

**No.22 Yeghipartush**

# Information on Existing Water Sources (Aragatsotn)

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

No.22 Community Yeghipatrush  
District Aparan  
Marz Aragatsotn

No.22 Community Yeghipatrush  
District Aparan  
Marz Aragatsotn  
Sampling date 08/Aug/2007

No	Water source	Latitude			Longitude			Atitude (m)	Yield(L/sec)		
		deg	min	sec	deg	min	sec		Min	Max	At site
1	spring intake	40	31	10.8	44	30	41	2,356	1.0	3.0	1.5
2	spring intake	40	31	15.1	44	30	46.5	2,405	0.5	1.0	0.7
3	spring intake	40	31	16.5	44	30	21.4	2,342	0.8	2.0	1.0
4	spring intake	40	31	0.5	44	29	26.1	2,314	2.0	4.0	2.0
5	spring intake	40	31	2.3	44	23	17.5	2,242	1.0	1.5	1.0
6											
7											
8											
9											
10											
<i>Notes:</i>											
<i>Latitude, Longitude, Atitude:</i>		<i>Measured at site</i>									
<i>Yield (Min, Max):</i>		<i>Interviewed to the Community</i>									
<i>Yield (at site):</i>		<i>Measured / estimated at site in summer of 2007</i>									

Users Acceptance for water quality	Acceptable
Notes	Transmission pipelines are in destroyed condition, there is estimated 40% leakage.
Alternative sources if any	No alternative water sources are available

	Parameters analysed	Units	No.1	Guidelines	
				WHO	Armenia
a	pH		8.1	6.5-8	6.0 - 9.0
b	Temperature	Deg.C	9.7		
c	TDS	Mg/L	82	1000	1000
1	Al:Aluminum	Mg/L	n.d	0.10	0.50
2	B:Boron	Mg/L	n.d	0.70	0.50
3	Cl:Chloride	Mg/L	4	250	350
4	Cr:Chrome	Mg/L	0.01	0.05	0.05
5	Cu:Copper	Mg/L	n.d	2	1
6	F:Fluoride	Mg/L	0.02	1.50	
7	Hardness	Mg/L	160	500	700
8	Fe:Iron	Mg/L	n.d	0.30	0.30
9	Mn:Manganese	Mg/L	n.d	0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d	0.070	0.250
11	Ni:Nickel	Mg/L	n.d	0.020	0.100
12	Nitrate(NO3+)	Mg/L	0.9	50.0	45.0
13	SO4:Sulfate	Mg/L	5.0	250.0	500.0
14	Zn:Zink	Mg/L	n.d	3.0	5.0
15	As:Arsenic	Mg/L	n.d	0.0	0.1
16	Ba:Barium	Mg/L	<0.01	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	n.d	0.00100	0.00050
21	Se:Selenium	Mg/L	0.001	0.010	0.010
22	Sr:Strontium	Mg/L	<0.7	NA	7.0
23	CN:Cyanide	Mg/L	n.d	0.070	0.035
24	Coli form bacteria	bacteria per 100 ml		-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml		0	0
26	Total bacteria	bacteria per 1 ml		-	50



No. 22 Marz Aragatsotn Community Yeghipartush**1. ACCESSIBILITY TO THE SITE**

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

**2. INTAKE STRUCTURE**

No.	Water main	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°31'10.8"	44°30'41.0"	2,356	1988	RC	1.5	No
2	Spring	40°31'15.1"	44°30'46.5"	2,405	1988	RC	0.7	No
3	Spring	40°31'16.5"	44°30'21.4"	2,342	1988	Steel	1.0	Yes
4	Spring	40°31'00.5"	44°29'26.1"	2,314	1966	Steel	2.0	Yes
5	Spring	40°31'02.3"	44°29'17.5"	2,242	1966	Steel	1.0	Yes

**3. TRANSMISSION PIPELINE**

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	8,000	150	Steel	1.6	1989	Huge	Yes
	1,500	125	Steel		1989	Huge	Yes
	200	100	Steel		1990	Little	No
	800	100	Polyethylene		1990	Little	No
2	4,500	65	Steel	1.5	1965	Huge	Yes
3	2,000	50	Steel		1965	Little	Yes

**4. RESERVOIR**

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m <sup>3</sup> )	Rehabilitation Necessity (Y/N)
1	40°32'11.1"	44°28'38.8"	2073	RC	Rectangular	6x12x4	250	Yes

**5. CHLORINATION EQUIPMENT**

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	Yes	Reservoir	Tablet	once a week

**6. DISTRIBUTION PIPELINE**

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1,400	150	Steel	1968	Little	Yes
2	1,500	65	Steel	1968	Medium	Yes
3	700	50	Steel	1968	Little	Yes
4	850	32	Steel	1968	Medium	Yes
5	1,350	25	Steel	1968	Medium	Yes
6	400	100	cast iron	1968	Little	Yes
7	100	50	cast iron	1968	Little	No

**7. PUMP STATION**

Existence (Y/N)	Power source	Type	Capacity (l/s)	Pump head (m)	Tank cap. (m <sup>3</sup> )	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	1968	1990	No	0	Yes

**9. DRAINAGE SYSTEM**

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

## Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

<b>Marz</b>	<b>Aragatsotn</b>
<b>Number and Name of Community</b>	<b>No.22 Yeghipartush</b>
<b>District</b>	<b>Aparan</b>

No.	Question	Answer
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### A: Baseline Data

A1	Actual population in 2001	735
A2	Actual population in 2007	850
A3	Number of households	187
A4.1	Elderly people	120
A4.2	Population in labor force (age from 16 to 62)	480
A4.3	Children	350
A5.1	Pensioners	127
A5.2	Unemployed	0
A5.3	Receiving benefits	15
A6	Average monthly income of household (AMD)	40,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	200

### B: Budget

B1	Annual Budget of the community 2004, in thousand AMD	1,125
	Annual Budget of the community 2005, in thousand AMD	1,393
	Annual Budget of the community 2006, in thousand AMD	1,657
	Annual Budget of the community 2007, in thousand AMD	325
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	380
	Amount spent in drinking water sector 2005, in thousand AMD	400
	Amount spent in drinking water sector 2006, in thousand AMD	440
	Amount spent in drinking water sector 2007, in thousand AMD	250
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned.

