

No.14 Drakhtik

Information on Existing Water Sources (Gegharkunik)

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

No.14 Community Drakhtik
District Krasnoselsk
Marz Gegharkunik

No.14 Community Drakhtik
District Krasnoselsk
Marz Gegharkunik
Sampling date 26/Jul/2007

No	Water source	Latitude			Longitude			Atitude	Yield(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Sprint	40	34	49.9	45	15	6.8	2,228	5.0	6.0	6.0
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 Acceptnce for water quality	Acceptable
Notes	Leakage in the water main - 50%
Alternative sources if any	There are free springs with 3l/sec discharge 600m north-east from the spring intakes

	Parameters analysed	Units	No.1	Guidelines	
				WHO	Armenia
a	pH		8.2	6.5-8	6.0 - 9.0
b	Temperature	Deg.C	11.5		
c	TDS	Mg/L	120	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	0.43	1.50	
7	Hardness	Mg/L	210	500	700
8	Fe:Iron	Mg/L	n.d.	0.30	0.30
9	Mn:Manganese	Mg/L	n.d.	0.40	0.10
10	Mo:Molibdenum	Mg/L	<0.02	0.070	0.250
11	Ni:Nickel	Mg/L	n.d.	0.020	0.100
12	Nitrate(NO3+)	Mg/L	2.2	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	<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	nd	-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml	nd	0	0
26	Total bacteria	bacteria per 1 ml	25	-	50

No. 14 Marz Gegharkunik Community Drakhtik**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	Possible	Possible	

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°34'49.9"	45°15'06.8"	2,228	1960	Concrete	6.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1,500	150	AsbestosCement	6.0	1960	Huge	Yes
2	2,000	100	Steel			Huge	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°33'59.4"	45°14'30.3"	2,019	Concrete	Circle	D=9m, H=3m	150	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	100	Steel	1960	Huge	Yes

7. PUMP STATION

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

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
1	1992		Yes	100	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.14Drakhtik
District	Kranoseisk

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	1,150
A2	Actual population in 2007	1,200
A3	Number of households	380
A4.1	Elderly people	69
A4.2	Population in labor force (age from 16 to 62)	321
A4.3	Children	307
A5.1	Pensioners	180
A5.2	Unemployed	18
A5.3	Receiving benefits	93
A6	Average monthly income of household (AMD)	100,000
A7	Number of medical ambulance station/first and health post	absent
A8	Number of beds in each medical ambulance station	0
A9	Number of school	1
A10	Number of pupils	170
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	8,266
	Annual Budget of the community 2005, in thousand AMD	10,183
	Annual Budget of the community 2006, in thousand AMD	12,382
	Annual Budget of the community 2007, in thousand AMD	12,383
	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,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	is not planned
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	3
D10.1	How is the regime of water supply in your community in the dry season?	24 hrs
D10.2	How is the regime of water supply in your community in the wet season?	24 hrs
D11	What time of day water is given?	-
D12	Are you pleased with duration of domestic water supply?	mainly satis.
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)	400

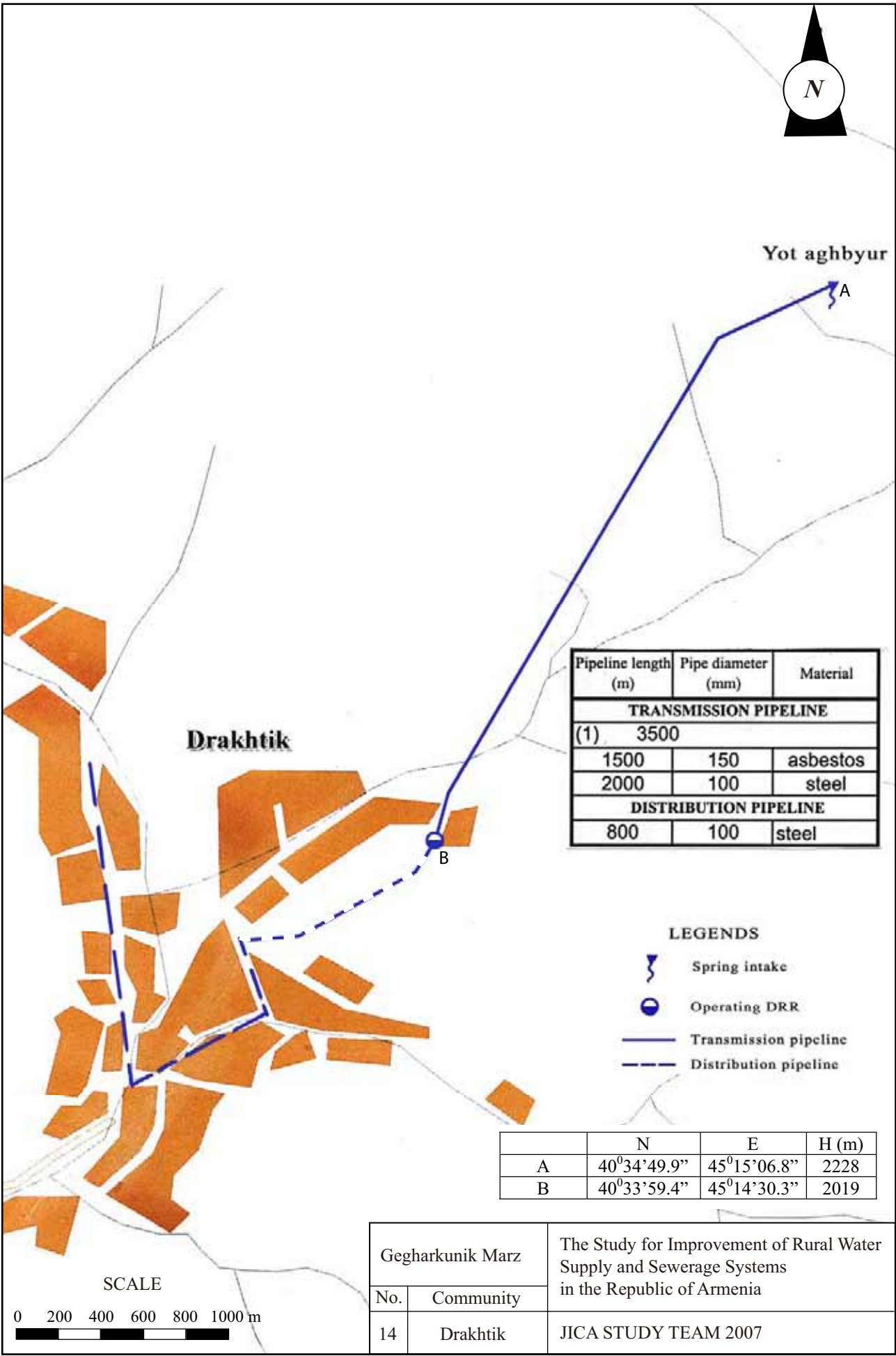
No.	Question	Answer
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	400
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flat rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	no need for irrigation
D20	Are you satisfied with irrigation water supply volume?	insufficient.

