			NA	0.00020
18	Cd:Cadmium	Mg/L	nd	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	nd	n.d			0.010	0.010
22	Sr:Strontium	Mg/L	nd	<0.7			NA	7.0
23	CN:Cyanide	Mg/L	nd	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.18 Community Tazagyugh
District Martuni
Marz Gegharkunik

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	01	10	1-4	-	Not identified
2	02	07	1-4	-	Not identified
3	03	12	1-5	-	Not identified
4	04	04	1-3	-	Not identified
5	05	25	1-3	-	Not identified
6	06	11	1-3	-	Not identified
7	07	10	1-5	-	Not identified
8	08	13	1-3	-	Not identified

No. 18 **Marz** Gegharkunik **Community** Tazagyugh

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Difficult	Difficult	
2	Transmission pipeline	Difficult	Difficult	Difficult to find the pipeline route
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°03′42.9″	45°04′51.6″	2,710	1960	Concrete	17.0	No

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	4,500	100	Steel	17.0	1960	Little	No
	1,000	70	Steel			Huge	Yes
	8,000	200	Steel			Huge	Yes
	4,500	150	Steel			Huge	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°08′15.0″	45°11′11.5″	2,150	Reinforced concrete	Circle	R=4m, H=5m	250	No

5. CHLORINATION EQUIPMENT

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	Yes	Reservoir	Bush sleeve	Daily

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	2,000	150	Steel, asbesto	1960	Huge	Yes
2	13,000	100	Steel, asbesto		Huge	Yes
3	2,000	75	Steel		Huge	Yes

7. PUMP STATION

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

8, PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
15	1960		Yes	50	Yes

9. DRAINAGE SYSTEM

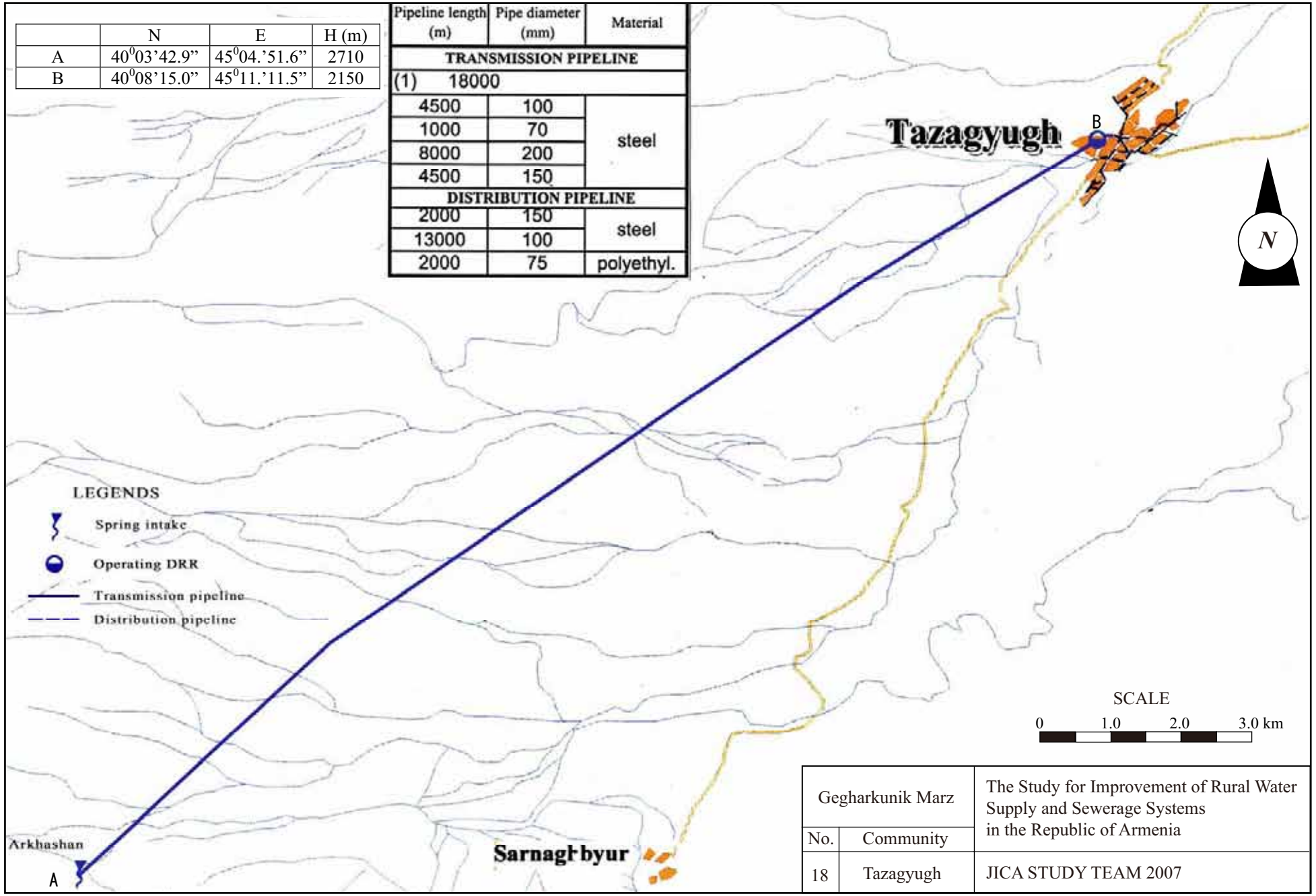
Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Gegharkunik**
Number and Name of Community	**No.18 Tazagyugh**
District	**Martini**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	2,560
A2	Actual population in 2007	2,840
A3	Number of households	830
A4.1	Elderly people	307
A4.2	Population in labor force (age from 16 to 62)	1,565
A4.3	Children	1,036
A5.1	Pensioners	357
A5.2	Unemployed	1
A5.3	Receiving benefits	113
A6	Average monthly income of household (AMD)	¹hí. h³ï
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	570
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	7,261
	Annual Budget of the community 2005, in thousand AMD	7,580
	Annual Budget of the community 2006, in thousand AMD	7,654
	Annual Budget of the community 2007, in thousand AMD	1,603
	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	70
	Amount spent in drinking water sector 2007, in thousand AMD	3,350
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	potatoes,cabbage, cereals, 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	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	unknown
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	500
D8	How many house connection household set the water meter	0
D9	Number of public taps	3
D10.1	How is the regime of water supply in your community in the dry season?	regularly - 12hrs
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?	20^{00}-08^{00}, 08^{00}-20^{00} (irrigation)
D12	Are you pleased with duration of domestic water supply?	generaly displeased
D13	Are hours of water supply convenient?	generaly inconvenient
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	3-5 hrs
D14.2	Estimate quantity of domestic water use of each household (litter per day)	600
D15.1	How long the taps are open to provide the each household for filling	3-5 hrs
D15.2	Estimate quantity of water for filling containers of each household (litter per	800
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flate rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	from springs on Arkhasham hills
D20	Are you satisfied with irrigation water supply volume?	insufficient.
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Mkhitaryan Verdi
E2	Position	water distributor
E3	Telephone	-
E4	Quantity and present condition of the water supply facilities: spring/ intake	2-partially rehabilitated
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	2-partially rehabilitated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1-deteriorated, 1-partially rehabilitated
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?	Social investments Fund
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?	not collect
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	960,000
	Repair cost(AMD)	500,000
	Others(AMD)	0
	Total (AMD)	1,460,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	water fee
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	absent
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Gegharkunik
No.18 Tazagyugh



	N	E	H (m)
A	40°03'42.9"	45°04.'51.6"	2710
B	40°08'15.0"	45°11.'11.5"	2150

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 18000		
4500	100	steel
1000	70	
8000	200	
4500	150	
DISTRIBUTION PIPELINE		
2000	150	steel
13000	100	
2000	75	polyethyl.

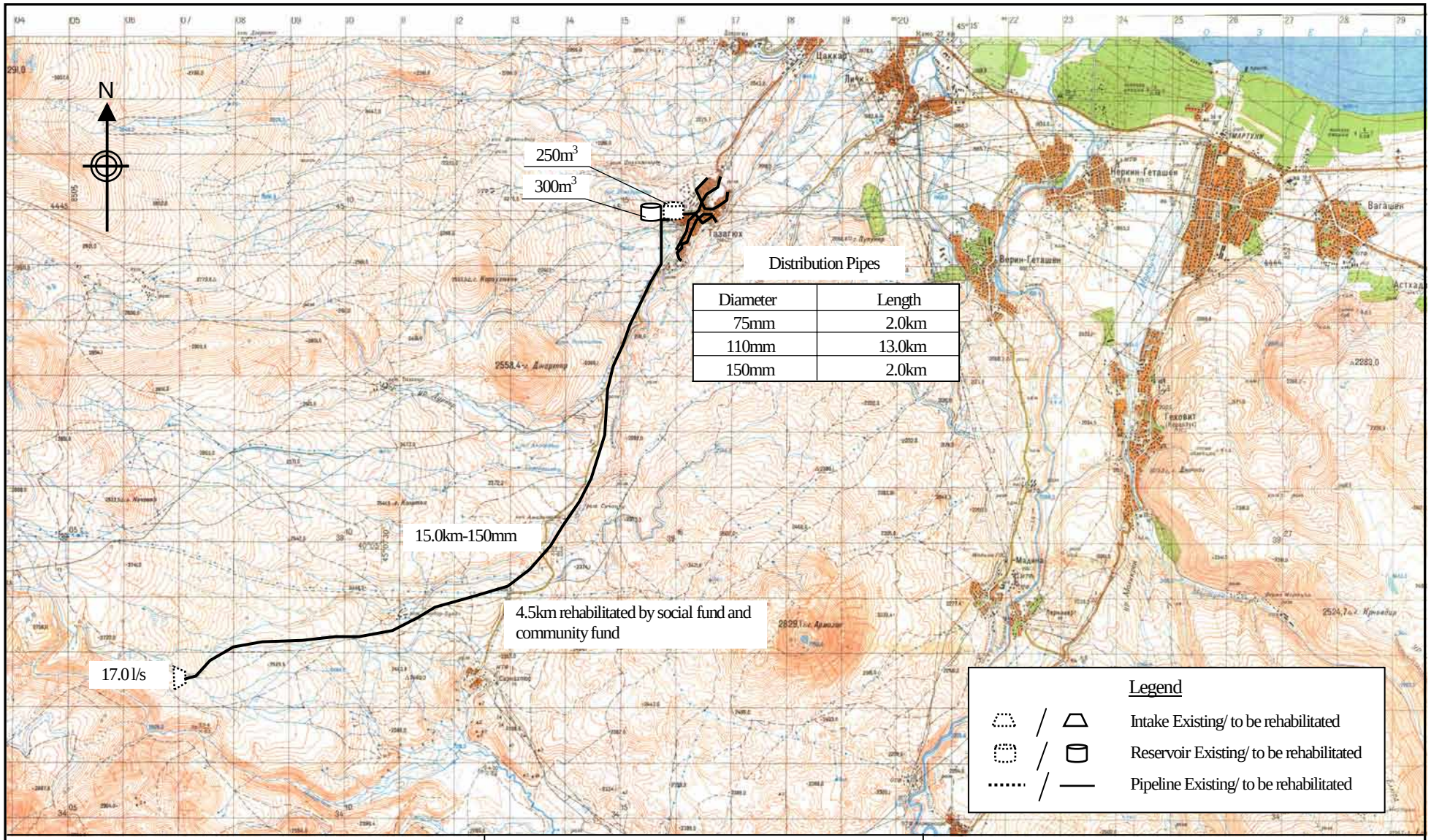
Gegharkunik Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
18	Tazagyugh	JICA STUDY TEAM 2007

Marz : **Gegharkunik** No.18
Name : **Tazagyugh**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	2,840	persons	284.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	570	pupils	5.7	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	830	household	72.2	
	Sub-total			361.9	
	Unaccouted for water (20%)			72.4	
1	Average Daily Water Demand		263.9	434.3	m3/day
2	Maximum Daily Water Demand			521.1	m3/day
3	Maximum Hourly Water Demand			45.2	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	1	17.0	lit/sec		1468.8	m3/day
`	Total					1468.8	m3/day
	2 Required reservoir volume					542	m3

C	**WATER SUPPLY FACILITIES REHABILITATION PLAN**			
No	Item	Quantity	Unit	
1	Intake			
	1m3		nos	
	2m3		nos	
	3m3		nos	
	4m3		nos	
2	Transmission pipe			Done by Social fund and
	50mm diameter		m	community fund
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter		m	
	150mm diameter	10,500	m	4500m rehabilitation
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			
	300m3 capacity	1	nos	
4	Distribution pipe			
	50mm diameter		m	
	75mm diameter	2,000	m	
	90mm diameter		m	
	110mm diameter	13,000	m	
	150mm diameter	2,000	m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	330	nos	
6	Water meter installation	830	nos	
7	Public tap	9	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	Gegharkunik	
No. 18	Tazagyugh	JICA STUDY TEAM

Marz : **Gegharkunik**
No. : **18**
Name : **Tazagyugh**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3		nos	367,700	
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm	10,500	m	13,140	137,970,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					137,970,000
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	2,000	m	7,160	14,320,000
		90mm		m	8,040	
		110mm	13,000	m	9,680	125,840,000
		150mm	2,000	m	13,140	26,280,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					166,440,000
5	House Connection		330	nos	74,000	24,420,000
6	Water Meter Installation		830	nos	80,000	66,400,000
7	Public Tap		9	nos	90,000	810,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	6,800	m	3,600	24,480,000
	Total				AMD	450,650,400
					Equivalent to USD	1,475,027
					Equivalent to JPY	155,615,401
					AMD	USD
	Investment Cost per household		830	HH	542,952	1,777
	Investment Cost per person		2,840	persons	158,680	519