### C: Socio-Economic Survey

C1	Major industries of the community:	meat, dairy, vegetables
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no

### D: Water Usage and Water Demand Survey

D1	Does the community hold water use permit? 1-Yes, 2-No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	is not planned
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	187
D8	How many house connection household set the water meter	0
D9	Number of public taps	20
D10.1	How is the regime of water supply in your community in the dry season?	24 hrs
D10.2	How is the regime of water supply in your community in the wet season?	24 hrs
D11	What time of day water is given?	-
D12	Are you pleased with duration of domestic water supply?	very pleased
D13	Are hours of water supply convenient?	-
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each household 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	1,000
D16	Drinking water monthly water fee per household	1000drams yearly
D17	How often do you usually pay water fees?	once a year
D18	Water fee structure 1Flat rate, 2 Having water tariff	flat rate
D19	Where do you acquire the irrigation water?	spring
D20	Are you satisfied with irrigation water supply volume?	is not sufficient

### E: Present Operation and Maintenance Works

E1	Name of responsible for water supply	Mkrtchyan Artak
E2	Position	water distributor
E3	Telephone	(093)334284
E4	Quantity and present condition of the water supply facilities: spring/ intake	7 partially repaired
E5	Quantity and present condition of the water supply facilities:	1 deteriorated ,1 partially
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1 deteriorated
E7	Quantity and present condition of the water supply facilities: net/distribution pipes	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	partially repaired
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community
E12	How do you repair the water supply facilities?	inviting a specialist
E13	Who is in charge of the repair work in the community?	volunteers from community
E14	How you prepare O&M costs?	community budget
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	240,000
	Repair cost(AMD)	250,000
	Others(AMD)	0
	Total (AMD)	490,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	water fee

### F: Initial Environmental Examination (IEE)

F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	yes
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

# Eghipatrush

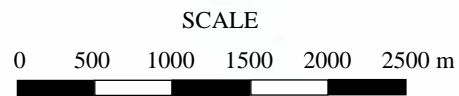
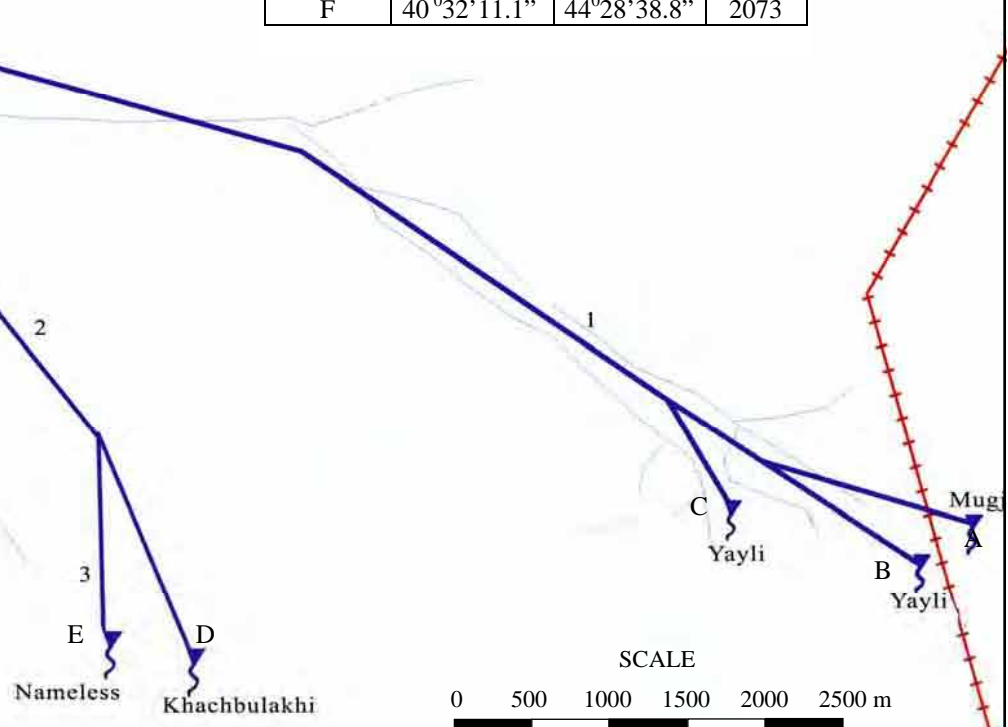
	N	E	H (m)
A	40°31'16.5"	44°30'21.4"	2342
B	40°31'10.8"	44°30'41.0"	2356
C	40°31'15.1"	44°30'46.5"	2405
D	40°31'02.3"	44°29'17.5"	2242
E	40°31'00.5"	44°29'26.1"	2314
F	40°32'11.1"	44°28'38.8"	2073



Pipeline length (m)	Pipe diameter (mm)	Material
<b>TRANSMISSION PIPELINE</b>		
1. 10500		
8000	150	Steel
1500	125	
200	100	Polyethylene
800	100	
2. 4500		
4500	65	Steel
3. 2000		
2000	50	Steel
<b>DISTRIBUTION PIPELINE</b>		
1400	150	Steel
1500	65	
700	50	
850	32	
1350	25	Cast iron
400	100	
100	50	

### LEGENDS

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



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

Marz : **Aragatsotn**  
Name : **Yeghipartush**

No.22

No.	Item	Quantity	Unit	Water demand (m3/d)
<b>A. WATER DEMAND</b>				
1	Population	850	persons	85.0
2	Factory	-	nos	0.0
3	School (pupils)	200	pupils	2.0
4	Medical Ambulance Station	-	nos	-
5	Policlinic	-	nos	-
6	Livestocks (87lit/household)	187	household	16.3
	Sub-total			103.3
	Unaccounted for water (20%)			20.7
1	Average Daily Water Demand			124.0 m3/day
2	Maximum Daily Water Demand			148.8 m3/day
3	Maximum Hourly Water Demand			17.7 m3/hr
<b>B. WATER SUPPLY PLAN</b>				
	1 Water source type	Nr.	Total vol.	
	a Spring	5	6.2	lit/sec
				535.7 m3/day
	Total			535.7 m3/day
	2 Required reservoir volume			213 m3