E: Present Operation and Maintenance Works

E1	Name of responsible for water supply	nobody
E2	Position	
E3	Telephone	
E4	Quantity and present condition of the water supply facilities: spring/ intake	6-deteriorated
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	1-deteriorated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1-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?	residents
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	none
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?	difficult to answer

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
	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 ethnic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent



Yot aghbyur

Drakhtik

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 3500		
1500	150	asbestos
2000	100	steel
DISTRIBUTION PIPELINE		
800	100	steel

LEGENDS

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

	N	E	H (m)
A	40°34'49.9"	45°15'06.8"	2228
B	40°33'59.4"	45°14'30.3"	2019

SCALE



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

Marz : **Gegharkunik**
Name : **Drakhtik**

No.14

No.	Item	Quantity	Unit	Water demand (m3/d)
A. WATER DEMAND				
	1 Population	1,200	persons	120.0
	2 Factory	-	nos	0.0
	3 School (pupils)	170	pupils	1.7
	4 Medical Ambulance Station	-	nos	-
	5 Polyclinic	-	nos	-
	6 Livestocks (87lit/household)	380	household	33.1
	Sub-total			154.8
	Unaccounted for water (20%)			31.0
1	Average Daily Water Demand			185.8 m3/day
2	Maximum Daily Water Demand			222.9 m3/day
3	Maximum Hourly Water Demand			24.1 m3/hr
B. WATER SUPPLY PLAN				
	1 Water source type	Nr.	Total vol.	
	a Spring	1	6.0	lit/sec
				518.4 m3/day
	Total			518.4 m3/day
	2 Required reservoir volume			290 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	2,500	m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			
	300m3 capacity	1	nos	
4	Distribution pipe			
	50mm diameter		m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter	800	m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	380	nos	
6	Water meter installation	380	nos	
7	Public tap	4	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. 14	Drakhtik	JICA STUDY TEAM

Marz : **Gegharkunik**

No. : **14**

Name : **Drakhtik**

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	2,500	m	9,680	24,200,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					24,200,000
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		m	7,160	
		90mm		m	8,040	
		110mm	800	m	9,680	7,744,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					7,744,000
5	House Connection		380	nos	74,000	28,120,000
6	Water Meter Installation		380	nos	80,000	30,400,000
7	Public Tap		4	nos	90,000	360,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage concrete surfa		320	m	3,600	1,152,000
Total					AMD	122,474,100
					Equivalent to USD	400,871
					Equivalent to JPY	42,291,888
					AMD	USD
Investment Cost per household			380	HH	322,300	1,055
Investment Cost per person			1,200	persons	102,062	334

No.15 Yerenos

Information on Existing Water Sources (Gegharkunik)

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

No.15 Community Yerenos
District Martuni
Marz Gegharkunik

No.15 Community Yerenos
District Martuni
Marz Gegharkunik
Sampling date 21/Jul/2007

No	Water source	Latitude			Longitude			Atitude (m)	Yield(L/sec)		
		deg	min	sec	deg	min	sec		Min	Max	At site
1	spring	40	11	37.5	45	8	11.3	2,310	20.0	25.0	25.0
2											
3											
4											
5											
6											
7											
8											
9											
10											
<i>Notes:</i>											
<i>Latitude, Longitude, Atitude:</i>		<i>Measured at site</i>									
<i>Yield (Min, Max):</i>		<i>Interviewed to the Community</i>									
<i>Yield (at site):</i>		<i>Measured / estimated at site in summer of 2007</i>									