GEGHARKUNIK MARZ
Marutuni District
No 18 Tazagyugh

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		132.1																																							
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		737.37	0.00	0.00	1.95	3.90	4.76	4.91	8.32	8.60	8.88	9.17	13.75	14.20	14.67	15.16	15.66	16.17	16.71	17.26	17.83	18.42	19.02	19.65	20.30	20.97	21.66	22.38	23.11	23.88	24.66	25.48	26.32	27.19	28.09	29.01	29.97	30.96	31.98	33.04	34.13	35.25
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				793																																				
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		34.72			0.20	0.40	0.51	0.52	0.54	0.56	0.58	0.60	0.62	0.64	0.66	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	1.44	1.48	1.53	1.58
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		89.78			0.50	1.04	1.31	1.36	1.40	1.45	1.49	1.54	1.59	1.65	1.70	1.76	1.82	1.88	1.94	2.00	2.07	2.14	2.21	2.28	2.35	2.43	2.51	2.60	2.68	2.77	2.86	2.96	3.05	3.15	3.26	3.37	3.48	3.59	3.71	3.83	3.96	4.09
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					0.5	1.04	1.31	1.36	1.40	1.45	1.49	1.54	1.59	1.65	1.70	1.76	1.82	1.88	1.94	2.00	2.07	2.14	2.21	2.28	2.35	2.43	2.51	2.60	2.68	2.77	2.86	2.96	3.05	3.15	3.26	3.37	3.48	3.59	3.71	3.83	3.96	4.09
5. Pump replacement		0.00																0.00															0.00									
Sub-total		159.90	0.00	0.00	1.18	1.94	2.33	2.41	2.49	2.57	2.65	2.74	2.83	2.93	3.02	3.13	3.23	3.34	3.45	3.55	3.68	3.80	3.92	4.05	4.18	4.32	4.46	4.61	4.77	4.92	5.09	5.25	5.42	5.60	5.79	5.98	6.18	6.38	6.60	6.81	7.03	7.27
C Gross Income (A-B)		577.47	0.00	0.00	0.77	1.96	2.43	2.50	5.83	6.03	6.23	6.43	10.92	11.27	11.65	12.03	12.43	12.83	13.26	13.71	14.15	14.62	15.10	15.60	16.12	16.65	17.20	17.77	18.34	18.96	19.57	20.23	20.90	21.59	22.30	23.03	23.79	24.58	25.38	26.23	27.10	27.98
D Depreciation cost		428.05						12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23
E Interest paid		129.66	0.04	0.07	2.24	4.49	5.51	5.52	5.52	5.52	5.52	5.52	5.52	5.36	5.20	5.04	4.88	4.71	4.55	4.38	4.21	4.03	3.86	3.69	3.51	3.33	3.15	2.97	2.78	2.60	2.41	2.22	2.03	1.83	1.64	1.44	1.24	1.04	0.83	0.63	0.42	0.21
F Net Income		19.76	-0.04	-0.07	-1.47	-2.53	-3.08	-15.25	-11.92	-11.72	-11.52	-11.32	-6.83	-6.32	-5.78	-5.24	-4.68	-4.11	-3.52	-2.90	-2.29	-1.64	-0.99	-0.32	0.38	1.09	1.82	2.57	3.33	4.13	4.93	5.78	6.64	7.53	8.43	9.36	10.32	11.31	12.32	13.37	14.45	15.54
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
H Net Income after deduction of TAX		19.76	-0.04	-0.07	-1.47	-2.53	-3.08	-15.25	-11.92	-11.72	-11.52	-11.32	-6.83	-6.32	-5.78	-5.24	-4.68	-4.11	-3.52	-2.90	-2.29	-1.64	-0.99	-0.32	0.38	1.09	1.82	2.57	3.33	4.13	4.93	5.78	6.64	7.53	8.43	9.36	10.32	11.31	12.32	13.37	14.45	15.54
OM Cost Recovery Ratio (A/B)		461%	0%	0%	166%	201%	204%	204%	334%	335%	335%	335%	486%	485%	486%	484%	485%	484%	484%	486%	485%	485%	485%	485%	486%	485%	486%	485%	484%	485%	484%	485%	486%	486%	485%	485%	485%	485%	485%	485%	485%	485%

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	19.76	-0.04	-0.07	-1.47	-2.53	-3.08	-15.25	-11.92	-11.72	-11.52	-11.32	-6.83	-6.32	-5.78	-5.24	-4.68	-4.11	-3.52	-2.90	-2.29	-1.64	-0.99	-0.32	0.38	1.09	1.82	2.57	3.33	4.13	4.93	5.78	6.64	7.53	8.43	9.36	10.32	11.31	12.32	13.37	14.45	15.54
2. Depreciation cost	428.05	0.00	0.00	0.00	0.00	0.00	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23
3. Interest Paid	129.66	0.04	0.07	2.24	4.49	5.51	5.52	5.52	5.52	5.52	5.52	5.52	5.36	5.20	5.04	4.88	4.71	4.55	4.38	4.21	4.03	3.86	3.69	3.51	3.33	3.15	2.97	2.78	2.60	2.41	2.22	2.03	1.83	1.64	1.44	1.24	1.04	0.83	0.63	0.42	0.21
Sub-total	577.47	0.00	0.00	0.77	1.96	2.43	2.50	5.83	6.03	6.23	6.43	10.92	11.27	11.65	12.03	12.43	12.83	13.26	13.71	14.15	14.62	15.10	15.60	16.12	16.65	17.20	17.77	18.34	18.96	19.57	20.23	20.90	21.59	22.30	23.03	23.79	24.58	25.38	26.23	27.10	27.98
B Finances																																									
1. Project Loan	552.19	3.91	2.79	217.52	224.93	102.01	0.58	0.45																																	
2. Local fund	189.08	1.29	0.91	73.71	76.93	36.11	0.07	0.06																																	
Sub-total	741.27	5.20	3.70	291.23	301.86	138.12	0.65	0.51																																	
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	136.23	0.04	0.07	1.47	2.53	3.08	3.02	0.00	0.00	0.00	0.00	10.47	10.12	9.74	9.37	8.97	8.56	8.14	7.69	7.25	6.77	6.29	5.80	5.28	4.75	4.20	3.63	3.05	2.44	1.83	1.17	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	136.23	0.04	0.07	1.47	2.53	3.08	3.02	0.00	0.00	0.00	0.00	10.47	10.12	9.74	9.37	8.97	8.56	8.14	7.69	7.25	6.77	6.29	5.80	5.28	4.75	4.20	3.63	3.05	2.44	1.83	1.17	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Cash Inflow	1454.97	5.24	3.77	293.47	306.35	143.63	6.17	6.34	6.03	6.23	6.43	21.39	21.39	21.39	21.40	21.40	21.39	21.40	21.40	21.40	21.39	21.39	21.40	21.40	21.40	21.40	21.40	21.39	21.40	21.40	21.40	21.40	21.59	22.30	23.03	23.79	24.58	25.38	26.23	27.10	27.98
APPLICATION OF FUNDS																																									
D Project disbursement	741.27	5.20	3.70	291.23	301.86	138.12	0.65	0.51																																	
E Total debt services																																									
1. Loan repayment	552.18											15.87	16.03	16.19	16.36	16.52	16.68	16.85	17.02	17.19	17.36	17.53	17.71	17.89	18.07	18.25	18.43	18.61	18.80	18.99	19.18	19.37	19.56	19.76	19.96	20.16	20.36	20.56	20.77	20.97	21.18
2. Interest paid	129.66	0.04	0.07	2.24	4.49	5.51	5.52	5.52	5.52	5.52	5.52	5.52	5.36	5.20	5.04	4.88	4.71	4.55	4.38	4.21	4.03	3.86	3.69	3.51	3.33	3.15	2.97	2.78	2.60	2.41	2.22	2.03	1.83	1.64	1.44	1.24	1.04	0.83	0.63	0.42	0.21
Sub-total	681.84	0.04	0.07	2.24	4.49	5.51	5.52	5.52	5.52	5.52	5.52	21.39	21.39	21.39	21.40	21.40	21.39	21.40	21.40	21.40	21.39	21.39	21.40	21.40	21.40	21.40	21.40	21.39	21.40	21.40	21.40	21.40	21.39	21.40	21.40	21.40	21.40	21.39	21.40	21.39	21.39
Total Cash Outflow	1423.11	5.24	3.77	293.47	306.35	143.63	6.17	6.03	5.52	5.52	5.52	21.39	21.39	21.39	21.40	21.40	21.39	21.40	21.40	21.40	21.39	21.39	21.40	21.40	21.40	21.40	21.40	21.39	21.40	21.40	21.40	21.40	21.39	21.40	21.40	21.40	21.40	21.39	21.40	21.39	21.39
F Net Surplus Cash (A+C2)-E	31.86	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.51	0.71	0.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.90	1.63	2.39	3.18	3.99	4.83	5.71	6.59
Investment Cost Recovery Ratio (%)																																									
Cost recovery by water fee (A/E)	85%	0%	0%	35%	44%	44%	45%	106%	109%	113%	116%	51%	53%	54%	56%	58%	60%	62%	64%	66%	68%	71%	73%	75%	78%	80%	83%	86%	89%	91%	95%	98%	101%	104%	108%	111%	115%	119%	123%	127%	131%
Cost recovery by water fee + subsidy ((A+C2)/E)	105%	100%	100%	100%	100%	100%	100%	106%	109%	113%	116%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	101%	104%	108%	111%	115%	119%	123%	127%	131%

GEGHARKUNIK MARZ
Marutuni District
No 18 Tazagyugh

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	737.37	84.4%
	Subsidy	136.23	15.6%
	Total	873.60	100.0%
2	**Expenditure**		
	OM cost	159.90	18.3%
	Loan repayment	552.18	63.2%
	Interest paid	129.66	14.8%
	Surplus cash	31.86	3.6%
	Total	873.60	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	492.52	3.82	2.73	198.46	198.98	87.58	0.53	0.42																																	
2. Operation and Maintenance Cost																																									
Salary	18.24			0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
Chlorine	18.24			0.20	0.40	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Electricity	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mantenance cost	45.79			0.50	1.01	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23
Pump replacement	0.00																0.00															0.00										
Sub-total	82.27			1.18	1.89	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
Total Outflow	574.79	3.82	2.73	199.64	200.87	89.78	2.73	2.62	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
B BENEFIT																																								
1. Water Tariff	462.99	0.00	0.00	1.95	3.90	4.76	4.91	8.32	8.60	8.88	9.17	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75
2. Subsidy	48.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.95	4.76	4.54	4.33	4.09	3.85	3.59	3.31	3.04	2.74	2.43	2.11	1.77	1.42	1.05	0.66	0.27	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	511.90	0.00	0.00	1.95	3.90	4.76	4.91	8.32	8.60	8.88	9.17	18.70	18.51	18.29	18.08	17.84	17.60	17.34	17.06	16.79	16.49	16.18	15.86	15.52	15.17	14.80	14.41	14.02	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75
NET BENEFIT	-62.89	-3.82	-2.73	-197.7	-197.0	-85.0	2.18	5.70	6.40	6.68	6.97	16.50	16.31	16.09	15.88	15.64	15.40	15.14	14.86	14.59	14.29	13.98	13.66	13.32	12.97	12.60	12.21	11.82	11.55	11.55	11.55	11.55	11.55	11.55	11.55	11.55	11.55	11.55	11.55	11.55

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	-215.84	-4.20	-3.00	-217.5	-216.9	-93.8	2.13	5.66	6.40	6.68	6.97	16.50	16.31	16.09	15.88	15.64	15.40	15.14	14.86	14.59	14.29	13.98	13.66	13.32	12.97	12.60	12.21	11.82	11.55	11.55	11.55	11.55	11.55	11.55	11.55	11.55	11.55	11.55	11.55	11.55
	2	Capital cost 20% up	-262.00	-4.58	-3.28	-237.4	-236.8	-102.5	2.07	5.62	6.40	6.68	6.97	16.50	16.31	16.09	15.88	15.64	15.40	15.14	14.86	14.59	14.29	13.98	13.66	13.32	12.97	12.60	12.21	11.82	11.55	11.55	11.55	11.55	11.55	11.55	11.55	11.55	11.55	11.55	11.55	11.55
2	1	OM cost 10% up	-175.42	-3.82	-2.73	-197.8	-197.2	-85.2	1.96	5.48	6.18	6.46	6.75	16.28	16.09	15.87	15.66	15.42	15.18	14.92	14.64	14.37	14.07	13.76	13.44	13.10	12.75	12.38	11.99	11.60	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33
	2	OM cost 20% up	-181.16	-3.82	-2.73	-197.9	-197.3	-85.5	1.74	5.26	5.96	6.24	6.53	16.06	15.87	15.65	15.44	15.20	14.96	14.70	14.42	14.15	13.85	13.54	13.22	12.88	12.53	12.16	11.77	11.38	11.11	11.11	11.11	11.11	11.11	11.11	11.11	11.11	11.11	11.11	11.11	11.11
3	1	Revenue 10% down	-204.61	-3.82	-2.73	-197.9	-197.4	-85.5	1.69	4.87	5.54	5.79	6.05	14.63	14.46	14.26	14.07	13.86	13.64	13.41	13.15	12.91	12.64	12.36	12.07	11.77	11.45	11.12	10.77	10.42	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18
	2	Revenue 20% down	-239.54	-3.82	-2.73	-198.1	-197.7	-86.0	1.20	4.04	4.68	4.90	5.14	12.76	12.61	12.43	12.26	12.07	11.88	11.67	11.45	11.23	10.99	10.74	10.49	10.22	9.94	9.64	9.33	9.02	8.80	8.80	8.80	8.80	8.80	8.80	8.80	8.80	8.80	8.80	8.80	8.80

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-1.16%	-4.03	-24.81%
	2	Capital cost 20% up	-1.58%	-5.61	-17.83%
2	1	OM cost 10% up	-0.79%	-1.21	-82.91%
	2	OM cost 20% up	-0.88%	-2.16	-46.24%
3	1	Revenue 10% down	-1.31%	-4.72	-21.20%
	2	Revenue 20% down	-2.00%	-6.53	-15.33%

No.19 Lchavan

Information on Existing Water Sources (Gegharkunik)

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

No.19 Community Lchavan
District Vardenis
Marz Gegharkunik

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	40	8	57.0	45	36	33.0	2,026	45.0	45.0	45.0
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	The springs are located at lower elevation of the village and water is pumped for 2 hours daily
Alternative sources if any	Water amount will be increased if the pump operating hours increase.