<b>C. WATER SUPPLY FACILITIES REHABILITATION PLAN</b>				
No	Item	Quantity	Unit	
1	Intake			
	1m3	3	nos	
	2m3		nos	
	3m3		nos	
	4m3		nos	
2	Transmission pipe			
	50mm diameter		m	
	75mm diameter	500	m	
	90mm diameter	6,300	m	
	110mm diameter		m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			
	250m3 capacity	1	nos	
4	Distribution pipe			
	50mm diameter	2,900	m	
	75mm diameter	1,500	m	
	90mm diameter		m	
	110mm diameter	400	m	
	150mm diameter	1,400	m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	-	nos	
6	Water meter installation	187	nos	
7	Public tap	2	nos	
8	Chlorination	1	nos	
9	Pumps	-	nos	



Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Aragatsotn	
No. 22	Yeghipartush	JICA STUDY TEAM



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

Marz : **Aragatsotn**  
No. : **22**  
Name : **Yeghipartush**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake	1m3	3	nos	367,700	1,103,100
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					<b>1,103,100</b>
2	Transmission Pipe	50mm		m	5,520	
		75mm	500	m	7,160	3,580,000
		90mm	6,300	m	8,040	50,652,000
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					<b>54,232,000</b>
3	Reservoir	50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3	1	nos	25,952,800	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					<b>25,952,800</b>
4	Distribution Pipe	50mm	2,900	m	5,520	16,008,000
		75mm	1,500	m	7,160	10,740,000
		90mm		m	8,040	
		110mm	400	m	9,680	3,872,000
		150mm	1,400	m	13,140	18,396,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					<b>49,016,000</b>
5	House Connection			nos	74,000	
6	Water Meter Installation		187	nos	80,000	<b>14,960,000</b>
7	Public Tap		2	nos	90,000	<b>180,000</b>
8	Chlorilation Equipment		1	nos	500,000	<b>500,000</b>
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage concrete surfa		2,480	m	3,600	<b>8,928,000</b>
<b>Total</b>					<b>AMD</b>	<b>154,871,900</b>
					Equivalent to USD	506,912
					Equivalent to JPY	53,479,266
					<b>AMD</b>	<b>USD</b>
Investment Cost per household			187	HH	828,192	2,711
Investment Cost per person			850	persons	182,202	596





**No.23 Yeghnik**

# Information on Existing Water Sources (Aragatsotn)

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

No.23 Community Yeghnik  
District Talin  
Marz Aragatsotn

No.23 Community Yeghnik  
District Talin  
Marz Aragatsotn  
Sampling date 31/Aug/2007

No	Water source	Latitude			Longitude			Atitude (m)	Yield(L/sec)		
		deg	min	sec	deg	min	sec		Min	Max	At site
1	Spring	40	25	7.6	43	57	33.8	1,985	0.5	1.5	0.5
2											
3											
4											
5											
6											
7											
8											
9											
10											

*Notes:*

<i>Latitude, Longitude, Atitude:</i>	<i>Measured at site</i>
<i>Yield (Min, Max):</i>	<i>Interviewed to the Community</i>
<i>Yield (at site):</i>	<i>Measured / estimated at site in summer of 2007</i>

Users Acceptance for water quality	Not acceptable
Notes	The water currently supplied does not satisfy drinking and household needs.
Alternative sources if any	The community has a prospective spring located at 11km distance from the Community. A water use has obtained permits to use 3.8l/sec from this spring.

	Parameters analysed	Units	No.1	Guidelines	
				WHO	Armenia
a	pH		7.4	6.5-8	6.0 - 9.0
b	Temperature	Deg.C	10.8		
c	TDS	Mg/L	43	1000	1000
1	Al:Aluminum	Mg/L	0.02	0.10	0.50
2	B:Boron	Mg/L	n.d	0.70	0.50
3	Cl:Chloride	Mg/L	4	250	350
4	Cr:Chrome	Mg/L	<0.01	0.05	0.05
5	Cu:Copper	Mg/L	n.d	2	1
6	F:Fluoride	Mg/L	0.16	1.50	
7	Hardness	Mg/L	90	500	700
8	Fe:Iron	Mg/L	n.d	0.30	0.30
9	Mn:Manganese	Mg/L	0.10	0.40	0.10
10	Mo:Molibdenum	Mg/L	0.020	0.070	0.250
11	Ni:Nickel	Mg/L	n.d	0.020	0.100
12	Nitrate(NO3+)	Mg/L	0.9	50.0	45.0
13	SO4:Sulfate	Mg/L	4.0	250.0	500.0
14	Zn:Zink	Mg/L	n.d	3.0	5.0
15	As:Arsenic	Mg/L	n.d	0.0	0.1
16	Ba:Barium	Mg/L	<0.01	0.70	0.10
17	Be:Berillium	Mg/L	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



No. 23 Marz Aragatsotn Community Yeghnik

**1. ACCESSIBILITY TO THE SITE**

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

**2. INTAKE STRUCTURE**

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°25'07.6"	43°57'33.8"	1,985	1999	Concrete	0.5	No

**3. TRANSMISSION PIPELINE**

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	800	150	Steel	0.5	1999	no	No
	900	100	Steel			no	No

**4. RESERVOIR**

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

**5. CHLORINATION EQUIPMENT**

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

**6. DISTRIBUTION PIPELINE**

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	300	100	Steel	1999	no	No

**7. PUMP STATION**

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

**8. PUBLIC TAPS**

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
1	1981		Yes	100	No

**9. DRAINAGE SYSTEM**

Existence	Rehabilitation	Remarks
No	Yes	

## Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

<b>Marz</b>	<b>Aragatsotn</b>
<b>Number and Name of Community</b>	<b>No.23 Yeghnik</b>
<b>District</b>	<b>Talin</b>

No.	Question	Answer
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### A: Baseline Data

A1	Actual population in 2001	661
A2	Actual population in 2007	480
A3	Number of households	177
A4.1	Elderly people	156
A4.2	Population in labor force (age from 16 to 62)	363
A4.3	Children	142
A5.1	Pensioners	95
A5.2	Unemployed	0
A5.3	Receiving benefits	16
A6	Average monthly income of household (AMD)	8,000
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	60

### B: Budget

B1	Annual Budget of the community 2004, in thousand AMD	500
	Annual Budget of the community 2005, in thousand AMD	500
	Annual Budget of the community 2006, in thousand AMD	110
	Annual Budget of the community 2007, in thousand AMD	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	0
	Amount spent in drinking water sector 2007, in thousand AMD	0
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned.