Users Acceptnce for water quality	Acceptable
Notes	500m3 DRR does not operate
Alternative sources if any	

	Parameters analysed	Units	No.1	Guidelines	
				WHO	Armenia
a	pH		8.1	6.5-8	6.0 - 9.0
b	Temperature	Deg.C	6.9		
c	TDS	Mg/L	61	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	7	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	0.64	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	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	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	n.d	0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001	0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002	0.00100	0.00050
21	Se:Selenium	Mg/L	<0.001	0.010	0.010
22	Sr:Strontium	Mg/L	<0.7	NA	7.0
23	CN:Cyanide	Mg/L	n.d	0.070	0.035
24	Coli form bacteria	bacteria per 100 ml		-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml		0	0
26	Total bacteria	bacteria per 1 ml		-	50

No. 15 Marz Gegharkunik Community Yerenos**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	Fair	Possible	

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°11'37.5"	45°08'11.3"	2,310	1970	Concrete	25.0	No

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1,000	200	Steel	12.5	1970	Huge	No
2	4,000	200	Steel	12.5	2004	Huge	No
	4,000	100	Steel			Huge	No
	4,000	100	Steel			Huge	No

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°11'47.4"	45°11'09.0"	2074	Concrete	Rectangular	12x15x4	600	No
2	40°12'39.5"	45°11'08.6"	2060	Concrete	Rectangular	12x18x4	700	No

5. CHLORINATION EQUIPMENT

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

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	3,000	200	Steel	1970	Huge	Yes
2	2,500	150	Steel		Huge	Yes
3	10,000	100	cast iron		Huge	Yes
4	6,000	75	Steel		Medium	Yes
5	3,000	50	uPVC	2004	Little	No

7. PUMP STATION

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

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
15	1970		Yes	100	Yes

9. DRAINAGE SYSTEM

Existence	Rehabilitation	Remarks
Yes	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	Gegharkunik
Number and Name of Community	No.15 Yerenos
District	Martini

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	6,167
A2	Actual population in 2007	5,000
A3	Number of households	1,200
A4.1	Elderly people	538
A4.2	Population in labor force (age from 16 to 62)	2,086
A4.3	Children	1,860
A5.1	Pensioners	800
A5.2	Unemployed	0
A5.3	Receiving benefits	270
A6	Average monthly income of household (AMD)	10,000
A7	Number of medical ambulance station/first and health post	absent
A8	Number of beds in each medical ambulance station	0
A9	Number of school	2
A10	Number of pupils	1,200
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	12,000
	Annual Budget of the community 2005, in thousand AMD	14,000
	Annual Budget of the community 2006, in thousand AMD	18,000
	Annual Budget of the community 2007, in thousand AMD	4,700
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	3
	Amount spent in drinking water sector 2005, in thousand AMD	350
	Amount spent in drinking water sector 2006, in thousand AMD	3,500
	Amount spent in drinking water sector 2007, in thousand AMD	3,000
	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	2007
D5	Present condition of the water supply volume of Domestic use	sufficient
D6	Present condition of the water supply volume of Irrigation water	insufficient
D7	Number of house connection to drinking water system	1000
D8	How many house connection household set the water meter	0
D9	Number of public taps	15
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?	regularly - 12hrs
D11	What time of day water is given?	21 ⁰⁰ -09 ⁰⁰
D12	Are you pleased with duration of domestic water supply?	mainly satis.
D13	Are hours of water supply convenient?	mainly convenient
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each household a day?	1.5 hrs
D14.2	Estimate quantity of domestic water use of each household (litter per day)	1,000

No.	Question	Answer
D15.1	How long the taps are open to provide the each household for filling	1.5 hrs
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?	pump station, by gravity from
D20	Are you satisfied with irrigation water supply volume?	insufficient.