No.19 Community Lchavan
District Vardenis
Marz Gegharkunik
Sampling date 22/Aug/2007

	Parameters analysed	Units	No.1				Guidelines	
							WHO	Armenia
a	pH		7.5				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	7.9					
c	TDS	Mg/L	52				1000	1000
1	Al:Aluminum	Mg/L	n.d				0.10	0.50
2	B:Boron	Mg/L	n.d				0.70	0.50
3	Cl:Chloride	Mg/L	6				250	350
4	Cr:Chrome	Mg/L	<0.01				0.05	0.05
5	Cu:Copper	Mg/L	n.d				2	1
6	F:Fluoride	Mg/L	0.83				1.50	
7	Hardness	Mg/L	90				500	700
8	Fe:Iron	Mg/L	0.02				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	2.7				50.0	45.0
13	SO4:Sulfate	Mg/L	12.0				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	<0.00005				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	n.d				0.010	0.010
22	Sr:Strontium	Mg/L	<0.7				NA	7.0
23	CN:Cyanide	Mg/L	n.d				0.070	0.035
24	Coli form bacteria	bacteria per 100 ml					-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
26	Total bacteria	bacteria per 1 ml					-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.19 Community Lchavan
District Vardenis
Marz Gegharkunik

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	01	11	20	0.3	Not identified
2	02	23	24	0.3	Not identified
3	03	29	30	0.4	Not identified
4	04	25	26	0.3	Not identified
5	05	22	24	0.3	Not identified
6	06	18	24	0.3	Not identified
7	07	17	30	0.4	Not identified
8	08	13	20	0.3	Not identified
9	01	11	20	0.3	Not identified

No. 19 **Marz** Gegharkunik **Community** Lchavan

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Fair	Possible	
2	Transmission pipeline			No transmission pipelien
3	Reservoir	Fair	Possible	

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°08′57.0″	45°36′33.0″	2,026	1964	Masonry	45.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	800	200	Steel	9.5	1964	Little	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°08′45.5″	45°36′52.5″	2079	Concrete	Rectangular	6x15x4	300	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	1,500	100	Cast iron	1964	Huge	Yes
2	2,500	100	Steel		Huge	Yes

7. PUMP STATION

Existence (Y/N)	Power source	Type	Capacity (l/s)	Pump head (m)	Tank cap. (m3)	House size (m)	Rehabilitation Necessity (Y/N)
Yes	Generator	Centrifugal	90	85	10	4x10	Yes

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
2			Yes	100	Yes

9. DRAINAGE SYSTEM

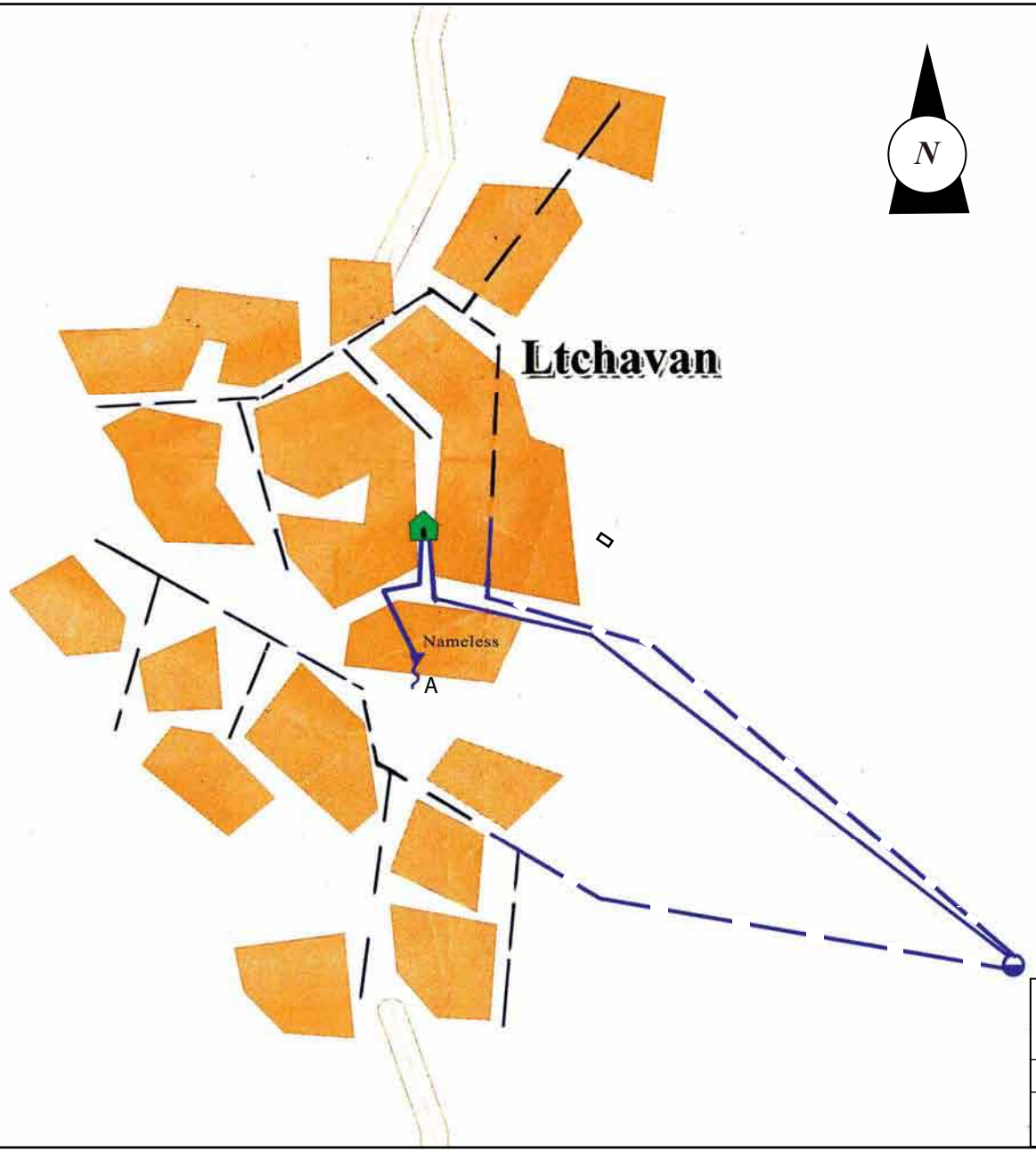
Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Gegharkunik**
Number and Name of Community	**No.19 Lchavan**
District	**Vardenis**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	620
A2	Actual population in 2007	700
A3	Number of households	104
A4.1	Elderly people	95
A4.2	Population in labor force (age from 16 to 62)	475
A4.3	Children	130
A5.1	Pensioners	82
A5.2	Unemployed	0
A5.3	Receiving benefits	45
A6	Average monthly income of household (AMD)	55,000
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	130
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	11,111
	Annual Budget of the community 2005, in thousand AMD	19,266
	Annual Budget of the community 2006, in thousand AMD	17,328
	Annual Budget of the community 2007, in thousand AMD	14,881
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	600
	Amount spent in drinking water sector 2005, in thousand AMD	650
	Amount spent in drinking water sector 2006, in thousand AMD	640
	Amount spent in drinking water sector 2007, in thousand AMD	600
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	potatoes,cabbage, cereals, dairy, meat
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1.Yes 2.No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	in the process
D5	Present condition of the water supply volume of Domestic use	insufficient
D6	Present condition of the water supply volume of Irrigation water	almost sufficient
D7	Number of house connection to drinking water system	104
D8	How many house connection household set the water meter	0
D9	Number of public taps	1
D10.1	How is the regime of water supply in your community in the dry season?	regularly - once in 2 days 2 hrs, 15% - 24 hrs
D10.2	How is the regime of water supply in your community in the wet season?	regularly - once in 2 days - 2hrs, 15% - 24 hrs
D11	What time of day water is given?	10^{00}-12^{00}, 10^{00}-12^{00}
D12	Are you pleased with duration of domestic water supply?	generaly displeased
D13	Are hours of water supply convenient?	generaly inconvenient
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	1,000
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	difficult to answer
D16	Drinking water monthly water fee per household	1000drams/ tap
D17	How often do you usually pay water fees?	each month
D18	Water fee structure 1Flate rate, 2 Having water tariff	1000 drams/ tap
D19	Where do you acquire the irrigation water?	river, rainwater, pump station
D20	Are you satisfied with irrigation water supply volume?	almost sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Martirosyan Shartak
E2	Position	administration deputy head
E3	Telephone	(093)098446
E4	Quantity and present condition of the water supply facilities: spring/ intake	1-rehabilitated
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	1-rehabilitated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	2-non - sufficient, 1-good
E7	Quantity and present condition of the water supply facilities: net/distribution	partially rehabilitated
E8	Quantity and present condition of the water supply facilities: public tap	rehabilitated
E9	Quantity and present condition of the water supply facilities: pump	2-rehabilitated
E10	Who is the owner of the water supply facilities?	community, water commun.
E11	Who is engaged in the water supply facilities repairing works?	watercomm.
E12	How do you repair the water supply facilities?	by ourselves, inviting a specialist
E13	Who is in charge of the repair work in the community?	hired specialist fromcommunity (S. Martirosyan)
E14	How you prepare O&M costs?	water fee
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	600,000
	Labor cost (AMD)	0
	Repair cost(AMD)	150,000
	Others(AMD)	0
	Total (AMD)	750,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	water fee
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	absent
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Gegharkunik
No.19 Lchavan



	N	E	H (m)
A	$40^0$08’57.0”	$45^0$36’33.0”	2026
B	$40^0$08’45.5”	$45^0$36’52.5”	2079

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
800	200	steel
DISTRIBUTION PIPELINE		
1500	100	cast iron
2500	100	steel

LEGENDS

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

SCALE

0 50 100 150 200 250 m

Gegharkunik Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
19	Lchavan	JICA STUDY TEAM 2007

Marz : **Gegharkunik** No.19
Name : **Lchavan**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
1	Population	700	persons	70.0	
2	Factory	-	nos	0.0	
3	School (pupils)	130	pupils	1.3	
4	Medical Ambulance Station	-	nos	-	
5	Policlinic	-	nos	-	
6	Livestocks (87lit/household)	104	household	9.0	
	Sub-total			80.3	
	Unaccouted for water (20%)			16.1	
1	Average Daily Water Demand			96.4	m3/day
2	Maximum Daily Water Demand			115.6	m3/day
3	Maximum Hourly Water Demand			15.7	m3/hr
B	**WATER SUPPLY PLAN**				
1	Water source type	Nr. Total vol.			
a	Spring	1 45.0	lit/sec	3888.0	m3/day
`	Total			3888.0	m3/day
2	Required reservoir volume			188	m3

C WATER SUPPLY FACILITIES REHABILITATION PLAN

No	Item	Quantity	Unit	
1	Intake			
	1m3		nos	
	2m3		nos	
	3m3	1	nos	
	4m3		nos	
2	Transmission pipe			
	50mm diameter		m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter		m	
	150mm diameter		m	
	200mm diameter	800	m	
	250mm diameter		m	
3	Reservoir			
	200m3 capacity	1	nos	
4	Distribution pipe			Done by pilot project
	50mm diameter		m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter	4,000	m	1650m
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	-	nos	Done by pilot project
6	Water meter installation	-	nos	"
7	Public tap	-	nos	"
8	Chlorination	-	nos	"
9	Pumps	1	nos	Q=90l/sec; H=85m

Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Gegharkunik	
No. 19	Lchavan	JICA STUDY TEAM

Marz : **Gegharkunik**
No. : **19**
Name : **Lchavan**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3		nos	367,700	
		2m3		nos	545,000	
		3m3	1	nos	669,100	669,100
		4m3		nos	805,100	
	Sub-total					669,100
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm	800	m	19,440	15,552,000
		250mm		m	27,040	
	Sub-total					15,552,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3	1	nos	22,524,600	22,524,600
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					22,524,600
4	Distribution Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	4,000	m	9,680	38,720,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					38,720,000
5	House Connection			nos	74,000	
6	Water Meter Installation			nos	80,000	
7	Public Tap			nos	90,000	
8	Chlorilation Equipment			nos	500,000	
9	Pump Replacement		1	nos	10,000,000	10,000,000
10	Drainage and Sewerage	concrete surfa	1,600	m	3,600	5,760,000
	Total				AMD	93,225,700
					Equivalent to USD	305,138
					Equivalent to JPY	32,192,038
					AMD	USD
	Investment Cost per household		104	HH	896,401	2,934
	Investment Cost per person		700	persons	133,180	436

