

No.46 Nigavan

Information on Existing Water Sources (Aragatsotn)

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

No.46 Community Nigavan
District Aparan
Marz Aragatsotn

No.46 Community Nigavan
District Aparan
Marz Aragatsotn
Sampling date 02/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	33	55.5	44	14	57.0	2,998	-	5.0	5.0
2	borehole	-	-	-	-	-	-	-	-	-	0.5
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 lake (Gharagyol) is the water source, the water of which is supplied to rural community without treatment and chlorination. The borehole is operated mainly in winter time, water is used for household needs.
Alternative sources if any	No alternative water sources are available

	Parameters analysed	Units	No.1 Lake water	No.2 Groundwater	Guidelines	
					WHO	Armenia
a	pH		8.2	6.4	6.5-8	6.0 - 9.0
b	Temperature	Deg.C	18.1	7.8		
c	TDS	Mg/L	13	504	1000	1000
1	Al:Aluminum	Mg/L	n.d	0.12	0.10	0.50
2	B:Boron	Mg/L	n.d	n.d	0.70	0.50
3	Cl:Chloride	Mg/L	4	100	250	350
4	Cr:Chrome	Mg/L	0.01	0.01	0.05	0.05
5	Cu:Copper	Mg/L	n.d	n.d	2	1
6	F:Fluoride	Mg/L	0.03	0.14	1.50	
7	Hardness	Mg/L	25	825	500	700
8	Fe:Iron	Mg/L	0.04	n.d	0.30	0.30
9	Mn:Manganese	Mg/L	n.d	n.d	0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d	n.d	0.070	0.250
11	Ni:Nickel	Mg/L	n.d	n.d	0.020	0.100
12	Nitrate(NO3+)	Mg/L	0.9	25.7	50.0	45.0
13	SO4:Sulfate	Mg/L	3.0	75.0	250.0	500.0
14	Zn:Zink	Mg/L	n.d	n.d	3.0	5.0
15	As:Arsenic	Mg/L	n.d	n.d	0.0	0.1
16	Ba:Barium	Mg/L	<0,01	<0,01	0.70	0.10
17	Be:Berillium	Mg/L	0.00005	<0.00005	NA	0.00020
18	Cd:Cadmium	Mg/L	n.d	n.d	0.0030	0.0010
19	Pb:Lead	Mg/L	<0,001	<0,001	0.010	0.030
20	Hg:Mercury	Mg/L	<0,0002	<0,0002	0.00100	0.00050
21	Se:Selenium	Mg/L	<0,001	<0,001	0.010	0.010
22	Sr:Strontium	Mg/L	n.d	0.7	NA	7.0
23	CN:Cyanide	Mg/L	n.d	n.d	0.070	0.035
24	Coli form bacteria	bacteria per 100 ml			-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml			0	0
26	Total bacteria	bacteria per 1 ml			-	50

No. 46 Marz Aragatsotn Community Nigavan**1. ACCESSIBILITY TO THE SITE**

No.	Structures	Access by vehicle	Machine construction	Remarks
1	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	Lake	40°33'55.5"	44°14'57.0"	2,998	1975	Concrete	5.0	Yes
2	Groundwater	-	-	-	-	-	0.5	No

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	7,000	100	Steel	5	2003	No	No

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m ³)	Rehabilitation Necessity (Y/N)
1	40°37'13.2"	40°17'55.5"	2,123	reinforced concrete	Rectangular	6x12x4	250	No

5. CHLORINATION

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	Yes	Reservoir	Liquid	Once a year

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	235	150	Steel	1985	Huge	Yes
2	3,527	100	Steel	1985	Little	No

7. PUMP STATION

Existence (Y/N)	Power source	Type	Capacity (l/s)	Pump head (m)	Tank cap. (m ³)	House size (m)	Rehabilitation Necessity (Y/N)
No							

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
4	1985		Yes	100	Yes

9. DRAINAGE SYSTEM

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

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	Aragatsotn
Number and Name of Community	No.46 Nigavan
District	Aparan

No.	Question	Answer
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A: Baseline Data

A1	Actual population in 2001	707
A2	Actual population in 2007	685
A3	Number of households	160
A4.1	Elderly people	135
A4.2	Population in labor force (age from 16 to 62)	370
A4.3	Children	180
A5.1	Pensioners	141
A5.2	Unemployed	0
A5.3	Receiving benefits	7
A6	Average monthly income of household (AMD)	50,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	120