E: Present Operation and Maintenance Works

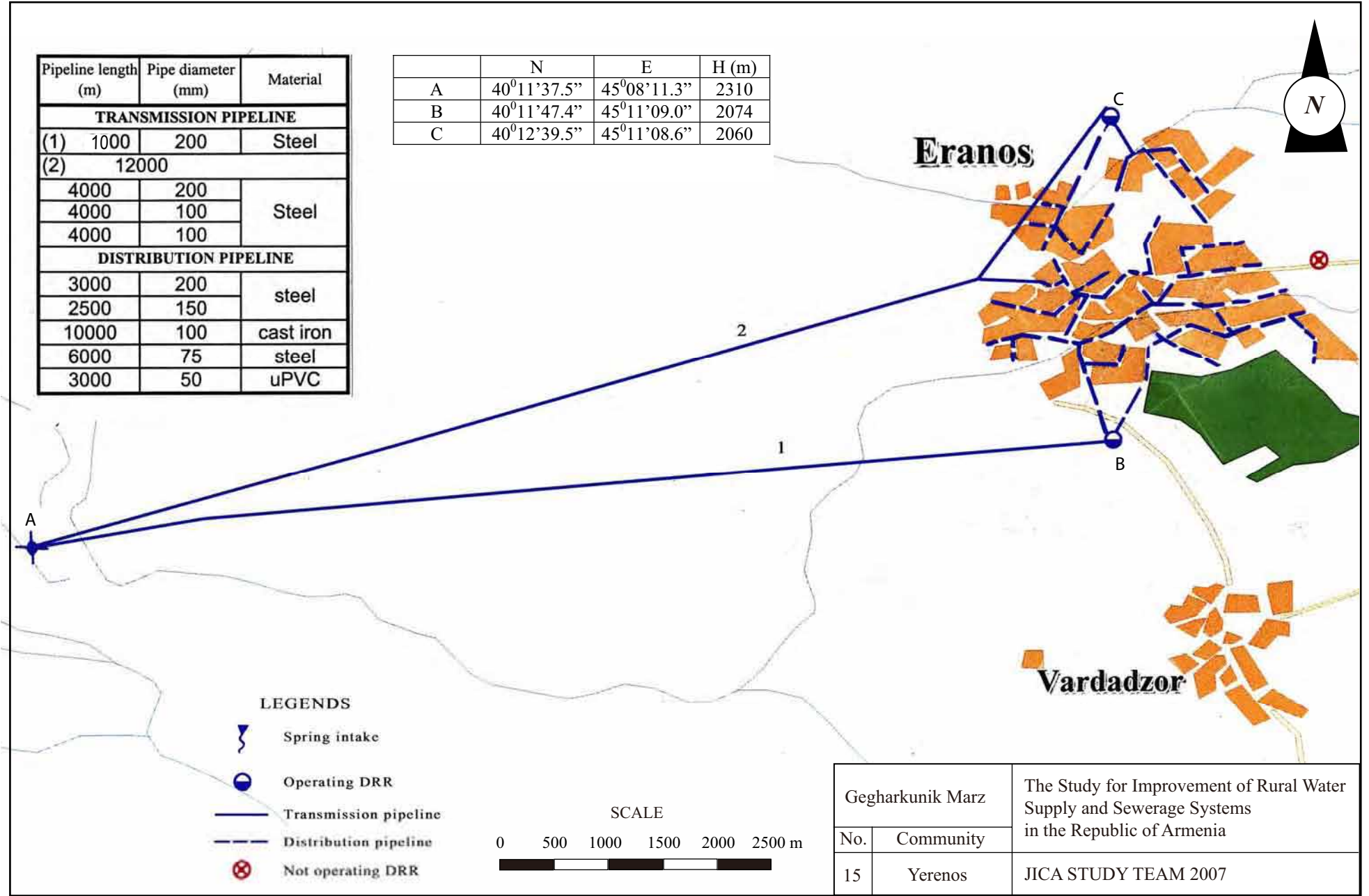
E1	Name of responsible for water supply	Baghdasaryan Manuk
E2	Position	community department specialist
E3	Telephone	(094)620820
E4	Quantity and present condition of the water supply facilities: spring/ intake	3-partially rehabilitated
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	2-rehabilitated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	2-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	partially rehabilitated
E9	Quantity and present condition of the water supply facilities: pump	4-deteriorated
E10	Who is the owner of the water supply facilities?	community, WUA
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 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)	0
	Repair cost(AMD)	3,000,000
	Others(AMD)	0
	Total (AMD)	3,000,000
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)

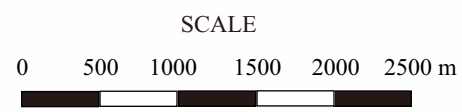
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
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 ethnic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 1000	200	Steel
(2) 12000		
4000	200	Steel
4000	100	
4000	100	
DISTRIBUTION PIPELINE		
3000	200	steel
2500	150	
10000	100	cast iron
6000	75	steel
3000	50	uPVC

	N	E	H (m)
A	40°11'37.5"	45°08'11.3"	2310
B	40°11'47.4"	45°11'09.0"	2074
C	40°12'39.5"	45°11'08.6"	2060



- LEGENDS**
-  Spring intake
 -  Operating DRR
 -  Transmission pipeline
 -  Distribution pipeline
 -  Not operating DRR