GEGHARKUNIK MARZ
Marutuni District
No 19 Lchavan

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		29.3																																							
Unit rate	AMD/m3				120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00	123.96	128.05	132.28	136.64	141.15	145.81	150.62	155.59	160.73	166.03	171.51	177.17	183.01	189.05	195.29	201.74	208.39	215.27	222.38	229.71	237.29	245.13	253.21	261.57	270.20	279.12	288.33	297.84	307.67
Sub-total		181.07	0.00	0.00	1.30	2.60	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.27	3.38	3.49	3.60	3.72	3.85	3.97	4.10	4.24	4.38	4.52	4.67	4.83	4.99	5.15	5.32	5.50	5.68	5.87	6.06	6.26	6.47	6.68	6.90	7.13	7.36	7.61	7.86	8.12
B Operating Costs																																									
1. Staff salary																																									
Inspectors	person				1																																				
Pump operators	person				1																																				
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				176																																				
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		7.73			0.05	0.09	0.11	0.12	0.12	0.12	0.13	0.13	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.17	0.18	0.18	0.19	0.20	0.20	0.21	0.22	0.22	0.23	0.24	0.25	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35
3. Electricity (for pump)		63.04			0.35	0.73	0.92	0.95	0.98	1.02	1.05	1.08	1.12	1.16	1.20	1.23	1.28	1.32	1.36	1.41	1.45	1.50	1.55	1.60	1.65	1.71	1.76	1.82	1.88	1.95	2.01	2.08	2.14	2.22	2.29	2.36	2.44	2.52	2.61	2.69	2.78	2.87
4. Maintenance cost		34.29			0.19	0.40	0.50	0.52	0.54	0.55	0.57	0.59	0.61	0.63	0.65	0.67	0.69	0.72	0.74	0.76	0.79	0.82	0.84	0.87	0.90	0.93	0.96	0.99	1.02	1.06	1.09	1.13	1.17	1.21	1.24	1.29	1.33	1.37	1.42	1.46	1.51	1.56
Pump repair					0.12	0.25	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	0.72	0.74	0.77	0.79	0.82	0.85	0.88	0.90	0.93	0.97	1.00
Pipe repair					0.07	0.14	0.18	0.19	0.19	0.20	0.21	0.21	0.22	0.23	0.24	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.30	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.40	0.41	0.42	0.44	0.45	0.47	0.48	0.50	0.51	0.53	0.55	0.57
5. Pump replacement		25.65																9.76															15.89									
Sub-total		166.11	0.00	0.00	1.07	1.72	2.04	2.12	2.19	2.25	2.33	2.40	2.49	2.57	2.66	2.74	2.84	12.69	3.03	3.12	3.23	3.33	3.44	3.56	3.67	3.80	3.92	4.04	4.18	4.33	4.47	4.61	20.65	4.93	5.08	5.25	5.43	5.60	5.80	5.98	6.17	6.38
C Gross Income (A-B)		14.96	0.00	0.00	0.23	0.88	1.13	1.05	0.98	0.92	0.84	0.77	0.68	0.70	0.72	0.75	0.76	-8.97	0.82	0.85	0.87	0.91	0.94	0.96	1.00	1.03	1.07	1.11	1.14	1.17	1.21	1.26	-14.59	1.33	1.39	1.43	1.47	1.53	1.56	1.63	1.69	1.74
D Depreciation cost		88.55						2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53
E Interest paid		29.95	0.04	0.07	0.55	1.03	1.26	1.27	1.27	1.27	1.27	1.27	1.27	1.23	1.20	1.16	1.12	1.08	1.05	1.01	0.97	0.93	0.89	0.85	0.81	0.77	0.72	0.68	0.64	0.60	0.55	0.51	0.47	0.42	0.38	0.33	0.29	0.24	0.19	0.14	0.10	0.05
F Net Income		-103.54	-0.04	-0.07	-0.32	-0.15	-0.13	-2.75	-2.82	-2.88	-2.96	-3.03	-3.12	-3.06	-3.01	-2.94	-2.89	-12.58	-2.76	-2.69	-2.63	-2.55	-2.48	-2.42	-2.34	-2.27	-2.18	-2.10	-2.03	-1.96	-1.87	-1.78	-17.59	-1.62	-1.52	-1.43	-1.35	-1.24	-1.16	-1.04	-0.94	-0.84
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		-103.54	-0.04	-0.07	-0.32	-0.15	-0.13	-2.75	-2.82	-2.88	-2.96	-3.03	-3.12	-3.06	-3.01	-2.94	-2.89	-12.58	-2.76	-2.69	-2.63	-2.55	-2.48	-2.42	-2.34	-2.27	-2.18	-2.10	-2.03	-1.96	-1.87	-1.78	-17.59	-1.62	-1.52	-1.43	-1.35	-1.24	-1.16	-1.04	-0.94	-0.84
OM Cost Recovery Ratio (A/B)		109%	0%	0%	122%	151%	155%	150%	145%	141%	136%	132%	127%	127%	127%	127%	127%	29%	127%	127%	127%	127%	127%	127%	127%	127%	127%	127%	127%	127%	127%	127%	29%	127%	127%	127%	127%	127%	127%	127%	127%	127%

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	-103.54	-0.04	-0.07	-0.32	-0.15	-0.13	-2.75	-2.82	-2.88	-2.96	-3.03	-3.12	-3.06	-3.01	-2.94	-2.89	-12.58	-2.76	-2.69	-2.63	-2.55	-2.48	-2.42	-2.34	-2.27	-2.18	-2.10	-2.03	-1.96	-1.87	-1.78	-17.59	-1.62	-1.52	-1.43	-1.35	-1.24	-1.16	-1.04	-0.94	-0.84
2. Depreciation cost	88.55	0.00	0.00	0.00	0.00	0.00	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53
3. Interest Paid	29.95	0.04	0.07	0.55	1.03	1.26	1.27	1.27	1.27	1.27	1.27	1.27	1.23	1.20	1.16	1.12	1.08	1.05	1.01	0.97	0.93	0.89	0.85	0.81	0.77	0.72	0.68	0.64	0.60	0.55	0.51	0.47	0.42	0.38	0.33	0.29	0.24	0.19	0.14	0.10	0.05
Sub-total	14.96	0.00	0.00	0.23	0.88	1.13	1.05	0.98	0.92	0.84	0.77	0.68	0.70	0.72	0.75	0.76	-8.97	0.82	0.85	0.87	0.91	0.94	0.96	1.00	1.03	1.07	1.11	1.14	1.17	1.21	1.26	-14.59	1.33	1.39	1.43	1.47	1.53	1.56	1.63	1.69	1.74
B Finances																																									
1. Project Loan	127.04	3.91	2.79	47.95	49.01	22.35	0.58	0.45																																	
2. Local fund	42.80	1.29	0.91	16.25	16.49	7.73	0.07	0.06																																	
Sub-total	169.84	5.20	3.70	64.20	65.50	30.08	0.65	0.51																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	23.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Subsidy for debt services	118.49	0.04	0.07	0.32	0.15	0.13	0.22	0.29	0.35	0.43	0.50	4.24	4.22	4.21	4.17	4.16	4.92	4.11	4.08	4.06	4.01	3.98	3.96	3.93	3.90	3.85	3.81	3.78	3.76	3.71	3.66	4.93	3.59	3.54	3.49	3.46	3.39	3.36	3.29	3.24	3.18
Sub-total	142.05	0.04	0.07	0.32	0.15	0.13	0.22	0.29	0.35	0.43	0.50	4.24	4.22	4.21	4.17	4.16	13.89	4.11	4.08	4.06	4.01	3.98	3.96	3.93	3.90	3.85	3.81	3.78	3.76	3.71	3.66	19.52	3.59	3.54	3.49	3.46	3.39	3.36	3.29	3.24	3.18
Total Cash Inflow	326.85	5.24	3.77	64.75	66.53	31.34	1.92	1.78	1.27	1.27	1.27	4.92	4.92	4.93	4.92	4.92	4.92	4.93	4.93	4.93	4.92	4.92	4.92	4.93	4.93	4.92	4.92	4.92	4.93	4.92	4.92	4.93	4.92	4.93	4.92	4.93	4.92	4.92	4.92	4.93	4.92
APPLICATION OF FUNDS																																								
D Project disbursement	169.84	5.20	3.70	64.20	65.50	30.08	0.65	0.51																																	
E Total debt services																																								
1. Loan repayment	127.06											3.65	3.69	3.73	3.76	3.80	3.84	3.88	3.92	3.96	3.99	4.03	4.07	4.12	4.16	4.20	4.24	4.28	4.33	4.37	4.41	4.46	4.50	4.55	4.59	4.64	4.68	4.73	4.78	4.83	4.87
2. Interest paid	29.95	0.04	0.07	0.55	1.03	1.26	1.27	1.27	1.27	1.27	1.27	1.27	1.23	1.20	1.16	1.12	1.08	1.05	1.01	0.97	0.93	0.89	0.85	0.81	0.77	0.72	0.68	0.64	0.60	0.55	0.51	0.47	0.42	0.38	0.33	0.29	0.24	0.19	0.14	0.10	0.05
Sub-total	157.01	0.04	0.07	0.55	1.03	1.26	1.27	1.27	1.27	1.27	1.27	4.92	4.92	4.93	4.92	4.92	4.92	4.93	4.93	4.93	4.92	4.92	4.92	4.93	4.93	4.92	4.92	4.92	4.93	4.92	4.92	4.93	4.92	4.93	4.92	4.93	4.92	4.92	4.92	4.93	4.92
Total Cash Outflow	326.85	5.24	3.77	64.75	66.53	31.34	1.92	1.78	1.27	1.27	1.27	4.92	4.92	4.93	4.92	4.92	4.92	4.93	4.93	4.93	4.92	4.92	4.92	4.93	4.93	4.92	4.92	4.92	4.93	4.92	4.92	4.93	4.92	4.93	4.92	4.93	4.92	4.92	4.92	4.93	4.92
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
Investment Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	10%	0%	0%	42%	85%	90%	83%	77%	72%	66%	61%	14%	14%	15%	15%	15%	0%	17%	17%	18%	18%	19%	20%	20%	21%	22%	23%	23%	24%	25%	26%	0%	27%	28%	29%	30%	31%	32%	33%	34%	35%
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%

GEGHARKUNIK MARZ
Marutuni District
No 19 Lchavan

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	181.07	56.0%
	Subsidy	142.05	44.0%
	Total	323.12	100.0%
2	**Expenditure**		
	OM cost	166.11	51.4%
	Loan repayment	127.06	39.3%
	Interest paid	29.95	9.3%
	Surplus cash	0.00	0.0%
	Total	323.12	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	114.01	3.82	2.73	43.84	43.43	19.24	0.53	0.42																																
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	4.10			0.05	0.09	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Electricity	31.60			0.35	0.29	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Mantenance cost	17.50			0.19	0.39	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47
Pump replacement	12.00																6.00															6.00								
Sub-total	83.43			1.07	1.25	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	7.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	7.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92
Total Outflow	197.44	3.82	2.73	44.91	44.68	21.16	2.45	2.34	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	7.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	7.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92
B BENEFIT																																								
1. Water Tariff	118.02	0.00	0.00	1.30	2.60	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17
2. Subsidy	118.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.97	2.99	3.01	3.01	3.04	12.81	3.06	3.07	3.09	3.08	3.09	3.11	3.12	3.13	3.13	3.13	3.14	3.16	3.16	3.15	19.05	3.17	3.16	3.16	3.17	3.15	3.17	3.15	3.14	3.13
Total Inflow	236.92	0.00	0.00	1.30	2.60	3.17	3.17	3.17	3.17	3.17	3.17	6.14	6.16	6.18	6.18	6.21	15.98	6.23	6.24	6.26	6.25	6.26	6.28	6.29	6.30	6.30	6.30	6.31	6.33	6.33	6.32	22.22	6.34	6.33	6.33	6.34	6.32	6.34	6.32	6.31	6.30
NET BENEFIT	39.48	-3.82	-2.73	-43.6	-42.1	-18.0	0.72	0.83	1.25	1.25	1.25	4.22	4.24	4.26	4.26	4.29	8.06	4.31	4.32	4.34	4.33	4.34	4.36	4.37	4.38	4.38	4.38	4.39	4.41	4.41	4.40	14.30	4.42	4.41	4.41	4.42	4.40	4.42	4.40	4.39	4.38

FIRR = **1.47%**

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	-16.22	-4.20	-3.00	-48.0	-46.4	-19.9	0.67	0.79	1.25	1.25	1.25	4.22	4.24	4.26	4.26	4.29	8.06	4.31	4.32	4.34	4.33	4.34	4.36	4.37	4.38	4.38	4.38	4.39	4.41	4.41	4.40	14.30	4.42	4.41	4.41	4.42	4.40	4.42	4.40	4.39	4.38
	2	Capital cost 20% up	-26.92	-4.58	-3.28	-52.4	-50.8	-21.8	0.61	0.75	1.25	1.25	1.25	4.22	4.24	4.26	4.26	4.29	8.06	4.31	4.32	4.34	4.33	4.34	4.36	4.37	4.38	4.38	4.38	4.39	4.41	4.41	4.40	14.30	4.42	4.41	4.41	4.42	4.40	4.42	4.40	4.39	4.38
2	1	OM cost 10% up	-11.30	-3.82	-2.73	-43.7	-42.2	-18.2	0.53	0.64	1.06	1.06	1.06	4.03	4.05	4.07	4.07	4.10	7.27	4.12	4.13	4.15	4.14	4.15	4.17	4.18	4.19	4.19	4.19	4.20	4.22	4.22	4.21	13.51	4.23	4.22	4.22	4.23	4.21	4.23	4.21	4.20	4.19
	2	OM cost 20% up	-17.07	-3.82	-2.73	-43.8	-42.3	-18.4	0.34	0.45	0.87	0.87	0.87	3.84	3.86	3.88	3.88	3.91	6.48	3.93	3.94	3.96	3.95	3.96	3.98	3.99	4.00	4.00	4.00	4.01	4.03	4.03	4.02	12.72	4.04	4.03	4.03	4.04	4.02	4.04	4.02	4.01	4.00
3	1	Revenue 10% down	-21.45	-3.82	-2.73	-43.7	-42.3	-18.3	0.40	0.51	0.93	0.93	0.93	3.61	3.62	3.64	3.64	3.67	6.46	3.69	3.70	3.71	3.71	3.71	3.73	3.74	3.75	3.75	3.75	3.76	3.78	3.78	3.77	12.08	3.79	3.78	3.78	3.79	3.77	3.79	3.77	3.76	3.75
	2	Revenue 20% down	-37.37	-3.82	-2.73	-43.9	-42.6	-18.6	0.09	0.20	0.62	0.62	0.62	2.99	3.01	3.02	3.02	3.05	4.86	3.06	3.07	3.09	3.08	3.09	3.10	3.11	3.12	3.12	3.12	3.13	3.14	3.14	3.14	9.86	3.15	3.14	3.14	3.15	3.14	3.15	3.14	3.13	3.12

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	0.99%	4.91	20.38%
	2	Capital cost 20% up	0.56%	16.48	6.07%
2	1	OM cost 10% up	1.18%	2.50	39.95%
	2	OM cost 20% up	0.88%	6.83	14.64%
3	1	Revenue 10% down	0.62%	13.63	7.33%
	2	Revenue 20% down	-0.33%	-54.13	-1.85%

No.20 Lusakunq

Information on Existing Water Sources (Gegharkunik)

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

No.20 Community Lusakunq
District Vardenis
Marz Gegharkunik

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	40	9	55.8	45	41	29.7	1,975	20.0	30.0	30.0
2	Khachaghbyur	40	9	49.0	45	41	43.9	1,974	90.0	90.0	90.0
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	There are 2 sources. The international network is to be rehabilitated.
Alternative sources if any	No alternative sources are needed.