### C: Socio-Economic Survey

C1	Major industries of the community:	dairy, meat, cereals
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no

### D: Water Usage and Water Demand Survey

D1	Does the community hold water use permit? 1-Yes, 2-No	yes
D2	Water use permit number	0075
D3	Date of expiry of water use permit	2006-2009
D4	Planned date of obtaining water use permit	-
D5	Present condition of the water supply volume of Domestic use	insufficient
D6	Present condition of the water supply volume of Irrigation water	insufficient
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	1
D10.1	How is the regime of water supply in your community in the dry season?	no water at all
D10.2	How is the regime of water supply in your community in the wet season?	no water at all
D11	What time of day water is given?	-
D12	Are you pleased with duration of domestic water supply?	mainly displeased
D13	Are hours of water supply convenient?	-
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each household a day?	-

No.	Question	Answer
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	1,000
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1-Flat rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	open canal
D20	Are you satisfied with irrigation water supply volume?	is not sufficient

### E: Present Operation and Maintenance Works

E1	Name of responsible for water supply	nobody
E2	Position	-
E3	Telephone	-
E4	Quantity and present condition of the water supply facilities: spring/ intake	absent
E5	Quantity and present condition of the water supply facilities:	1 rehabilitated.
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	absent
E7	Quantity and present condition of the water supply facilities: net/distribution pipes	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	deteriorated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	nobody
E12	How do you repair the water supply facilities?	in no way
E13	Who is in charge of the repair work in the community?	nobody
E14	How you prepare O&M costs?	no collection
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	0
	Others(AMD)	0
	Total (AMD)	0
E16	Do the residents participate in the O&M works?	no
E17	What kind of OM method is preferable to you?	water fee

### F: Initial Environmental Examination (IEE)

F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	yes
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent








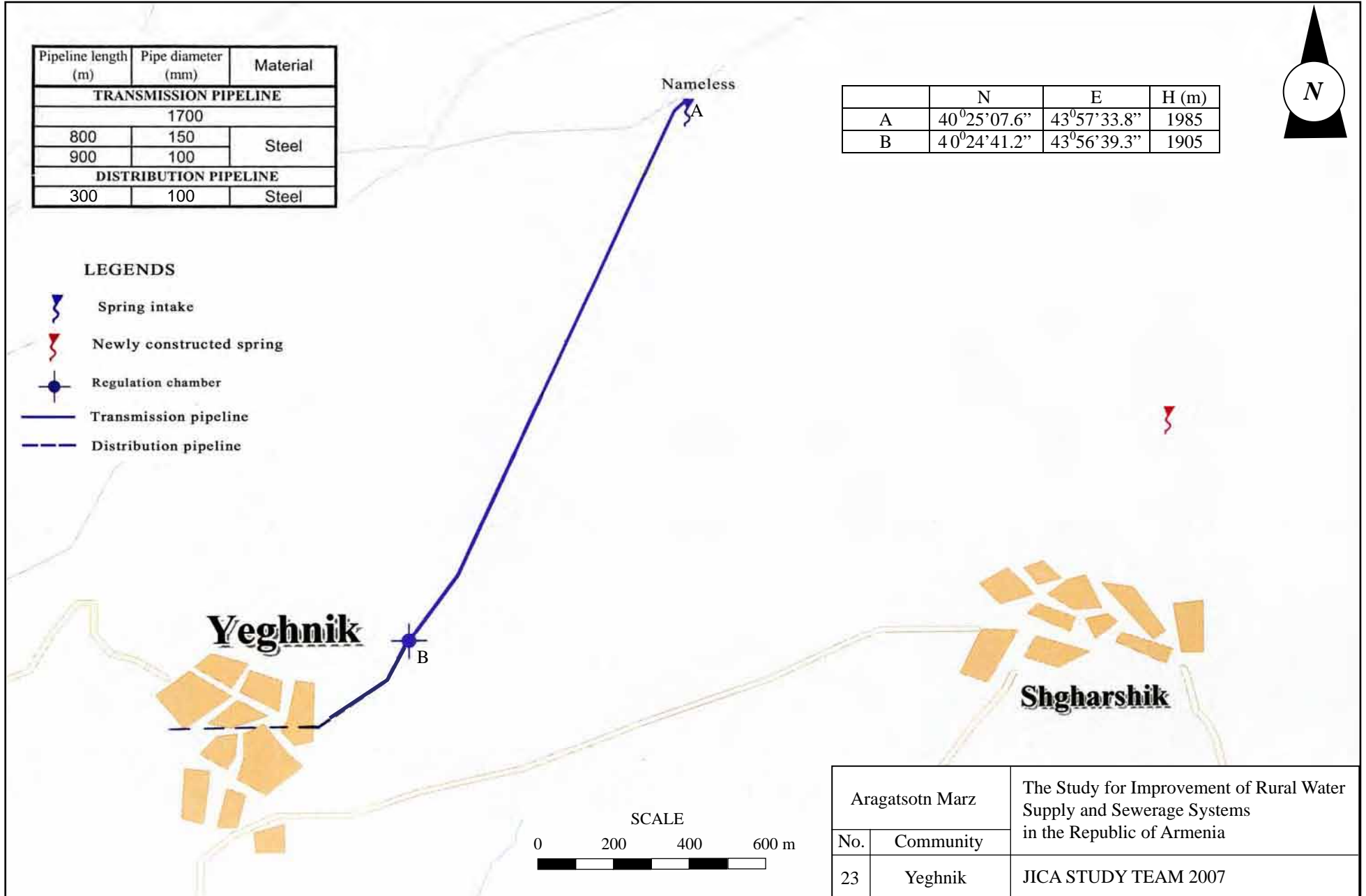
Pipeline length (m)	Pipe diameter (mm)	Material
<b>TRANSMISSION PIPELINE</b>		
1700		
800	150	Steel
900	100	
<b>DISTRIBUTION PIPELINE</b>		
300	100	Steel