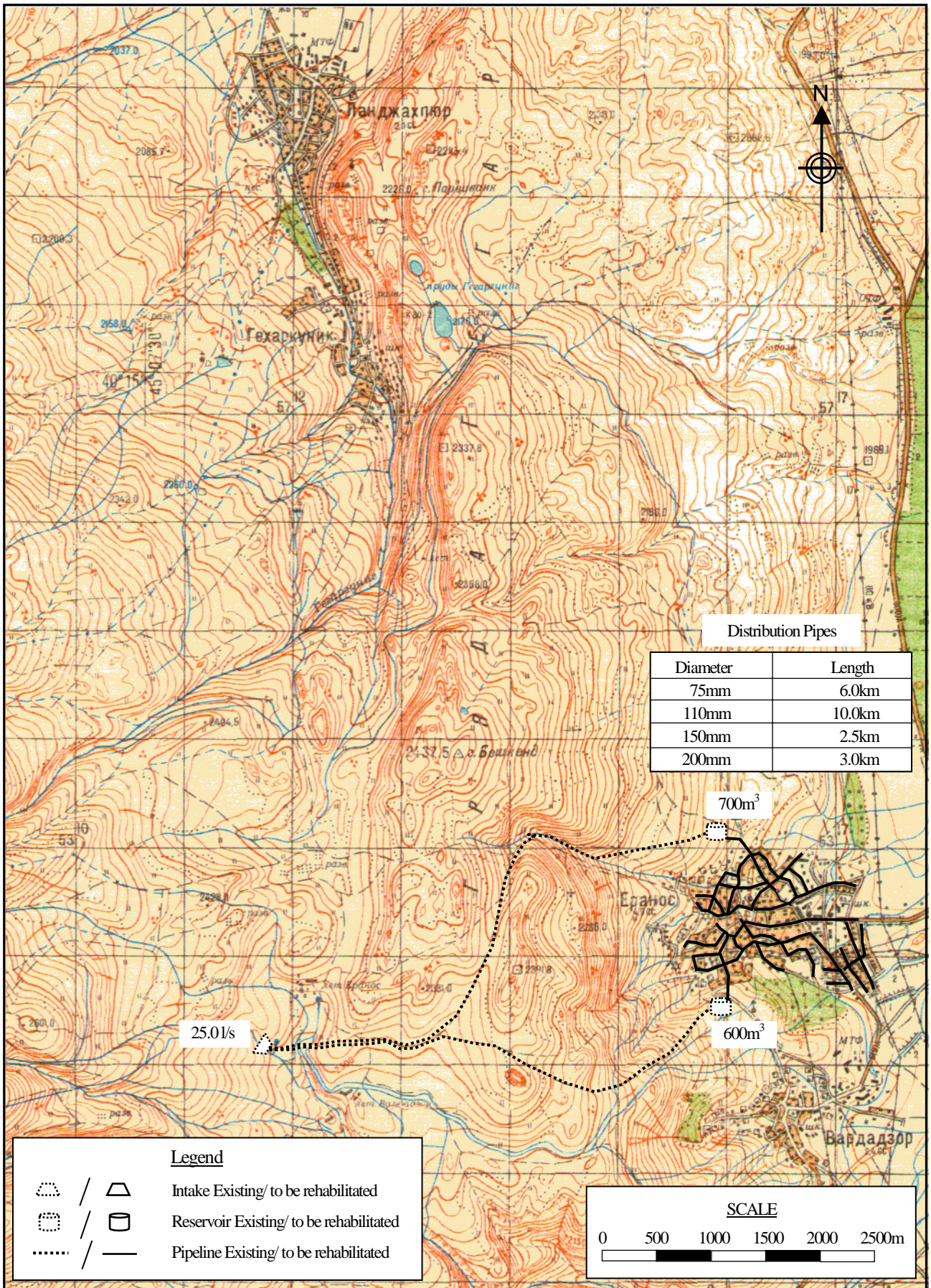
Gegharkunik Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
15	Yerenos	JICA STUDY TEAM 2007

Marz : **Gegharkunik**
Name : **Yerenos**

No.15

No.	Item	Quantity	Unit	Water demand (m3/d)
A. WATER DEMAND				
1	Population	5,000	persons	500.0
2	Factory	-	nos	0.0
3	School (pupils)	1,200	pupils	12.0
4	Medical Ambulance Station	-	nos	-
5	Policlinic	-	nos	-
6	Livestocks (87lit/household)	1,200	household	104.4
	Sub-total			616.4
	Unaccounted for water (20%)			123.3
1	Average Daily Water Demand			739.7 m3/day
2	Maximum Daily Water Demand			887.6 m3/day
3	Maximum Hourly Water Demand			72.1 m3/hr
B. WATER SUPPLY PLAN				
	1 Water source type	Nr.	Total vol.	
	a Spring	1	25.0	lit/sec
				2160.0 m3/day
	Total			2160.0 m3/day
	2 Required reservoir volume			865 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			
4	Distribution pipe			
	50mm diameter		m	
	75mm diameter	6,000	m	
	90mm diameter		m	
	110mm diameter	10,000	m	
	150mm diameter	2,500	m	
	200mm diameter	3,000	m	
	250mm diameter		m	
5	House connection	200	nos	
6	Water meter installation	1,200	nos	
7	Public tap	12	nos	
8	Chlorination	2	nos	
9	Pumps	-	nos	



Water Supply Facilities Rehabilitation Plan

Marz Gegharkunik

No. 15 Yerenos

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

JICA STUDY TEAM

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

Marz : **Gegharkunik**

No. : **15**

Name : **Yerenos**

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		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					
4	Distribution Pipe	50mm		m	5,520	
		75mm	6,000	m	7,160	42,960,000
		90mm		m	8,040	
		110mm	10,000	m	9,680	96,800,000
		150mm	2,500	m	13,140	32,850,000
		200mm	3,000	m	19,440	58,320,000
		250mm		m	27,040	
	Sub-total					230,930,000
5	House Connection		200	nos	74,000	14,800,000
6	Water Meter Installation		1,200	nos	80,000	96,000,000
7	Public Tap		12	nos	90,000	1,080,000
8	Chlorilation Equipment		2	nos	500,000	1,000,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	8,600	m	3,600	30,960,000
Total					AMD	374,770,000
					Equivalent to USD	1,226,663
					Equivalent to JPY	129,412,919
					AMD	USD
Investment Cost per household			1,200	HH	312,308	1,022
Investment Cost per person			5,000	persons	74,954	245