No.20 Community Lusakunq
District Vardenis
Marz Gegharkunik
Sampling date 16/Aug/2007

	Parameters analysed	Units	No.1 Khachagh byur				Guidelines	
							WHO	Armenia
a	pH		7.8				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	8.8					
c	TDS	Mg/L	74				1000	1000
1	Al:Aluminum	Mg/L	n.d.				0.10	0.50
2	B:Boron	Mg/L	n.d.				0.70	0.50
3	Cl:Chloride	Mg/L	6				250	350
4	Cr:Chrome	Mg/L	<0.01				0.05	0.05
5	Cu:Copper	Mg/L	n.d.				2	1
6	F:Fluoride	Mg/L	0.41				1.50	
7	Hardness	Mg/L	125				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	0.170				0.070	0.250
11	Ni:Nickel	Mg/L	n.d.				0.020	0.100
12	Nitrate(NO3+)	Mg/L	3.1				50.0	45.0
13	SO4:Sulfate	Mg/L	4.0				250.0	500.0
14	Zn:Zink	Mg/L	n.d.				3.0	5.0
15	As:Arsenic	Mg/L	n.d.				0.0	0.1
16	Ba:Barium	Mg/L	0.01				0.70	0.10
17	Be:Berillium	Mg/L	n.d.				NA	0.00020
18	Cd:Cadmium	Mg/L	n.d.				0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001				0.010	0.030
20	Hg:Mercury	Mg/L	n.d.				0.00100	0.00050
21	Se:Selenium	Mg/L	n.d.				0.010	0.010
22	Sr:Strontium	Mg/L	n.d.				NA	7.0
23	CN:Cyanide	Mg/L	n.d.				0.070	0.035
24	Coli form bacteria	bacteria per 100 ml					-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
26	Total bacteria	bacteria per 1 ml					-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.20 Community Lusakunq
District Vardenis
Marz Gegharkunik

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	01	24	0.3	Not identified
2	03	02	20	0.3	Not identified
3	04	17	22	0.3	Not identified
4	04	25	20	0.3	Not identified
5	05	15	22	0.3	Not identified
6	06	14	24	0.3	Not identified
7	07	17	22	0.3	Not identified
8	08	08	24	0.3	Not identified
9	08	23	24	0.3	Not identified

No. 20 **Marz** Gegharkunik **Community** Lusakunq

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Fair	Possible	
2	Transmission pipeline	Possible	Possible	
3	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°09′55.8″	45°41′29.7″	1,975	1947	Masonry	30.0	Yes
2	Spring	40°09′49.0″	45°41′43.9″	1,974	1997	Concrete	90.0	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 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	2,000	150	Steel	1997	Little	No
2	2,000	100	AsbestosCement	1947	Huge	Yes
3	500	75	AsbestosCement	1947	Little	Yes

7. PUMP STATION

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

8. PUBLIC TAPS

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

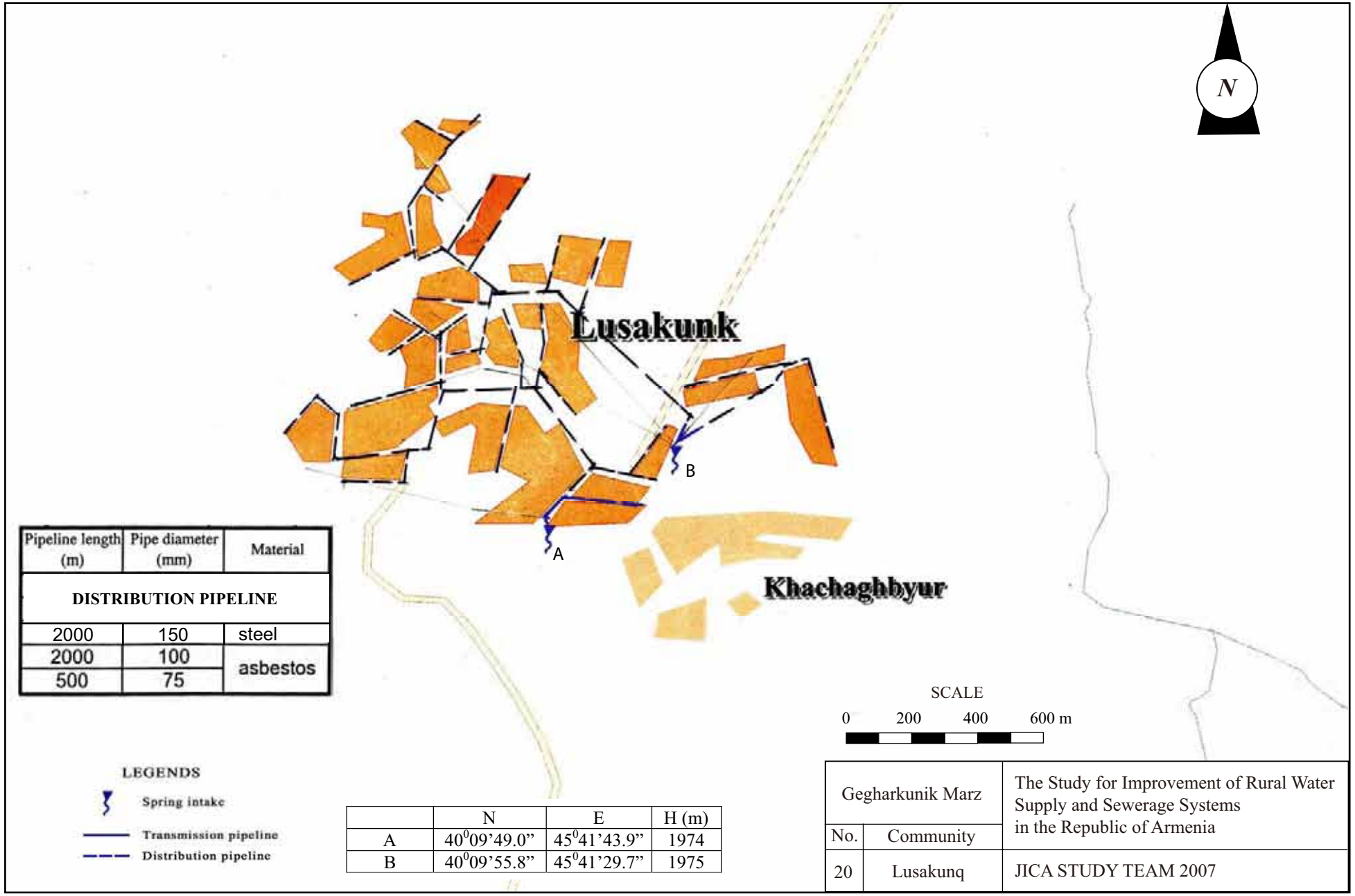
9. DRAINAGE SYSTEM

Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Gegharkunik**
Number and Name of Community	**No.20 Lusakunq**
District	**Vardenis**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	1,497
A2	Actual population in 2007	1,510
A3	Number of households	431
A4.1	Elderly people	139
A4.2	Population in labor force (age from 16 to 62)	1,000
A4.3	Children	374
A5.1	Pensioners	192
A5.2	Unemployed	absent
A5.3	Receiving benefits	56
A6	Average monthly income of household (AMD)	20,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	274
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	4,413
	Annual Budget of the community 2005, in thousand AMD	5,402
	Annual Budget of the community 2006, in thousand AMD	4,605
	Annual Budget of the community 2007, in thousand AMD	2,000
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	0
	Amount spent in drinking water sector 2005, in thousand AMD	0
	Amount spent in drinking water sector 2006, in thousand AMD	0
	Amount spent in drinking water sector 2007, in thousand AMD	0
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	potatoes, meat, dairy
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1.Yes 2.No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	in the process
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	0
D8	How many house connection household set the water meter	0
D9	Number of public taps	1
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?	-
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)	100
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	200
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 Khachaghbyur spring
D20	Are you satisfied with irrigation water supply volume?	insufficient.
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Ohanyan Eduard
E2	Position	administration head
E3	Telephone	(093)204292
E4	Quantity and present condition of the water supply facilities: spring/ intake	1-deteriorated,
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	3-deteriorated,
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	absent
E7	Quantity and present condition of the water supply facilities: net/distribution	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	deteriorated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community and residents
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	specialist from community
E14	How you prepare O&M costs?	donation from residents
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	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?	water fee
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	absent
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent



Pipeline length (m)	Pipe diameter (mm)	Material
DISTRIBUTION PIPELINE		
2000	150	steel
2000	100	asbestos
500	75	

SCALE

0 200 400 600 m

LEGENDS

Spring intake

Transmission pipeline

Distribution pipeline

	N	E	H (m)
A	$40^0$09’49.0”	$45^0$41’43.9”	1974
B	$40^0$09’55.8”	$45^0$41’29.7”	1975

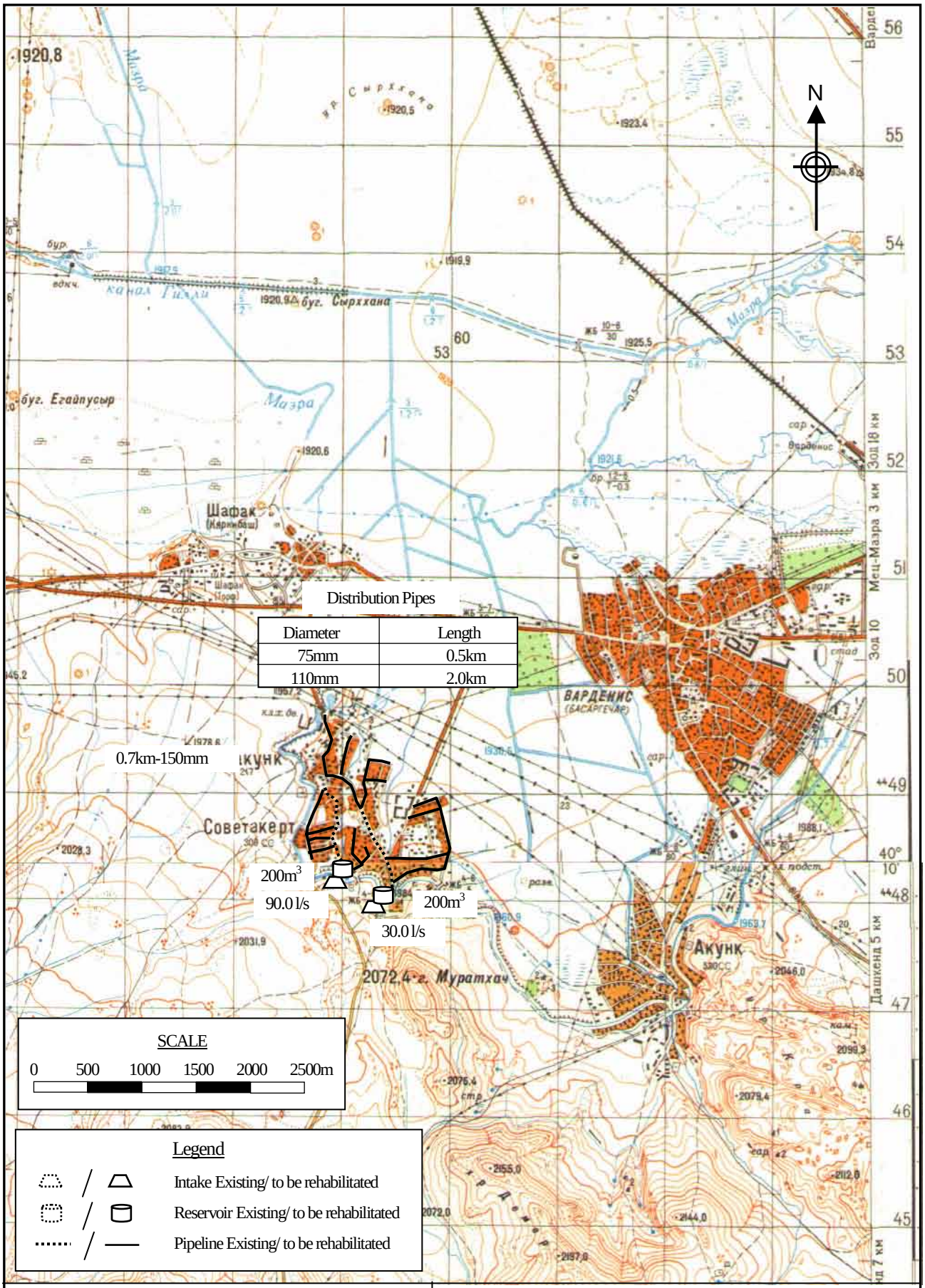
Gegharkunik Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
20	Lusakunq	JICA STUDY TEAM 2007