	N	E	H (m)
A	40°25'07.6"	43°57'33.8"	1985
B	40°24'41.2"	43°56'39.3"	1905



**LEGENDS**

-  Spring intake
-  Newly constructed spring
-  Regulation chamber
-  Transmission pipeline
-  Distribution pipeline

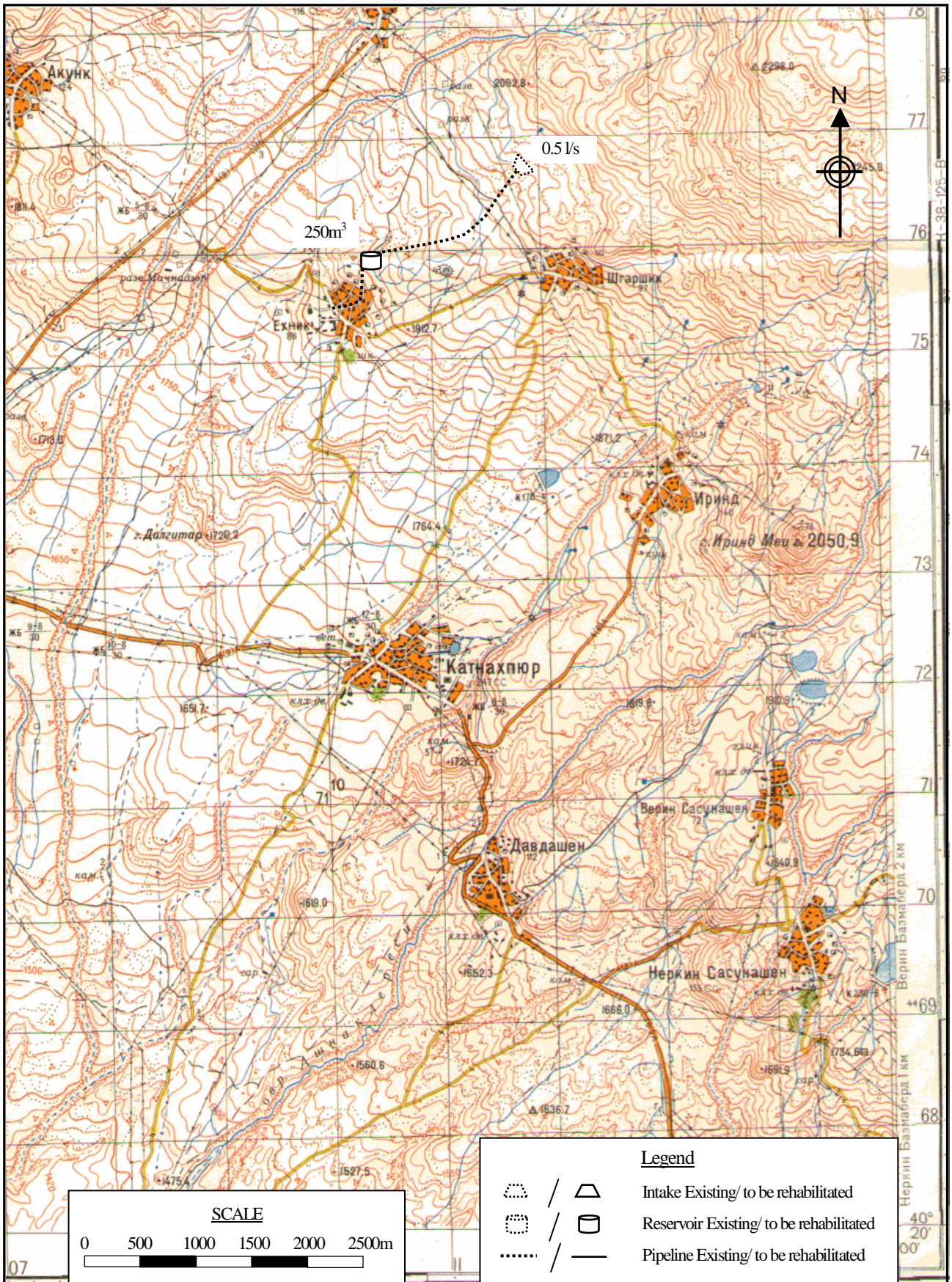


Aragatsotn Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
23	Yeghnik	JICA STUDY TEAM 2007

Marz : **Aragatsotn**  
Name : **Yeghnik**

No.23

No.	Item	Quantity	Unit	Water demand (m3/d)
<b>A. WATER DEMAND</b>				
	1 Population	480	persons	48.0
	2 Factory	-	nos	0.0
	3 School (pupils)	60	pupils	0.6
	4 Medical Ambulance Station	-	nos	-
	5 Polyclinic	-	nos	-
	6 Livestocks (87lit/household)	177	household	15.4
	Sub-total			64.0
	Unaccounted for water (20%)			12.8
1	Average Daily Water Demand		48	76.8 m3/day
2	Maximum Daily Water Demand			92.2 m3/day
3	Maximum Hourly Water Demand			17.5 m3/hr
<b>B. WATER SUPPLY PLAN</b>				
	1 Water source type	Nr.	Total vol.	
	a Spring	1	0.5 lit/sec	43.2 m3/day
	Total			43.2 m3/day
	2 Additional water source			
	2 Required reservoir volume			210 m3
<b>C. WATER SUPPLY FACILITIES REHABILITATION PLAN</b>				
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			
	250m3 capacity	1	nos	
4	Distribution pipe			
	50mm diameter		m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter		m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	87	nos	
6	Water meter installation	177	nos	
7	Public tap	2	nos	
8	Chlorination	1	nos	
9	Pumps	-	nos	



Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Aragatsotn	
No. 23	Yeghnik	JICA STUDY TEAM