B: Budget

B1	Annual Budget of the community 2004, in thousand AMD	900
	Annual Budget of the community 2005, in thousand AMD	1,100
	Annual Budget of the community 2006, in thousand AMD	1,300
	Annual Budget of the community 2007, in thousand AMD	600
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	230
	Amount spent in drinking water sector 2005, in thousand AMD	235
	Amount spent in drinking water sector 2006, in thousand AMD	225
	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:	dairy, meat
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	Aregak credit program

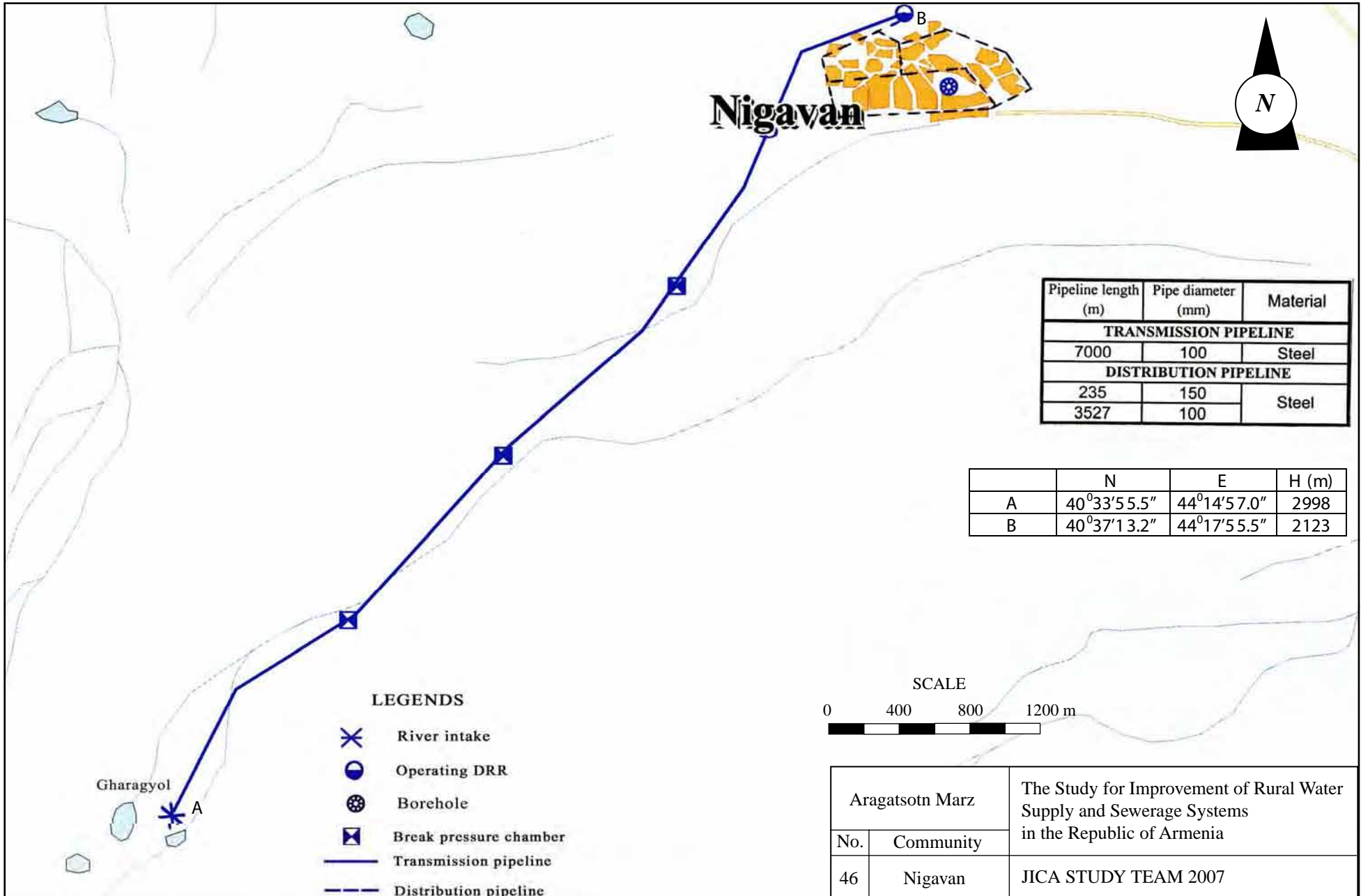
D: Water Usage and Water Demand Survey

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	110
D8	How many house connection household set the water meter	0
D9	Number of public taps	4
D10.1	How is the regime of water supply in your community in the dry season?	regularly 3 hrs
D10.2	How is the regime of water supply in your community in the wet season?	regularly 4 hrs
D11	What time of day water is given?	9-12; 9-11; 16-18
D12	Are you pleased with duration of domestic water supply?	very pleased
D13	Are hours of water supply convenient?	fully 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)	300
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	300