Marz : **Gegharkunik** No.20
Name : **Lusakunq**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	1,510	persons	151.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	274	pupils	2.7	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	431	household	37.5	
	Sub-total			191.2	
	Unaccouted for water (20%)			38.2	
1	Average Daily Water Demand			229.4	m3/day
2	Maximum Daily Water Demand			275.3	m3/day
3	Maximum Hourly Water Demand			26.8	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	1	30.0	lit/sec		2592.0	m3/day
	b Spring	1	90.0	lit/sec		7776.0	m3/day
`	Total					10368.0	m3/day
	2 Required reservoir volume					322	m3

C	**WATER SUPPLY FACILITIES REHABILITATION PLAN**		
	No Item	Quantity	Unit
	1 Intake		
	1m3		nos
	2m3	1	nos
	3m3		nos
	4m3	1	nos
	2 Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
	3 Reservoir		
	200m3 capacity	2	nos
	4 Distribution pipe		
	50mm diameter		m
	75mm diameter	500	m
	90mm diameter		m
	110mm diameter	2,000	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
	5 House connection	431	nos
	6 Water meter installation	431	nos
	7 Public tap	5	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	Gegharkunik	
No. 20	Lusakunq	JICA STUDY TEAM

Marz : **Gegharkunik**
No. : **20**
Name : **Lusakunq**

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	1	nos	805,100	805,100
	Sub-total					1,350,100
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	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		m	5,520	
		75mm	500	m	7,160	3,580,000
		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					22,940,000
5	House Connection		431	nos	74,000	31,894,000
6	Water Meter Installation		431	nos	80,000	34,480,000
7	Public Tap		5	nos	90,000	450,000
8	Chlorilation Equipment		2	nos	500,000	1,000,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	1,000	m	3,600	3,600,000
	Total				AMD	140,763,300
					Equivalent to USD	460,734
					Equivalent to JPY	48,607,385
					AMD	USD
	Investment Cost per household		431	HH	326,597	1,069
	Investment Cost per person		1,510	persons	93,221	305

GEGHARKUNIK MARZ
Marutuni District
No 20 Lusakunq

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		69.8																																							
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		389.54	0.00	0.00	1.03	2.06	2.51	2.60	4.40	4.54	4.69	4.85	7.26	7.50	7.75	8.01	8.27	8.54	8.83	9.12	9.42	9.73	10.05	10.38	10.72	11.08	11.44	11.82	12.21	12.61	13.03	13.46	13.91	14.36	14.84	15.33	15.83	16.36	16.90	17.45	18.03	18.62
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				419																																					
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		18.38			0.10	0.21	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.40	0.41	0.42	0.44	0.45	0.47	0.48	0.50	0.51	0.53	0.55	0.57	0.58	0.60	0.62	0.64	0.67	0.69	0.71	0.73	0.76	0.78	0.81	0.84
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		11.68			0.06	0.14	0.17	0.18	0.18	0.19	0.19	0.20	0.21	0.21	0.22	0.23	0.24	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.40	0.41	0.42	0.44	0.45	0.47	0.48	0.50	0.51	0.53
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	0.14	0.17	0.18	0.18	0.19	0.19	0.20	0.21	0.21	0.22	0.23	0.24	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.40	0.41	0.42	0.44	0.45	0.47	0.48	0.50	0.51	0.53
5. Pump replacement		0.00																0.00															0.00									
Sub-total		47.76	0.00	0.00	0.40	0.60	0.70	0.72	0.74	0.77	0.79	0.82	0.85	0.87	0.90	0.93	0.96	0.99	1.03	1.06	1.09	1.14	1.17	1.21	1.25	1.29	1.33	1.38	1.42	1.47	1.51	1.56	1.62	1.67	1.73	1.79	1.84	1.90	1.96	2.03	2.09	2.17
C Gross Income (A-B)		341.78	0.00	0.00	0.63	1.46	1.81	1.88	3.66	3.77	3.90	4.03	6.41	6.63	6.85	7.08	7.31	7.55	7.80	8.06	8.33	8.59	8.88	9.17	9.47	9.79	10.11	10.44	10.79	11.14	11.52	11.90	12.29	12.69	13.11	13.54	13.99	14.46	14.94	15.42	15.94	16.45
D Depreciation cost		133.70						3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82
E Interest paid		43.00	0.04	0.07	0.77	1.49	1.82	1.82	1.82	1.82	1.82	1.82	1.83	1.78	1.72	1.67	1.62	1.56	1.51	1.45	1.39	1.34	1.28	1.22	1.16	1.10	1.04	0.98	0.92	0.86	0.80	0.73	0.67	0.61	0.54	0.48	0.41	0.34	0.28	0.21	0.14	0.07
F Net Income		165.08	-0.04	-0.07	-0.14	-0.03	-0.01	-3.76	-1.98	-1.87	-1.74	-1.61	0.76	1.03	1.31	1.59	1.87	2.17	2.47	2.79	3.12	3.43	3.78	4.13	4.49	4.87	5.25	5.64	6.05	6.46	6.90	7.35	7.80	8.26	8.75	9.24	9.76	10.30	10.84	11.39	11.98	12.56
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		165.08	-0.04	-0.07	-0.14	-0.03	-0.01	-3.76	-1.98	-1.87	-1.74	-1.61	0.76	1.03	1.31	1.59	1.87	2.17	2.47	2.79	3.12	3.43	3.78	4.13	4.49	4.87	5.25	5.64	6.05	6.46	6.90	7.35	7.80	8.26	8.75	9.24	9.76	10.30	10.84	11.39	11.98	12.56
OM Cost Recovery Ratio (A/B)		816%	0%	0%	256%	342%	359%	361%	595%	590%	594%	591%	854%	862%	861%	861%	861%	863%	857%	860%	864%	854%	859%	858%	858%	859%	860%	857%	860%	858%	863%	863%	859%	860%	858%	856%	860%	861%	862%	860%	863%	858%

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	165.08	-0.04	-0.07	-0.14	-0.03	-0.01	-3.76	-1.98	-1.87	-1.74	-1.61	0.76	1.03	1.31	1.59	1.87	2.17	2.47	2.79	3.12	3.43	3.78	4.13	4.49	4.87	5.25	5.64	6.05	6.46	6.90	7.35	7.80	8.26	8.75	9.24	9.76	10.30	10.84	11.39	11.98	12.56
2. Depreciation cost	133.70	0.00	0.00	0.00	0.00	0.00	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82
3. Interest Paid	43.00	0.04	0.07	0.77	1.49	1.82	1.82	1.82	1.82	1.82	1.82	1.83	1.78	1.72	1.67	1.62	1.56	1.51	1.45	1.39	1.34	1.28	1.22	1.16	1.10	1.04	0.98	0.92	0.86	0.80	0.73	0.67	0.61	0.54	0.48	0.41	0.34	0.28	0.21	0.14	0.07
Sub-total	341.78	0.00	0.00	0.63	1.46	1.81	1.88	3.66	3.77	3.90	4.03	6.41	6.63	6.85	7.08	7.31	7.55	7.80	8.06	8.33	8.59	8.88	9.17	9.47	9.79	10.11	10.44	10.79	11.14	11.52	11.90	12.29	12.69	13.11	13.54	13.99	14.46	14.94	15.42	15.94	16.45
B Finances																																									
1. Project Loan	182.85	3.91	2.79	70.50	72.21	32.41	0.58	0.45																																	
2. Local fund	61.43	1.29	0.91	23.87	24.31	10.92	0.07	0.06																																	
Sub-total	244.28	5.20	3.70	94.37	96.52	43.33	0.65	0.51																																	
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	1.68	0.04	0.07	0.14	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.68	0.46	0.23	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	1.68	0.04	0.07	0.14	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.68	0.46	0.23	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Cash Inflow	587.74	5.24	3.77	95.14	98.01	45.15	2.53	4.17	3.77	3.90	4.03	7.09	7.09	7.08	7.09	7.31	7.55	7.80	8.06	8.33	8.59	8.88	9.17	9.47	9.79	10.11	10.44	10.79	11.14	11.52	11.90	12.29	12.69	13.11	13.54	13.99	14.46	14.94	15.42	15.94	16.45
APPLICATION OF FUNDS																																									
D Project disbursement	244.28	5.20	3.70	94.37	96.52	43.33	0.65	0.51																																	
E Total debt services																																									
1. Loan repayment	182.85											5.26	5.31	5.36	5.42	5.47	5.52	5.58	5.64	5.69	5.75	5.81	5.86	5.92	5.98	6.04	6.10	6.16	6.23	6.29	6.35	6.41	6.48	6.54	6.61	6.67	6.74	6.81	6.88	6.95	7.02
2. Interest paid	43.00	0.04	0.07	0.77	1.49	1.82	1.82	1.82	1.82	1.82	1.82	1.83	1.78	1.72	1.67	1.62	1.56	1.51	1.45	1.39	1.34	1.28	1.22	1.16	1.10	1.04	0.98	0.92	0.86	0.80	0.73	0.67	0.61	0.54	0.48	0.41	0.34	0.28	0.21	0.14	0.07
Sub-total	225.85	0.04	0.07	0.77	1.49	1.82	1.82	1.82	1.82	1.82	1.82	7.09	7.09	7.08	7.09	7.09	7.08	7.09	7.09	7.08	7.09	7.09	7.08	7.08	7.08	7.08	7.08	7.08	7.09	7.09	7.08	7.08	7.09	7.08	7.09	7.08	7.08	7.09	7.09	7.09	7.09
Total Cash Outflow	470.13	5.24	3.77	95.14	98.01	45.15	2.47	2.33	1.82	1.82	1.82	7.09	7.09	7.08	7.09	7.09	7.08	7.09	7.09	7.08	7.09	7.09	7.08	7.08	7.08	7.08	7.08	7.08	7.09	7.09	7.08	7.08	7.09	7.08	7.09	7.08	7.08	7.09	7.09	7.09	7.09
F Net Surplus Cash (A+C2)-E	117.61	0.00	0.00	0.00	0.00	0.00	0.06	1.84	1.95	2.08	2.21	0.00	0.00	0.00	0.00	0.22	0.47	0.71	0.97	1.25	1.50	1.79	2.09	2.39	2.71	3.03	3.36	3.71	4.05	4.43	4.82	5.21	5.60	6.03	6.45	6.91	7.38	7.85	8.33	8.85	9.36
Investment Cost Recovery Ratio (%)																																									
Cost recovery by water fee (A/E)	151%	0%	0%	81%	98%	99%	103%	201%	207%	214%	221%	90%	94%	97%	100%	103%	107%	110%	114%	118%	121%	125%	130%	134%	138%	143%	147%	152%	157%	162%	168%	174%	179%	185%	191%	198%	204%	211%	217%	225%	232%
Cost recovery by water fee + subsidy ((A+C2)/E)	152%	100%	100%	100%	100%	100%	103%	201%	207%	214%	221%	100%	100%	100%	100%	103%	107%	110%	114%	118%	121%	125%	130%	134%	138%	143%	147%	152%	157%	162%	168%	174%	179%	185%	191%	198%	204%	211%	217%	225%	232%

GEGHARKUNIK MARZ
Marutuni District
No 20 Lusakunq

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	389.54	99.6%
	Subsidy	1.68	0.4%
	Total	391.22	100.0%
2	**Expenditure**		
	OM cost	47.76	12.2%
	Loan repayment	182.85	46.7%
	Interest paid	43.00	11.0%
	Surplus cash	117.61	30.1%
	Total	391.22	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	163.62	3.82	2.73	64.40	63.92	27.80	0.53	0.42																																
2. Operation and Maintenance Cost																																								
Salary	9.12			0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Chlorine	9.67			0.10	0.21	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Electricity	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mantenance cost	5.95			0.06	0.13	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Pump replacement	0.00																0.00															0.00										
Sub-total	24.74			0.40	0.58	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Total Outflow	188.36	3.82	2.73	64.80	64.50	28.46	1.19	1.08	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
B BENEFIT																																								
1. Water Tariff	244.48	0.00	0.00	1.03	2.06	2.51	2.60	4.40	4.54	4.69	4.85	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26
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	244.48	0.00	0.00	1.03	2.06	2.51	2.60	4.40	4.54	4.69	4.85	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26
NET BENEFIT	56.12	-3.82	-2.73	-63.8	-62.4	-26.0	1.41	3.32	3.88	4.03	4.19	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60