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

Marz : **Aragatsotn**

No. : **23**

Name : **Yeghnik**

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	1	nos	25,952,800	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					25,952,800
4	Distribution Pipe	50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					
5	House Connection		87	nos	74,000	6,438,000
6	Water Meter Installation		177	nos	80,000	14,160,000
7	Public Tap		2	nos	90,000	180,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage concrete surfa			m	3,600	
Total					AMD	47,230,800
					Equivalent to USD	154,592
					Equivalent to JPY	16,309,405
					AMD	USD
	Investment Cost per household		177	HH	266,841	873
	Investment Cost per person		480	persons	98,398	322





**No.24 Yernjatap**

# Information on Existing Water Sources (Aragatsotn)

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

No.24 Community Yernjatap  
District Aparan  
Marz Aragatsotn

No.24 Community Yernjatap  
District Aparan  
Marz Aragatsotn  
Sampling date 06/Sep/2007

No	Water source	Latitude			Longitude			Atitude	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Aroghi spring	40	29	37.2	44	28	54.9	2,333	3.0	8.0	5.0
2	Kotnaghbyuz mine	40	29	14.3	44	18	47.9	2,101	2.0	5.0	2.3
3	Tojo mine	40	28	30.0	44	29	2.9	2,045	4.0	8.0	2.0
4											
5											
6											
7											
8											
9											
10											

<i>Notes:</i>	
<i>Latitude, Longitude, Atitude:</i>	<i>Measured at site</i>
<i>Yield (Min, Max):</i>	<i>Interviewed to the Community</i>
<i>Yield (at site):</i>	<i>Measured / estimated at site in summer of 2007</i>

Users Acceptnce for water quality	Acceptable
Notes	Yernjatap community currently uses the water mains fed to No.47 Norashen rural community.
Alternative sources if any	No alternative water sources are available

	Parameters analysed	Units	No.1	Guidelines	
				WHO	Armenia
a	pH		7.6	6.5-8	6.0 - 9.0
b	Temperature	Deg.C	13.4		
c	TDS	Mg/L	41	1000	1000
1	Al:Aluminum	Mg/L	0.02	0.10	0.50
2	B:Boron	Mg/L	<0.2	0.70	0.50
3	Cl:Chloride	Mg/L	4	250	350
4	Cr:Chrome	Mg/L	0.01	0.05	0.05
5	Cu:Copper	Mg/L	n.d	2	1
6	F:Fluoride	Mg/L	0.02	1.50	
7	Hardness	Mg/L	95	500	700
8	Fe:Iron	Mg/L	n.d	0.30	0.30
9	Mn:Manganese	Mg/L	0.10	0.40	0.10
10	Mo:Molibdenum	Mg/L	0.030	0.070	0.250
11	Ni:Nickel	Mg/L	n.d	0.020	0.100
12	Nitrate(NO3+)	Mg/L	0.9	50.0	45.0
13	SO4:Sulfate	Mg/L	8.0	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	0.00007	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	n.d	-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml	n.d	0	0
26	Total bacteria	bacteria per 1 ml	n.d	-	50





No. 24 Marz Aragatsotn Community Yernjatap**1. ACCESSIBILITY TO THE SITE**

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

**2. IN Water main**

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°29'37.2"	44°28'54.9"	2,333	1936	Masonry	5.0	Yes
2	Water main	40°29'14.3"	44°28'47.9"	2,101	1991	Steel	2.3	No
3	Water main	40°28'30.0"	44°29'02.9"	2,045	1979	Steel	2.0	No

**3. TRANSMISSION PIPELINE**

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	4,000	100	Steel	4.0	1970	Medium	Yes
2	1,200	100	Steel	1.8		Medium	Yes
	1,000	100	Steel			Medium	Yes
3	3,300	150	Steel	1.8	1995	Little	Yes
4	2,200	150	Steel	0.9		Little	Yes

**4. RESERVOIR**

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°27'44.3"	44°28'10.0"	1,913	reinforced concrete	Rectangular	6×6×3,5	100	Yes
2	40°27'44.3"	44°28'10.0"	1,913	reinforced concrete	Rectangular	6×6×3,5	100	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	800	150	Steel	1979	Little	Yes
2	6,900	100	Steel	1979	Little	Yes
3	600	80	Steel	1995	Little	Yes
4	2,500	50	Polyethylene	1995	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)
10	1970	1995	No	0	Yes

**9. DRAINAGE SYSTEM**

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

**Questionnaire on Existing Water Supply Conditions  
by Socio-Economic Survey**

<b>Marz</b>	<b>Aragatsotn</b>
<b>Number and Name of Community</b>	<b>No.24 Yernjatap</b>
<b>District</b>	<b>Aparan</b>

No.	Question	Answer
-----	----------	--------

**A: Baseline Data**

A1	Actual population in 2001	603
A2	Actual population in 2007	702
A3	Number of households	220
A4.1	Elderly people	60
A4.2	Population in labor force (age from 16 to 62)	500
A4.3	Children	142
A5.1	Pensioners	58
A5.2	Unemployed	33
A5.3	Receiving benefits	19
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	146

**B: Budget**

B1	Annual Budget of the community 2004, in thousand AMD	2,300
	Annual Budget of the community 2005, in thousand AMD	2,100
	Annual Budget of the community 2006, in thousand AMD	2,400
	Annual Budget of the community 2007, in thousand AMD	2,100
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	180
	Amount spent in drinking water sector 2005, in thousand AMD	180
	Amount spent in drinking water sector 2006, in thousand AMD	180
	Amount spent in drinking water sector 2007, in thousand AMD	90
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned.