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flat rate, 2 Having water tariff	-
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	Petrosyan Hovsep
E2	Position	water distributor
E3	Telephone	(0252)90291
E4	Quantity and present condition of the water supply facilities: spring/ intake	1 rehabilitated
E5	Quantity and present condition of the water supply facilities:	1 rehabilitated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1 rehabilitated.
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	1 partially repaired
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?	residents
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	20,000
	Repair cost(AMD)	50,000
	Others(AMD)	0
	Total (AMD)	70,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	resident participation
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	yes
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	yes
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
7000	100	Steel
DISTRIBUTION PIPELINE		
235	150	Steel
3527	100	

	N	E	H (m)
A	40°33'55.5"	44°14'57.0"	2998
B	40°37'13.2"	44°17'55.5"	2123

LEGENDS

- River intake
- Operating DRR
- Borehole
- Break pressure chamber
- Transmission pipeline
- Distribution pipeline



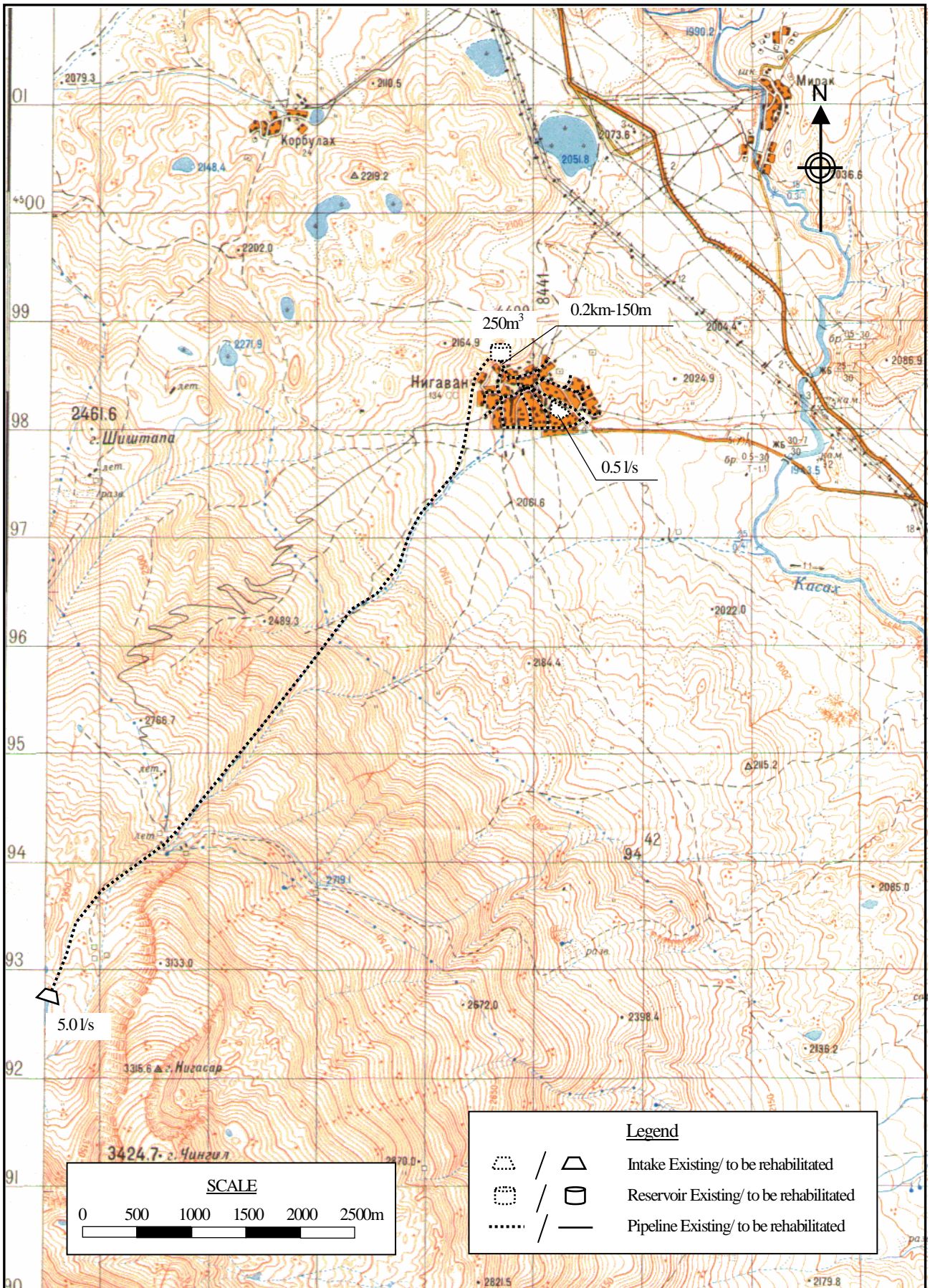
Aragatsotn Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
46	Nigavan	JICA STUDY TEAM 2007