No.16 Zolaqar

Information on Existing Water Sources (Gegharkunik)

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

No.16 Community Zolaqar
District Martuni
Marz Gegharkunik

No.16 Community Zolaqar
District Martuni
Marz Gegharkunik
Sampling date 09/Aug/2007

No	Water source	Latitude			Longitude			Atitude	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring intakes	40	6	51.3	45	23	0.9	2,041	15.0	17.0	18.0
2	14 groundwater	40	7	31.5	45	22	29.5	2,010	-	-	300.0
3		40	7	31.0	45	22	45.2	2,003			
4		40	7	33.6	45	22	42.0	2,000			
5		40	7	28.7	45	22	51.0	2,001			
6		40	7	17.2	45	23	11.7	2,041			
7		40	7	27.9	45	23	29.6	2,017			
8		40	7	47.1	45	22	28.8	1,997			
9		40	8	2.0	45	22	38.9	1,976			
10		40	8	16.0	45	22	32.7	1,961			
11		40	7	52.5	45	22	14.1	1,992			
12		40	7	46.7	45	21	53.1	2,003			
13		40	7	37.1	45	22	17.7	2,010			
14		40	7	34.1	45	22	20.7	2,011			
15		40	7	36.6	45	21	57.9	2,020			

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 Not acceptable
Notes	Leakage in the network - 60-70%. Water demand is met with household demands.
Alternative sources if any	

	Parameters analysed	Units	No.1 pumping facility	No.2 Spring	Guidelines	
					WHO	Armenia
a	pH		7.4	7.2	6.5-8	6.0 - 9.0
b	Temperature	Deg.C	11.2	8.6		
c	TDS	Mg/L	82	82	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	6	7	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	0.91	0.82	1.50	
7	Hardness	Mg/L	140	135	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	nd	0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.3	1.8	50.0	45.0
13	SO4:Sulfate	Mg/L	2.0	4.0	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	n.d	nd	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	n.d	nd	0.010	0.010
22	Sr:Strontium	Mg/L	n.d	<0.7	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

No. 16 Marz Gegharkunik Community Zolaqar**1. ACCESSIBILITY TO THE SITE**

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Possible	Possible	
	Intake	Fair	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°06'51.3"	45°23'00.9"	2,041	1930	Masonry	18.0	Yes
2	Groundwater (14)				1990-2002	Concrete	300.0	No

Note : Coordinates of groundwater intake sites are mentioned in the existing resource survey sheet

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	1,400	150	Steel	1960	Huge	Yes
2	1,300	100	Steel	1960	Huge	Yes
3	8,000	75	Steel	1980	Huge	Yes
4	6,000	50	Steel	1980	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 (14 nos)	Commercial	Centrifugal	-	-	-	-	No

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
15	1960	1980	Yes	67	No

9. DRAINAGE SYSTEM

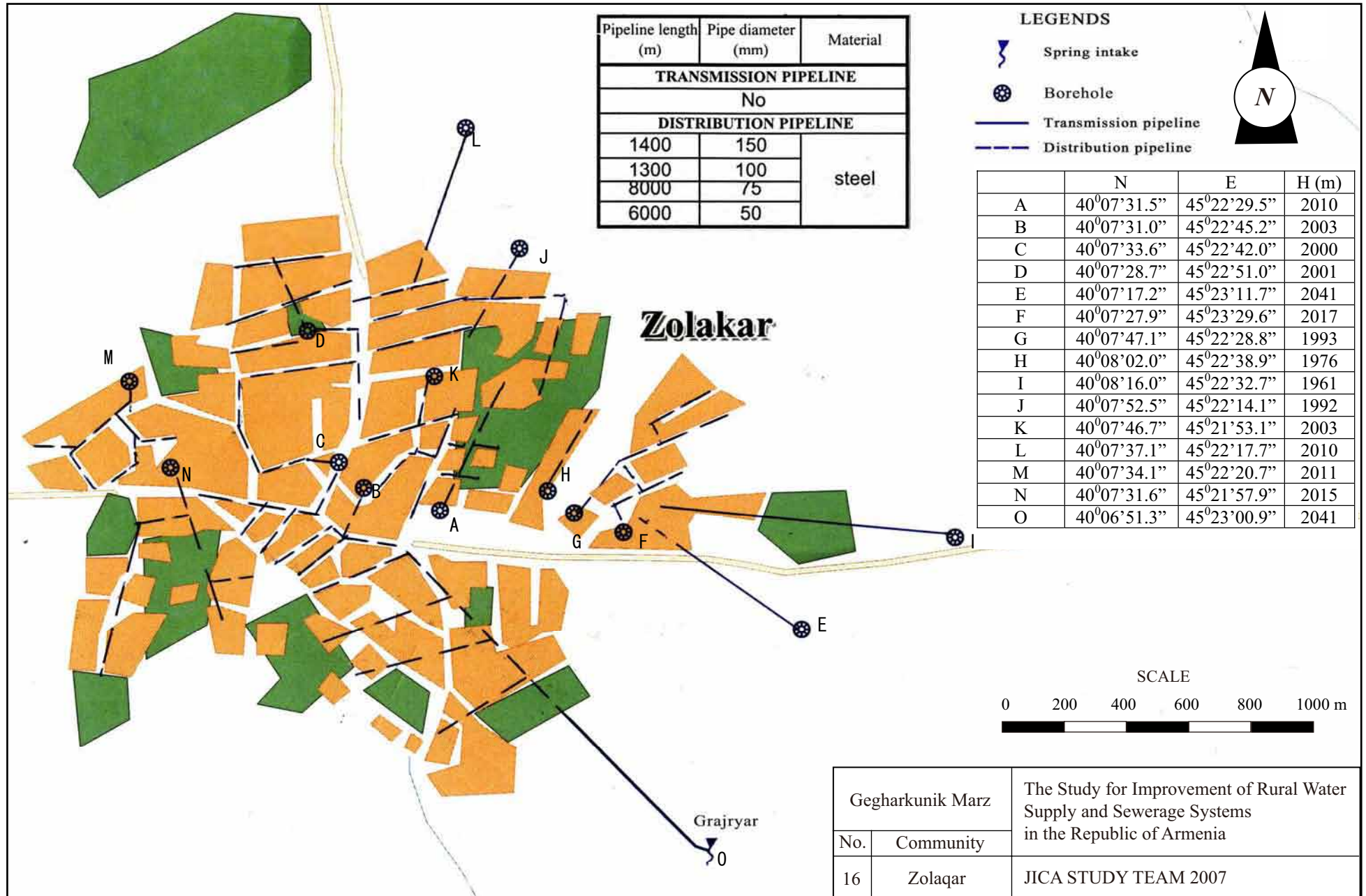
Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	Gegharkunik
Number and Name of Community	No.16 Zolaqar
District	Martini