**C: Socio-Economic Survey**

C1	Major industries of the community:	cereals, meat, dairy, vegetables
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no

**D: Water Usage and Water Demand Survey**

D1	Does the community hold water use permit? 1-Yes, 2-No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	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	150
D8	How many house connection household set the water meter	0
D9	Number of public taps	2
D10.1	How is the regime of water supply in your community in the dry season?	regularly 6 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?	13-19;
D12	Are you pleased with duration of domestic water supply?	mainly displeased
D13	Are hours of water supply convenient?	not convenient at all
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each household a day?	-

No.	Question	Answer
D14.2	Estimate quantity of domestic water use of each household (litter per day)	according to the supplied
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	according to the supplied
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flat rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	from Aparan reservoir
D20	Are you satisfied with irrigation water supply volume?	is not sufficient

**E: Present Operation and Maintenance Works**

E1	Name of responsible for water supply	Galstyan Qerob
E2	Position	water distributor
E3	Telephone	with the help of administration head
E4	Quantity and present condition of the water supply facilities: spring/ intake	1 deteriorated
E5	Quantity and present condition of the water supply facilities:	2 deteriorated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	2 deteriorated
E7	Quantity and present condition of the water supply facilities: net/distribution pipes	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	partially repaired
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	Specialist in the community with fee
E14	How you prepare O&M costs?	community budget
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	180,000
	Repair cost(AMD)	0
	Others(AMD)	0
	Total (AMD)	180,000
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

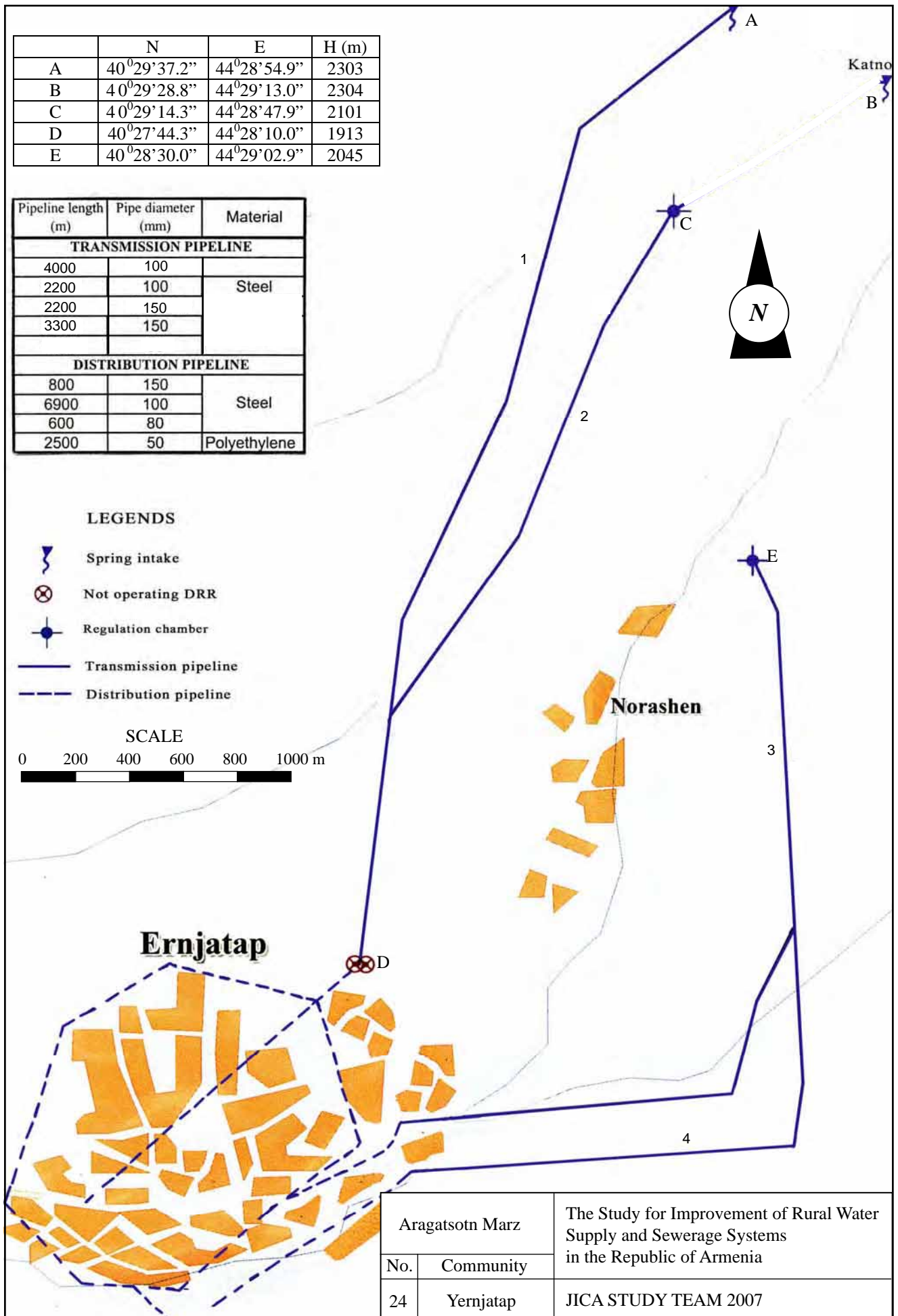
	N	E	H (m)
A	40°29'37.2"	44°28'54.9"	2303
B	40°29'28.8"	44°29'13.0"	2304
C	40°29'14.3"	44°28'47.9"	2101
D	40°27'44.3"	44°28'10.0"	1913
E	40°28'30.0"	44°29'02.9"	2045

Pipeline length (m)	Pipe diameter (mm)	Material
<b>TRANSMISSION PIPELINE</b>		
4000	100	Steel
2200	100	
2200	150	
3300	150	
<b>DISTRIBUTION PIPELINE</b>		
800	150	Steel
6900	100	
600	80	
2500	50	Polyethylene