Marz : **Aragatsotn**
Name : **Nigavan**

No.46

No.	Item	Quantity	Unit	Water demand (m3/d)
A. WATER DEMAND				
1	Population	685	persons	68.5
2	Factory	-	nos	0.0
3	School (pupils)	120	pupils	1.2
4	Medical Ambulance Station	-	nos	-
5	Policlinic	-	nos	-
6	Livestocks (87lit/household)	160	household	13.9
	Sub-total			83.6
	Unaccounted for water (20%)			16.7
1	Average Daily Water Demand			100.3 m3/day
2	Maximum Daily Water Demand			120.4 m3/day
3	Maximum Hourly Water Demand			16.3 m3/hr
B. WATER SUPPLY PLAN				
	1 Water source type	Nr.	Total vol.	
	a Lake	1	5.0 lit/sec	432.0 m3/day
	b Borehole	1	0.5 lit/sec	
	Total			432.0 m3/day
	2 Required reservoir volume			196 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		m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			
4	Distribution pipe			
	50mm diameter		m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter		m	
	150mm diameter	200	m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	50	nos	
6	Water meter installation	160	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. 46	Nigavan	JICA STUDY TEAM

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

Marz : **Aragatsotn**
No. : **46**
Name : **Nigavan**

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		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		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm	200	m	13,140	2,628,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					2,628,000
5	House Connection		50	nos	74,000	3,700,000
6	Water Meter Installation		160	nos	80,000	12,800,000
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		80	m	3,600	288,000
Total					AMD	20,463,700
					Equivalent to USD	66,980
					Equivalent to JPY	7,066,380
					AMD	USD
Investment Cost per household			160	HH	127,898	419
Investment Cost per person			685	persons	29,874	98

No.47 Norashen

Information on Existing Water Sources (Aragatsotn)

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

No.47 Community Norashen
District Aparan
Marz Aragatsotn

No.47 Community Norashen
District Aparan
Marz Aragatsotn
Sampling date 05/Sep/2007

No	Water source	Latitude			Longitude			Atitude (m)	Yield(L/sec)		
		deg	min	sec	deg	min	sec		Min	Max	At site
1	Joji spring	40	29	44.0	44	29	48.8	2,387	4.0	8.0	6.0
2	Katnov spring	40	29	28.8	44	29	13.0	2,304	2.0	5.0	2.5
3											
4											
5											
6											
7											
8											
9											
10											
<i>Notes:</i>											
<i>Latitude, Longitude, Atitude:</i>		<i>Measured at site</i>									
<i>Yield (Min, Max):</i>		<i>Interviewed to the Community</i>									
<i>Yield (at site):</i>		<i>Measured / estimated at site in summer of 2007</i>									

Users Acceptnce for water quality	Acceptable
Notes	No.24 Yernjatap community receives Katnov spring's flow fully and 2l/sec from Joj spring. 3,7l/sec is given to Norasehn.
Alternative sources if any	The community has a big groundwater source.