FIRR = 1.54%

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	-21.12	-4.20	-3.00	-70.2	-68.8	-28.7	1.36	3.28	3.88	4.03	4.19	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60
	2	Capital cost 20% up	-36.47	-4.58	-3.28	-76.7	-75.2	-31.5	1.30	3.24	3.88	4.03	4.19	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60
2	1	OM cost 10% up	-7.49	-3.82	-2.73	-63.8	-62.5	-26.0	1.34	3.25	3.81	3.96	4.12	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53
	2	OM cost 20% up	-9.22	-3.82	-2.73	-63.9	-62.6	-26.1	1.28	3.19	3.75	3.90	4.06	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47	6.47
3	1	Revenue 10% down	-22.27	-3.82	-2.73	-63.9	-62.6	-26.2	1.15	2.88	3.43	3.56	3.71	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87
	2	Revenue 20% down	-38.77	-3.82	-2.73	-64.0	-62.9	-26.5	0.89	2.44	2.97	3.09	3.22	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	1.03%	5.00	20.00%
	2	Capital cost 20% up	0.57%	16.95	5.90%
2	1	OM cost 10% up	1.48%	0.43	231.41%
	2	OM cost 20% up	1.41%	0.91	110.40%
3	1	Revenue 10% down	0.91%	7.00	14.28%
	2	Revenue 20% down	0.22%	61.19	1.63%

No.21 Khachaghbyur

Information on Existing Water Sources (Gegharkunik)

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

No.21 Community Khachaghbyur
District Vardenis
Marz Gegharkunik

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Khachaghbyur	40	9	49.0	45	41	43.9	1,974	90.0	90.0	90.0
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	The spring (Khachaghbyour), 150L/sec is used for irrigation. the internal network is to be rehabilitated.
Alternative sources if any	No alternative sources are needed,

No.21 Community Khachaghbyur
District Vardenis
Marz Gegharkunik
Sampling date 14/Aug/2007

	Parameters analysed	Units	No.1				Guidelines	
							WHO	Armenia
a	pH		7.7				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	8.5					
c	TDS	Mg/L	60				1000	1000
1	Al:Aluminum	Mg/L	n.d.				0.10	0.50
2	B:Boron	Mg/L	n.d.				0.70	0.50
3	Cl:Chloride	Mg/L	6				250	350
4	Cr:Chrome	Mg/L	<0.01				0.05	0.05
5	Cu:Copper	Mg/L	n.d.				2	1
6	F:Fluoride	Mg/L	0.06				1.50	
7	Hardness	Mg/L	100				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	<0.006				0.020	0.100
12	Nitrate(NO3+)	Mg/L	2.7				50.0	45.0
13	SO4:Sulfate	Mg/L	2.0				250.0	500.0
14	Zn:Zink	Mg/L	n.d.				3.0	5.0
15	As:Arsenic	Mg/L	n.d.				0.0	0.1
16	Ba:Barium	Mg/L	<0.01				0.70	0.10
17	Be:Berillium	Mg/L	n.d.				NA	0.00020
18	Cd:Cadmium	Mg/L	0.0002				0.0030	0.0010
19	Pb:Lead	Mg/L	0.001				0.010	0.030
20	Hg:Mercury	Mg/L	n.d.				0.00100	0.00050
21	Se:Selenium	Mg/L	n.d.				0.010	0.010
22	Sr:Strontium	Mg/L	n.d.				NA	7.0
23	CN:Cyanide	Mg/L	n.d.				0.070	0.035
24	Coli form bacteria	bacteria per 100 ml	nd				-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml	nd				0	0
26	Total bacteria	bacteria per 1 ml	30				-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.21 Community Khachaghbyur
District Vardenis
Marz Gegharkunik

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	01	11	20	0.3	Not identified
2	02	01	20	0.3	Not identified
3	03	02	20	0.3	Not identified
4	04	17	22	0.3	Not identified
5	05	15	20	0.3	Not identified
6	06	14	22	0.3	Not identified
7	07	17	24	0.3	Not identified
8	08	13	20	0.3	Not identified

No. 21 **Marz** Gegharkunik **Community** Khachaghbyur

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Fair	Possible	
2	Transmission pipeline			
3	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°09′49.0″	45°41′43.9″	1,974	2002	Concrete	90.0	No

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 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	400	200	Steel	2002	Huge	Yes
2	500	150	Steel		Little	No
3	450	125	Steel		Huge	Yes
4	2,700	100	Steel		Huge	Yes
5	1,000	80	Steel		Huge	Yes

7. PUMP STATION

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

8. PUBLIC TAPS

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

9. DRAINAGE SYSTEM

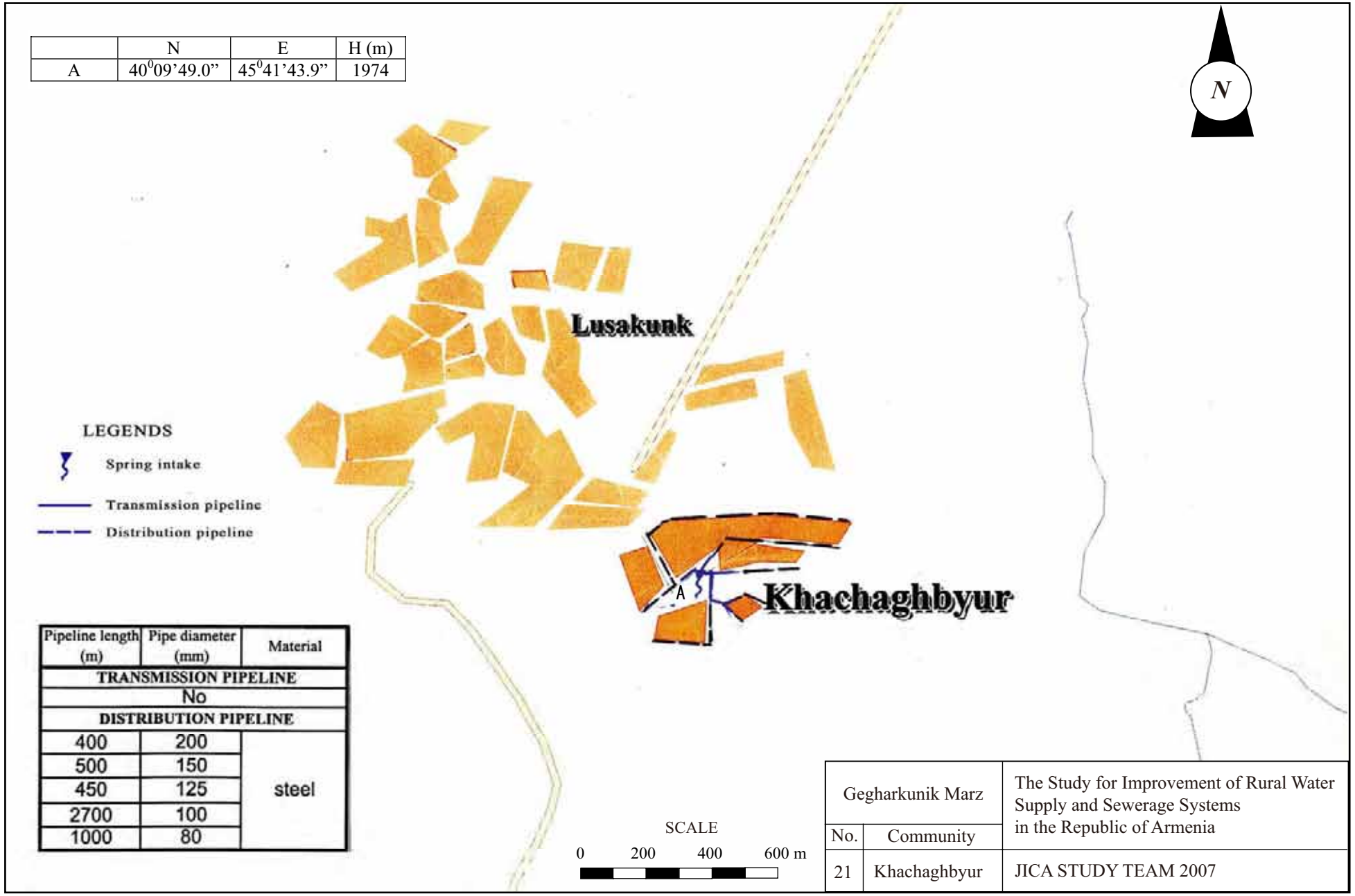
Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Gegharkunik**
Number and Name of Community	**No.21 Khachaghbyur**
District	**Vardenis**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	1,453
A2	Actual population in 2007	1,504
A3	Number of households	463
A4.1	Elderly people	380
A4.2	Population in labor force (age from 16 to 62)	954
A4.3	Children	260
A5.1	Pensioners	130
A5.2	Unemployed	46
A5.3	Receiving benefits	84
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	190
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	3,100
	Annual Budget of the community 2005, in thousand AMD	2,980
	Annual Budget of the community 2006, in thousand AMD	3,150
	Annual Budget of the community 2007, in thousand AMD	1,200
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	1,500
	Amount spent in drinking water sector 2005, in thousand AMD	2,000
	Amount spent in drinking water sector 2006, in thousand AMD	2,000
	Amount spent in drinking water sector 2007, in thousand AMD	1,000
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	potatoes,cabbage, cereals, dairy, meat
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1.Yes 2.No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	unknown
D5	Present condition of the water supply volume of Domestic use	almost sufficient
D6	Present condition of the water supply volume of Irrigation water	almost sufficient
D7	Number of house connection to drinking water system	90
D8	How many house connection household set the water meter	0
D9	Number of public taps	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?	-
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	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	Zaqaryan Never
E2	Position	administration staff
E3	Telephone	with the help of administ. head
E4	Quantity and present condition of the water supply facilities: spring/ intake	2-excellent, 4-deteriorated
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	1-good 2-deteriorated, 1-partially rehabilitated.
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	absent
E7	Quantity and present condition of the water supply facilities: net/distribution	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	deteriorated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community and residents
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	community
E14	How you prepare O&M costs?	administration budget
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	2,000,000
	Others(AMD)	0
	Total (AMD)	2,000,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	water fee
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	absent
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

	N	E	H (m)
A	$40^0$09’49.0”	$45^0$41’43.9”	1974



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
No		
DISTRIBUTION PIPELINE		
400	200	steel
500	150	
450	125	
2700	100	
1000	80	

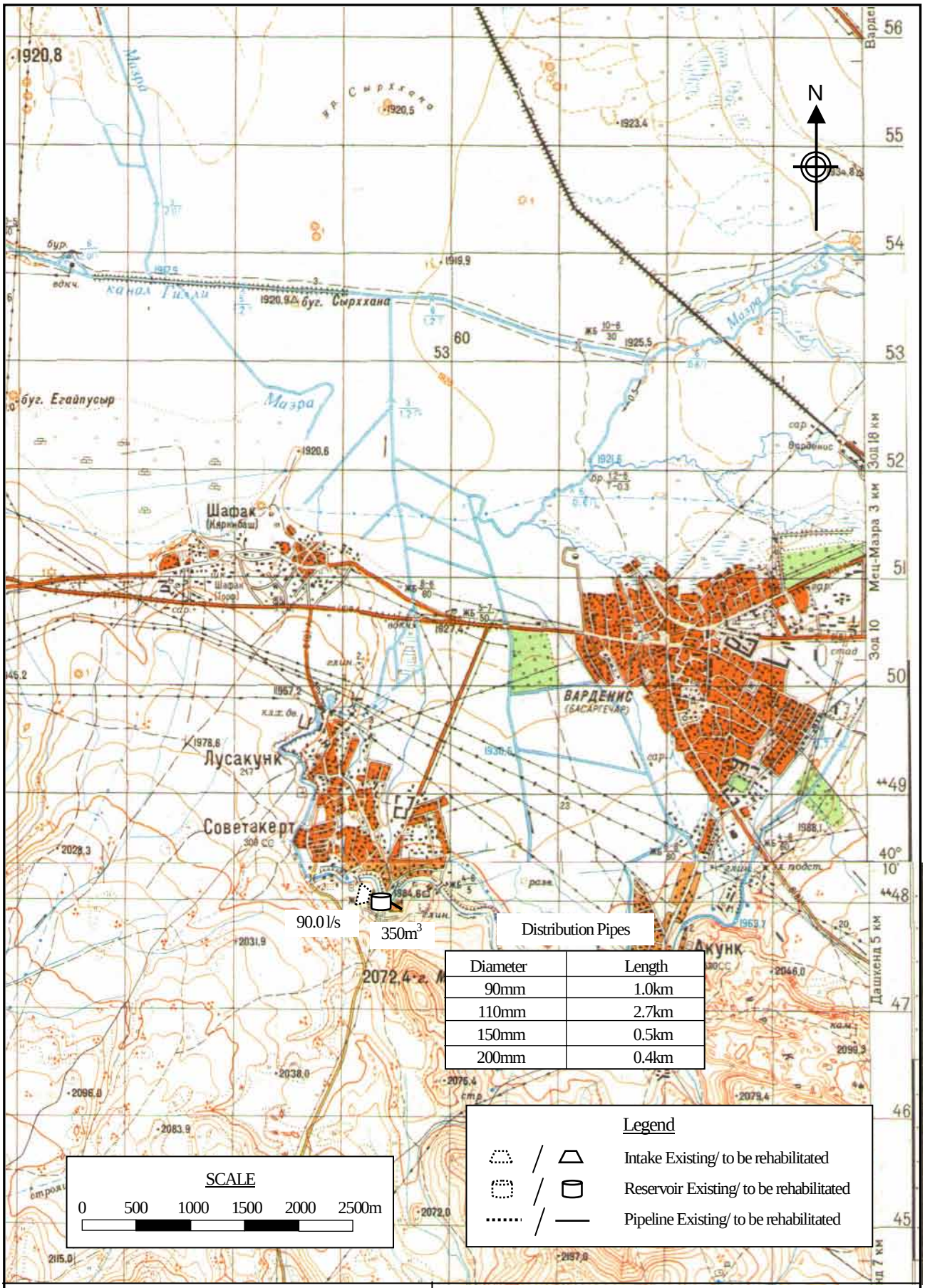
Gegharkunik Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
21	Khachaghbyur	JICA STUDY TEAM 2007