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	6,840
A2	Actual population in 2007	6,900
A3	Number of households	1,300
A4.1	Elderly people	923
A4.2	Population in labor force (age from 16 to 62)	3,337
A4.3	Children	2,300
A5.1	Pensioners	817
A5.2	Unemployed	2,000
A5.3	Receiving benefits	312
A6	Average monthly income of household (AMD)	37,000
A7	Number of medical ambulance station/first and health post	absent
A8	Number of beds in each medical ambulance station	0
A9	Number of school	2
A10	Number of pupils	1,200
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	1,020
	Annual Budget of the community 2005, in thousand AMD	1,024
	Annual Budget of the community 2006, in thousand AMD	1,018
	Annual Budget of the community 2007, in thousand AMD	1,118
	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	70
	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	almost sufficient
D6	Present condition of the water supply volume of Irrigation water	almost sufficient
D7	Number of house connection to drinking water system	780
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?	irregularly ,1 hour in 2 days
D10.2	How is the regime of water supply in your community in the wet season?	irregularly, once in 2 days - 1hour
D11	What time of day water is given?	different times
D12	Are you pleased with duration of domestic water supply?	generally displeased
D13	Are hours of water supply convenient?	generally inconvenient
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)	300

No.	Question	Answer
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	500
D16	Drinking water monthly water fee per household	300 drams per capita/month
D17	How often do you usually pay water fees?	each month
D18	Water fee structure 1 Flat rate, 2 Having water tariff	flat rate
D19	Where do you acquire the irrigation water?	deep well, spring
D20	Are you satisfied with irrigation water supply volume?	insufficient.
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	every district has it's
E2	Position	
E3	Telephone	
E4	Quantity and present condition of the water supply facilities: spring/ intake	7 deep wells
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	absent
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	3-partially rehabilitated
E9	Quantity and present condition of the water supply facilities: pump	deteriorated
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?	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?	collect water fee from residents
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	500,000
	Repair cost(AMD)	0
	Others(AMD)	0
	Total (AMD)	500,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	difficult to answer
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 ethnic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent



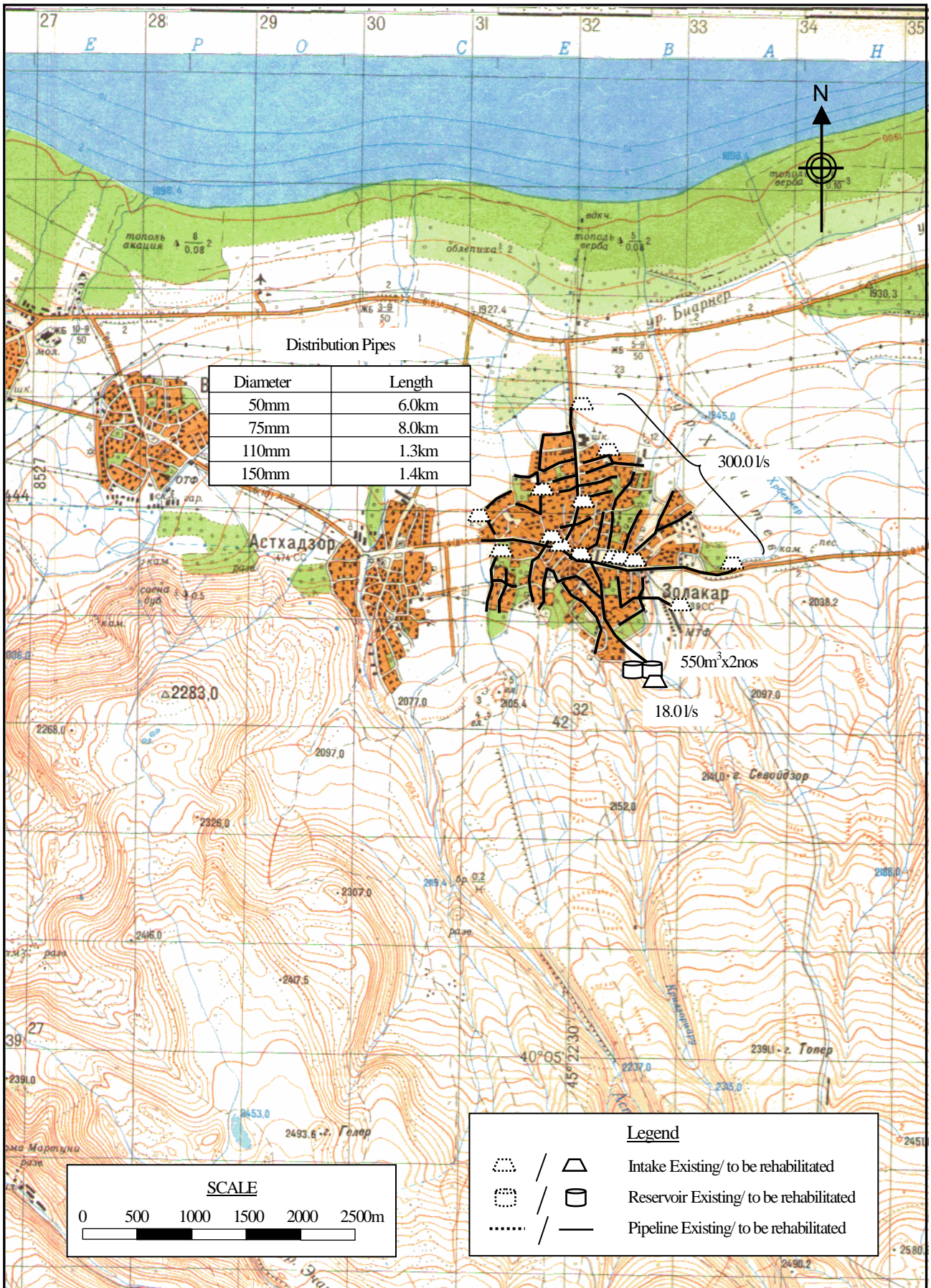
Marz : **Gegharkunik**
Name : **Zolaqar**

No.16

No.	Item	Quantity	Unit	Water demand (m3/d)
A. WATER DEMAND				
1	Population	6,900	persons	690.0
2	Factory	-	nos	0.0
3	School (pupils)	1,200	pupils	12.0
4	Medical Ambulance Station	-	nos	-
5	Policlinic	-	nos	-
6	Livestocks (87lit/household)	1,300	household	113.1
	Sub-total			815.1
	Unaccounted for water (20%)			163.0
1	Average Daily Water Demand			978.1 m3/day
2	Maximum Daily Water Demand			1173.7 m3/day
3	Maximum Hourly Water Demand			89.0 m3/hr
B. WATER SUPPLY PLAN				
	1 Water source type	Nr.	Total vol.	
	a Spring	1	18.0	lit/sec 1555.2 m3/day
	b Borehole	14	300.0	lit/sec 25920.0 m3/day
	Total			27475.2 m3/day
	2 Required reservoir volume			1068 m3

C. WATER SUPPLY FACILITIES REHABILITATION PLAN

No	Item	Quantity	Unit
1	Intake		
	1m3		nos
	2m3	1	nos
	3m3		nos
	4m3		nos
2	Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	550m3 capacity	2	nos For spring O
4	Distribution pipe		
	50mm diameter	6,000	m
	75mm diameter	8,000	m
	90mm diameter		m
	110mm diameter	1,300	m
	150mm diameter	1,400	m
	200mm diameter		m
	250mm diameter		m
5	House connection	520	nos
6	Water meter installation	1,300	nos
7	Public tap	13	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. 16	Zolaqar	
		JICA STUDY TEAM

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

Marz : **Gegharkunik**

No. : **16**

Name : **Zolaqar**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake	1m3		nos	367,700	
		2m3	1	nos	545,000	545,000
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					545,000
2	Transmission Pipe	50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		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		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		550m3	2	nos	50,884,800	101,769,600
	Sub-total					101,769,600
4	Distribution Pipe	50mm	6,000	m	5,520	33,120,000
		75mm	8,000	m	7,160	57,280,000
		90mm		m	8,040	
		110mm	1,300	m	9,680	12,584,000
		150mm	1,400	m	13,140	18,396,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					121,380,000
5	House Connection		520	nos	74,000	38,480,000
6	Water Meter Installation		1,300	nos	80,000	104,000,000
7	Public Tap		13	nos	90,000	1,170,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	6,680	m	3,600	24,048,000
Total					AMD	391,892,600
					Equivalent to USD	1,282,707
					Equivalent to JPY	135,325,574
					AMD	USD
Investment Cost per household			1,300	HH	301,456	987
Investment Cost per person			6,900	persons	56,796	186