	Parameters analysed	Units	No.1 Gogaghbyur	Guidelines	
				WHO	Armenia
a	pH		8.3	6.5-8	6.0 - 9.0
b	Temperature	Deg.C	6.5		
c	TDS	Mg/L	31	1000	1000
1	Al:Aluminum	Mg/L	0.04	0.10	0.50
2	B:Boron	Mg/L	n.d	0.70	0.50
3	Cl:Chloride	Mg/L	5	250	350
4	Cr:Chrome	Mg/L	<0.01	0.05	0.05
5	Cu:Copper	Mg/L	n.d	2	1
6	F:Fluoride	Mg/L	0.05	1.50	
7	Hardness	Mg/L	85	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	1.3	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	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	<9	-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml	n.d	0	0
26	Total bacteria	bacteria per 1 ml	98	-	50

No. 47 Marz Aragatsotn Community Norashen**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			No reservoir

2. INTAKE STRUCTURE

No.	Water main	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°29'44,0"	44°29'48.8"	2,387	1979	reinforced concrete	6.0	No
2	Spring	40°29'28,8"	44°29'13,0"	2,304	1991	Steel	2.5	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	2,700	150	Steel	5.7	1979	Little	Yes
2	1,000	100	Steel	2.25	1991	Little	Yes
3	1,500	100	Steel	0.0	1991	Little	Yes
	1,200	65	Steel	0.0	1991	Little	Yes

4. RESERVOIR

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

5. CHLORINATION

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	Yes	Intake	Liquid	Once a year

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1,200	65	Steel	2002	Little	Yes
2	1,700	50	Steel		Little	Yes
3	850	32	Steel	1980	Little	Yes
4	250	25	Steel		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)
3	1991		Yes	70	Yes

9. DRAINAGE SYSTEM

Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	Aragatsotn
Number and Name of Community	No.47 Norashen
District	Aparan

No.	Question	Answer
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A: Baseline Data

A1	Actual population in 2001	154
A2	Actual population in 2007	153
A3	Number of households	86
A4.1	Elderly people	29
A4.2	Population in labor force (age from 16 to 62)	60
A4.3	Children	42
A5.1	Pensioners	29
A5.2	Unemployed	0
A5.3	Receiving benefits	0
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	absent
A10	Number of pupils	0

B: Budget

B1	Annual Budget of the community 2004, in thousand AMD	1,800
	Annual Budget of the community 2005, in thousand AMD	2,000
	Annual Budget of the community 2006, in thousand AMD	3,500
	Annual Budget of the community 2007, in thousand AMD	1,507
	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	900
	Amount spent in drinking water sector 2007, in thousand AMD	0
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned.

C: Socio-Economic Survey

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

D: Water Usage and Water Demand Survey

D1	Does the community hold water use permit? 1-Yes, 2-No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	in process
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	86
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?	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)	200
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	250
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?	spring
D20	Are you satisfied with irrigation water supply volume?	sufficient






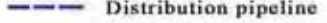
E: Present Operation and Maintenance Works