**LEGENDS**

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

**SCALE**



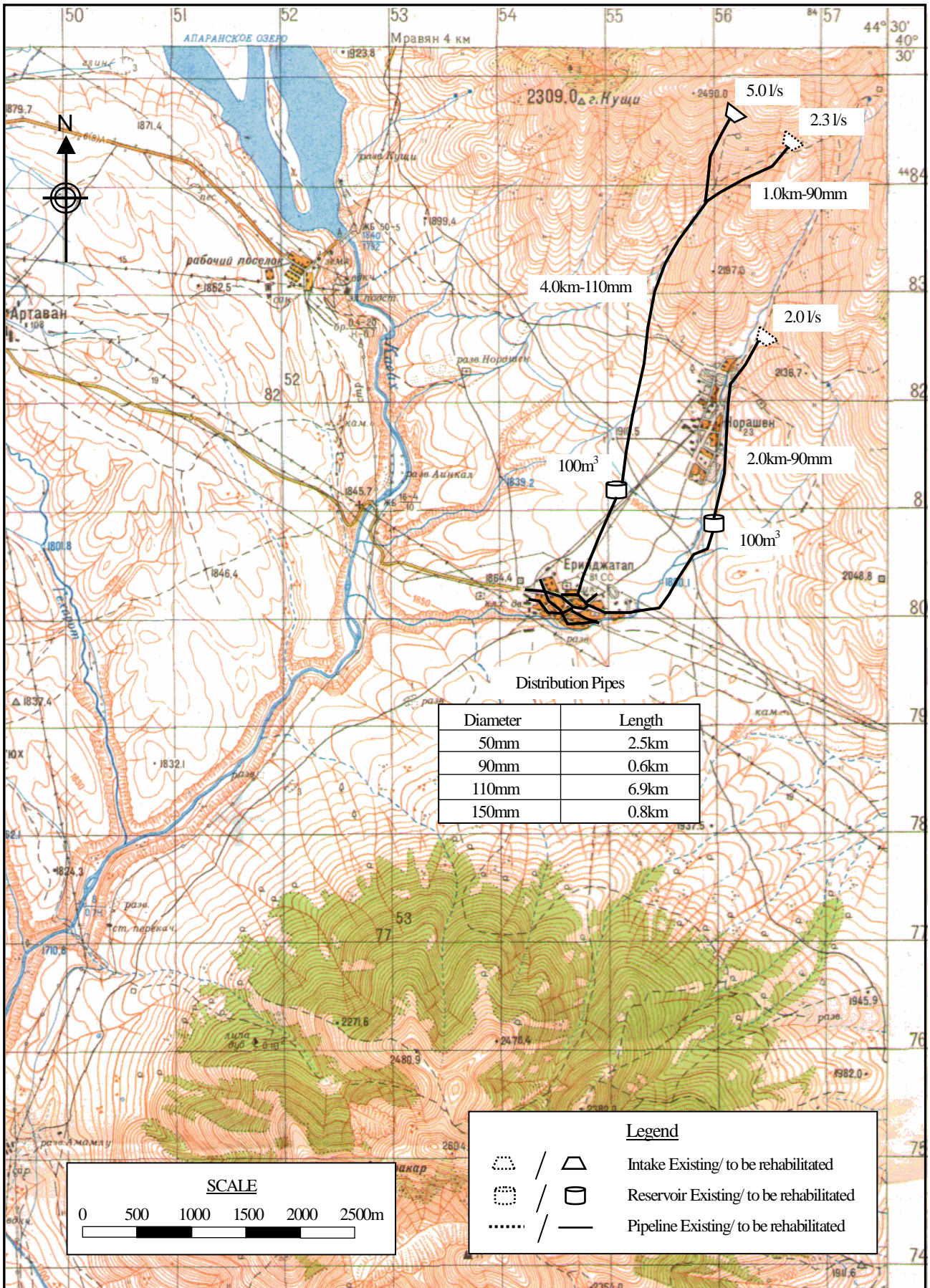
Aragatsotn Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
24	Yernjatap	JICA STUDY TEAM 2007

Marz : **Aragatsotn**  
Name : **Yernjatap**

No.24

No.	Item	Quantity	Unit	Water demand (m3/d)
<b>A. WATER DEMAND</b>				
1	Population	702	persons	70.2
2	Factory	-	nos	0.0
3	School (pupils)	146	pupils	1.5
4	Medical Ambulance Station	-	nos	-
5	Policlinic	-	nos	-
6	Livestocks (87lit/household)	220	household	19.1
	Sub-total			90.8
	Unaccounted for water (20%)			18.2
1	Average Daily Water Demand			109.0 m3/day
2	Maximum Daily Water Demand			130.8 m3/day
3	Maximum Hourly Water Demand			17.7 m3/hr
<b>B. WATER SUPPLY PLAN</b>				
	1 Water source type	Nr.	Total vol.	
	a Spring	3	9.3	lit/sec
				803.5 m3/day
	Total			803.5 m3/day
	2 Required reservoir volume			212 m3

<b>C. WATER SUPPLY FACILITIES REHABILITATION PLAN</b>				
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	3,000	m	
	110mm diameter	4,000	m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			
	100m3 capacity	2	nos	
4	Distribution pipe			
	50mm diameter	2,500	m	
	75mm diameter		m	
	90mm diameter	600	m	
	110mm diameter	6,900	m	
	150mm diameter	800	m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	70	nos	
6	Water meter installation	220	nos	
7	Public tap	3	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	Aragatsotn	
No. 24	Yernjatap	JICA STUDY TEAM

Marz : **Aragatsotn**  
No. : **24**  
Name : **Yernjatap**

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					<b>367,700</b>
2	Transmission Pipe	50mm		m	5,520	
		75mm		m	7,160	
		90mm	3,000	m	8,040	24,120,000
		110mm	4,000	m	9,680	38,720,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					<b>62,840,000</b>
3	Reservoir	50m3		nos	8,363,900	
		100m3	2	nos	12,968,300	25,936,600
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					<b>25,936,600</b>
4	Distribution Pipe	50mm	2,500	m	5,520	13,800,000
		75mm		m	7,160	
		90mm	600	m	8,040	4,824,000
		110mm	6,900	m	9,680	66,792,000
		150mm	800	m	13,140	10,512,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					<b>95,928,000</b>
5	House Connection		70	nos	74,000	<b>5,180,000</b>
6	Water Meter Installation		220	nos	80,000	<b>17,600,000</b>
7	Public Tap		3	nos	90,000	<b>270,000</b>
8	Chlorilation Equipment		2	nos	500,000	<b>1,000,000</b>
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage concrete surfa		4,320	m	3,600	<b>15,552,000</b>
<b>Total</b>					<b>AMD</b>	<b>224,674,300</b>
					Equivalent to USD	735,383
					Equivalent to JPY	77,582,936
					<b>AMD</b>	<b>USD</b>
	Investment Cost per household		220	HH	1,021,247	3,343
	Investment Cost per person		702	persons	320,049	1,048