Marz : **Gegharkunik** No.21
Name : **Khachaghbyur**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	1,504	persons	150.4	
	2 Factory	-	nos	0.0	
	3 School (pupils)	190	pupils	1.9	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	463	household	40.3	
	Sub-total			192.6	
	Unaccouted for water (20%)			38.5	
1	Average Daily Water Demand			231.1	m3/day
2	Maximum Daily Water Demand			277.3	m3/day
3	Maximum Hourly Water Demand			27.0	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	1	90.0	lit/sec		7776.0	m3/day
`	Total					7776.0	m3/day
	2 Required reservoir volume					324	m3

C	**WATER SUPPLY FACILITIES REHABILITATION PLAN**		
No	Item	Quantity	Unit
	1 Intake		
	1m3		nos
	2m3		nos
	3m3		nos
	4m3		nos
	2 Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
	3 Reservoir		
	350m3 capacity	1	nos
	4 Distribution pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter	1,000	m
	110mm diameter	2,700	m
	150mm diameter	500	m
	200mm diameter	400	m
	250mm diameter		m
	5 House connection	373	nos
	6 Water meter installation	463	nos
	7 Public tap	5	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	Gegharkunik	
No. 21	Khachaghbyur	JICA STUDY TEAM

Marz : **Gegharkunik**
No. : **21**
Name : **Khachaghbyur**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3		nos	367,700	
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3	1	nos	33,528,700	33,528,700
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					33,528,700
4	Distribution Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm	1,000	m	8,040	8,040,000
		110mm	2,700	m	9,680	26,136,000
		150mm	500	m	13,140	6,570,000
		200mm	400	m	19,440	7,776,000
		250mm		m	27,040	
	Sub-total					48,522,000
5	House Connection		373	nos	74,000	27,602,000
6	Water Meter Installation		463	nos	80,000	37,040,000
7	Public Tap		5	nos	90,000	450,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	1,840	m	3,600	6,624,000
	Total				AMD	154,266,700
					Equivalent to USD	504,932
					Equivalent to JPY	53,270,283
					AMD	USD
	Investment Cost per household		463	HH	333,189	1,091
	Investment Cost per person		1,504	persons	102,571	336

GEGHARKUNIK MARZ
Marutuni District
No 21 Khachaghbyur

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		70.3																																							
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		392.43	0.00	0.00	1.04	2.08	2.53	2.61	4.43	4.57	4.73	4.88	7.32	7.56	7.81	8.07	8.33	8.61	8.89	9.18	9.49	9.80	10.12	10.46	10.80	11.16	11.53	11.91	12.30	12.71	13.13	13.56	14.01	14.47	14.95	15.44	15.95	16.48	17.02	17.58	18.16	18.76
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				422																																					
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		18.48			0.10	0.21	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.39	0.40	0.41	0.43	0.44	0.45	0.47	0.48	0.50	0.52	0.53	0.55	0.57	0.59	0.61	0.63	0.65	0.67	0.69	0.72	0.74	0.76	0.79	0.81	0.84
3. Electricity (for pump)		0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. Maintenance cost		13.12			0.07	0.15	0.19	0.20	0.20	0.21	0.22	0.23	0.23	0.24	0.25	0.26	0.27	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.36	0.37	0.38	0.39	0.41	0.42	0.43	0.45	0.46	0.48	0.49	0.51	0.53	0.54	0.56	0.58	0.60
Pump repair					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe repair					0.07	0.15	0.19	0.20	0.20	0.21	0.22	0.23	0.23	0.24	0.25	0.26	0.27	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.36	0.37	0.38	0.39	0.41	0.42	0.43	0.45	0.46	0.48	0.49	0.51	0.53	0.54	0.56	0.58	0.60
5. Pump replacement		0.00																0.00															0.00									
Sub-total		49.30	0.00	0.00	0.41	0.61	0.72	0.74	0.76	0.79	0.82	0.85	0.87	0.90	0.93	0.96	0.99	1.03	1.06	1.09	1.13	1.17	1.20	1.24	1.28	1.33	1.38	1.42	1.46	1.52	1.57	1.62	1.68	1.73	1.79	1.84	1.91	1.97	2.02	2.10	2.16	2.24
C Gross Income (A-B)		343.13	0.00	0.00	0.63	1.47	1.81	1.87	3.67	3.78	3.91	4.03	6.45	6.66	6.88	7.11	7.34	7.58	7.83	8.09	8.36	8.63	8.92	9.22	9.52	9.83	10.15	10.49	10.84	11.19	11.56	11.94	12.33	12.74	13.16	13.60	14.04	14.51	15.00	15.48	16.00	16.52
D Depreciation cost		146.65						4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19
E Interest paid		47.14	0.04	0.07	0.84	1.63	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.95	1.89	1.83	1.77	1.71	1.65	1.59	1.53	1.46	1.40	1.34	1.27	1.21	1.14	1.08	1.01	0.94	0.87	0.81	0.74	0.67	0.59	0.52	0.45	0.38	0.30	0.23	0.15	0.08
F Net Income		149.34	-0.04	-0.07	-0.21	-0.16	-0.19	-4.32	-2.52	-2.41	-2.28	-2.16	0.26	0.52	0.80	1.09	1.38	1.68	1.99	2.31	2.64	2.98	3.33	3.69	4.06	4.43	4.82	5.22	5.64	6.06	6.50	6.94	7.40	7.88	8.38	8.89	9.40	9.94	10.51	11.06	11.66	12.25
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		149.34	-0.04	-0.07	-0.21	-0.16	-0.19	-4.32	-2.52	-2.41	-2.28	-2.16	0.26	0.52	0.80	1.09	1.38	1.68	1.99	2.31	2.64	2.98	3.33	3.69	4.06	4.43	4.82	5.22	5.64	6.06	6.50	6.94	7.40	7.88	8.38	8.89	9.40	9.94	10.51	11.06	11.66	12.25
OM Cost Recovery Ratio (A/B)		796%	0%	0%	252%	339%	351%	353%	583%	578%	577%	574%	841%	840%	840%	841%	841%	836%	839%	842%	840%	838%	843%	844%	844%	839%	836%	839%	842%	836%	836%	837%	834%	836%	835%	839%	835%	837%	843%	837%	841%	838%

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	149.34	-0.04	-0.07	-0.21	-0.16	-0.19	-4.32	-2.52	-2.41	-2.28	-2.16	0.26	0.52	0.80	1.09	1.38	1.68	1.99	2.31	2.64	2.98	3.33	3.69	4.06	4.43	4.82	5.22	5.64	6.06	6.50	6.94	7.40	7.88	8.38	8.89	9.40	9.94	10.51	11.06	11.66	12.25
2. Depreciation cost	146.65	0.00	0.00	0.00	0.00	0.00	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19
3. Interest Paid	47.14	0.04	0.07	0.84	1.63	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.95	1.89	1.83	1.77	1.71	1.65	1.59	1.53	1.46	1.40	1.34	1.27	1.21	1.14	1.08	1.01	0.94	0.87	0.81	0.74	0.67	0.59	0.52	0.45	0.38	0.30	0.23	0.15	0.08
Sub-total	343.13	0.00	0.00	0.63	1.47	1.81	1.87	3.67	3.78	3.91	4.03	6.45	6.66	6.88	7.11	7.34	7.58	7.83	8.09	8.36	8.63	8.92	9.22	9.52	9.83	10.15	10.49	10.84	11.19	11.56	11.94	12.33	12.74	13.16	13.60	14.04	14.51	15.00	15.48	16.00	16.52
B Finances																																									
1. Project Loan	200.43	3.91	2.79	76.91	79.52	36.27	0.58	0.45																																	
2. Local fund	67.54	1.29	0.91	26.06	26.78	12.37	0.07	0.06																																	
Sub-total	267.97	5.20	3.70	102.97	106.30	48.64	0.65	0.51																																	
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	5.40	0.04	0.07	0.21	0.16	0.19	0.13	0.00	0.00	0.00	0.00	1.31	1.11	0.89	0.66	0.43	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	5.40	0.04	0.07	0.21	0.16	0.19	0.13	0.00	0.00	0.00	0.00	1.31	1.11	0.89	0.66	0.43	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	616.50	5.24	3.77	103.81	107.93	50.64	2.65	4.18	3.78	3.91	4.03	7.76	7.77	7.77	7.77	7.77	7.77	7.83	8.09	8.36	8.63	8.92	9.22	9.52	9.83	10.15	10.49	10.84	11.19	11.56	11.94	12.33	12.74	13.16	13.60	14.04	14.51	15.00	15.48	16.00	16.52
APPLICATION OF FUNDS																																								
D Project disbursement	267.97	5.20	3.70	102.97	106.30	48.64	0.65	0.51																																	
E Total debt services																																								
1. Loan repayment	200.43											5.76	5.82	5.88	5.94	6.00	6.06	6.12	6.18	6.24	6.30	6.36	6.43	6.49	6.56	6.62	6.69	6.76	6.82	6.89	6.96	7.03	7.10	7.17	7.24	7.32	7.39	7.46	7.54	7.61	7.69
2. Interest paid	47.14	0.04	0.07	0.84	1.63	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.95	1.89	1.83	1.77	1.71	1.65	1.59	1.53	1.46	1.40	1.34	1.27	1.21	1.14	1.08	1.01	0.94	0.87	0.81	0.74	0.67	0.59	0.52	0.45	0.38	0.30	0.23	0.15	0.08
Sub-total	247.57	0.04	0.07	0.84	1.63	2.00	2.00	2.00	2.00	2.00	2.00	7.76	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.76	7.76	7.77	7.76	7.77	7.76	7.77	7.77	7.76	7.76	7.77	7.77	7.77	7.76	7.76	7.77	7.77	7.76	7.77	7.76	7.77
Total Cash Outflow	515.54	5.24	3.77	103.81	107.93	50.64	2.65	2.51	2.00	2.00	2.00	7.76	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.76	7.76	7.77	7.76	7.77	7.76	7.77	7.77	7.76	7.76	7.77	7.77	7.77	7.76	7.76	7.77	7.77	7.76	7.77	7.76	7.77
F Net Surplus Cash (A+C2)-E	100.96	0.00	0.00	0.00	0.00	0.00	0.00	1.67	1.78	1.91	2.03	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.32	0.59	0.87	1.16	1.45	1.76	2.06	2.39	2.72	3.07	3.43	3.80	4.17	4.56	4.97	5.40	5.84	6.27	6.74	7.24	7.71	8.24	8.75
Investment Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	139%	0%	0%	75%	90%	91%	94%	184%	189%	196%	202%	83%	86%	89%	92%	94%	98%	101%	104%	108%	111%	115%	119%	123%	127%	131%	135%	140%	144%	149%	154%	159%	164%	170%	175%	181%	187%	193%	199%	206%	213%
Cost recovery by water fee + subsidy ((A+C2)/E)	141%	100%	100%	100%	100%	100%	100%	184%	189%	196%	202%	100%	100%	100%	100%	100%	100%	101%	104%	108%	111%	115%	119%	123%	127%	131%	135%	140%	144%	149%	154%	159%	164%	170%	175%	181%	187%	193%	199%	206%	213%

GEGHARKUNIK MARZ
Marutuni District
No 21 Khachaghbyur

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	392.43	98.6%
	Subsidy	5.40	1.4%
	Total	397.83	100.0%
2	**Expenditure**		
	OM cost	49.30	12.4%
	Loan repayment	200.43	50.4%
	Interest paid	47.14	11.8%
	Surplus cash	100.96	25.4%
	Total	397.83	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	179.44	3.82	2.73	70.25	70.46	31.23	0.53	0.42																																	
2. Operation and Maintenance Cost																																									
Salary	9.12			0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Chlorine	9.67			0.10	0.21	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Electricity	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mantenance cost	6.70			0.07	0.15	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Pump replacement	0.00																0.00															0.00										
Sub-total	25.49			0.41	0.60	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Total Outflow	204.93	3.82	2.73	70.66	71.06	31.91	1.21	1.10	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
B BENEFIT																																								
1. Water Tariff	246.47	0.00	0.00	1.04	2.08	2.53	2.61	4.43	4.57	4.73	4.88	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
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	0.00
Total Inflow	246.47	0.00	0.00	1.04	2.08	2.53	2.61	4.43	4.57	4.73	4.88	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
NET BENEFIT	41.54	-3.82	-2.73	-69.6	-69.0	-29.4	1.40	3.33	3.89	4.05	4.20	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64

FIRR = 1.07%

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	-36.58	-4.20	-3.00	-76.6	-76.0	-32.5	1.35	3.29	3.89	4.05	4.20	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64
	2	Capital cost 20% up	-53.41	-4.58	-3.28	-83.7	-83.1	-35.6	1.29	3.25	3.89	4.05	4.20	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64
2	1	OM cost 10% up	-21.53	-3.82	-2.73	-69.7	-69.0	-29.4	1.33	3.26	3.82	3.98	4.13	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57
	2	OM cost 20% up	-23.31	-3.82	-2.73	-69.7	-69.1	-29.5	1.26	3.19	3.75	3.91	4.06	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50
3	1	Revenue 10% down	-36.38	-3.82	-2.73	-69.7	-69.2	-29.6	1.14	2.89	3.43	3.58	3.71	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91
	2	Revenue 20% down	-53.02	-3.82	-2.73	-69.8	-69.4	-29.9	0.88	2.44	2.98	3.10	3.22	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18

No.		Description	FIRR		Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	0.57%		8.71	11.48%
	2	Capital cost 20% up	0.13%		72.61	1.38%
2	1	OM cost 10% up	1.01%		0.62	160.54%
	2	OM cost 20% up	0.95%		1.33	75.04%
3	1	Revenue 10% down	0.45%		13.60	7.35%
	2	Revenue 20% down	-0.22%		-59.08	-1.69%