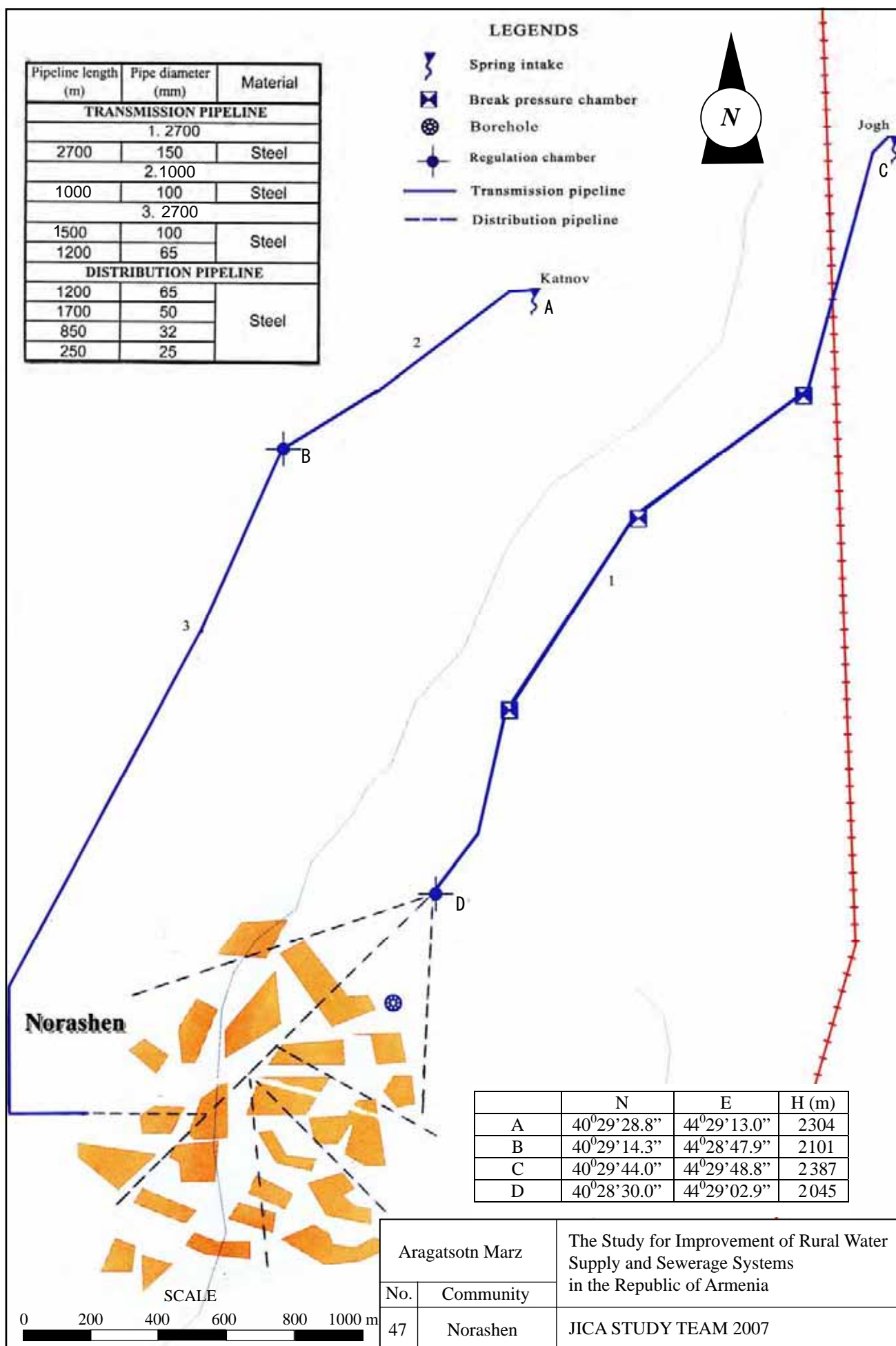
E1	Name of responsible for water supply	Baghdasaryan Smbat
E2	Position	administration head
E3	Telephone	(093)650772
E4	Quantity and present condition of the water supply facilities: spring/ intake	1 rehabilitated
E5	Quantity and present condition of the water supply facilities:	1 rehabilitated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	7 rehabilitated
E7	Quantity and present condition of the water supply facilities: net/distribution pipes	rehabilitated
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 from community
E14	How you prepare O&M costs?	residents
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	900,000
	Others(AMD)	0
	Total (AMD)	900,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	resident participation

F: Initial Environmental Examination (IEE)

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

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
1. 2700		
2700	150	Steel
2. 1000		
1000	100	Steel
3. 2700		
1500	100	Steel
1200	65	
DISTRIBUTION PIPELINE		
1200	65	Steel
1700	50	
850	32	
250	25	

- LEGENDS**
-  Spring intake
 -  Break pressure chamber
 -  Borehole
 -  Regulation chamber
 -  Transmission pipeline
 -  Distribution pipeline



	N	E	H (m)
A	40°29'28.8"	44°29'13.0"	2304
B	40°29'14.3"	44°28'47.9"	2101
C	40°29'44.0"	44°29'48.8"	2387
D	40°28'30.0"	44°29'02.9"	2045

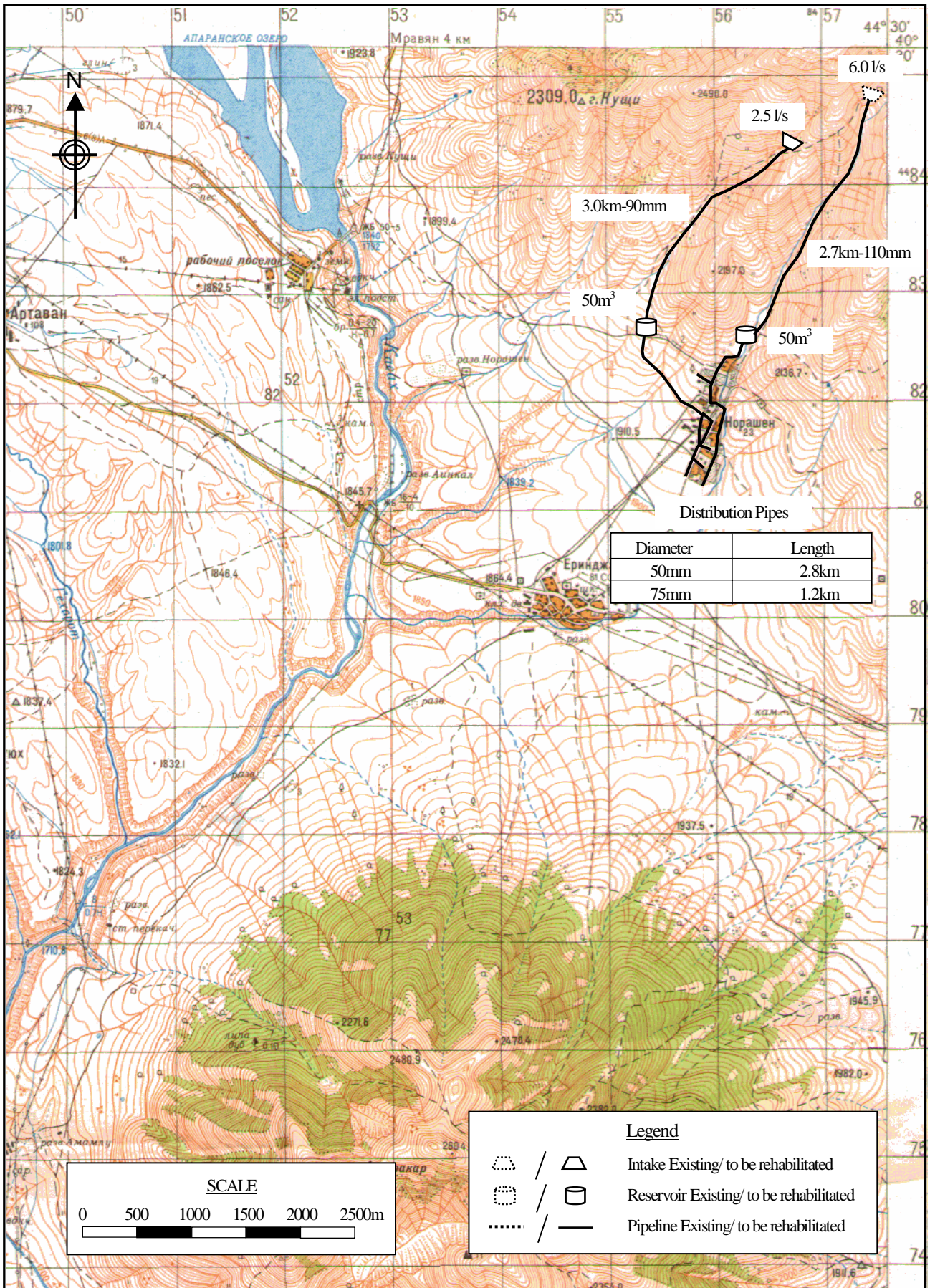
Aragatsotn Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
47	Norashen	JICA STUDY TEAM 2007

Marz : **Aragatsotn**
Name : **Norashen**

No.47

No.	Item	Quantity	Unit	Water demand (m3/d)
A. WATER DEMAND				
	1 Population	153	persons	15.3
	2 Factory	-	nos	0.0
	3 School (pupils)	-	pupils	0.0
	4 Medical Ambulance Station	-	nos	-
	5 Polyclinic	-	nos	-
	6 Livestocks (87lit/household)	86	household	7.5
	Sub-total			22.8
	Unaccounted for water (20%)			4.6
1	Average Daily Water Demand			27.4 m3/day
2	Maximum Daily Water Demand			32.8 m3/day
3	Maximum Hourly Water Demand			8.0 m3/hr
B. WATER SUPPLY PLAN				
	1 Water source type	Nr.	Total vol.	
	a Spring	2	8.5	lit/sec
				734.4 m3/day
	Total			734.4 m3/day
	2 Required reservoir volume			96 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	3,000	m	
	110mm diameter	2,700	m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			
	50m3 capacity	2	nos	
4	Distribution pipe			
	50mm diameter	2,800	m	
	75mm diameter	1,200	m	
	90mm diameter		m	
	110mm diameter		m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	-	nos	
6	Water meter installation	86	nos	
7	Public tap	1	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. 47	Norashen	
		JICA STUDY TEAM

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

Marz : **Aragatsotn**
No. : **47**
Name : **Norashen**

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	3,000	m	8,040	24,120,000
		110mm	2,700	m	9,680	26,136,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					50,256,000
3	Reservoir	50m3	2	nos	8,363,900	16,727,800
		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					16,727,800
4	Distribution Pipe	50mm	2,800	m	5,520	15,456,000
		75mm	1,200	m	7,160	8,592,000
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					24,048,000
5	House Connection			nos	74,000	
6	Water Meter Installation		86	nos	80,000	6,880,000
7	Public Tap		1	nos	90,000	90,000
8	Chlorilation Equipment		2	nos	500,000	1,000,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage concrete surfa		1,600	m	3,600	5,760,000
Total					AMD	105,129,500
					Equivalent to USD	344,100
					Equivalent to JPY	36,302,573
					AMD	USD
	Investment Cost per household		86	HH	1,222,436	4,001
	Investment Cost per person		153	persons	687,121	2,249

No.48 Norashen

Information on Existing Water Sources (Aragatsotn)

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

No.48 Community Norashen
District Aragats
Marz Aragatsotn

No.48 Community Norashen
District Aragats
Marz Aragatsotn
Sampling date 12/Jul/2007

No	Water source	Latitude			Longitude			Atitude	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	"Mantash" treatment plant	40	36	55.6	44	3	35.6	2,171	15.0	20.0	20.0
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	The internal network is in deteriorated condition, there is 50% leakage.
Alternative sources if any	No alternative water sources are available

	Parameters analysed	Units	No.1	Guidelines	
				WHO	Armenia
<i>a</i>	pH		7	6.5-8	6.0 - 9.0
<i>b</i>	Temperature	Deg.C	13.5		
<i>c</i>	TDS	Mg/L	41	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	0.06	1.50	
7	Hardness	Mg/L	60	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	0.009	0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.8	50.0	45.0
13	SO4:Sulfate	Mg/L	3.0	250.0	500.0
14	Zn:Zink	Mg/L	n.d	3.0	5.0
15	As:Arsenic	Mg/L	n.d	0.0	0.1
16	Ba:Barium	Mg/L	<0,01	0.70	0.10
17	Be:Berillium	Mg/L	0.00005	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	<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	<3	-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml	n.d	0	0
26	Total bacteria	bacteria per 1 ml	25	-	50

No. 48 Marz Aragatsotn Community Norashen**1. ACCESSIBILITY TO THE SITE**

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Possible	Possible	
2	Transmission pipeline	Unknown	Unknown	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	Treatment plant	40°36'55.6"	44°03'35.6"	2,171	1964	Masonry	20.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	100	100	Steel	19.0	1985	Little	No
	14,900	150	Steel		1985	Little	No

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m ³)	Rehabilitation Necessity (Y/N)
1	40°39'33.5"	44°04'53.2"	2,033	reinforced concrete	Circle	d=6m, h=2.5	800	Yes

5. CHLORINATION EQUIPMENT

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	Yes	treatment plant	Liquid	daily

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1,800	125	Steel	1955	Medium	Yes
2	1,300	100	Steel		Medium	Yes
3	1,600	80	Steel		Huge	Yes
4	900	50	Steel		Huge	Yes
5	400	32	Steel		Huge	Yes

7. PUMP STATION

Existence (Y/N)	Power source	Type	Capacity (l/s)	Pump head (m)	Tank cap. (m ³)	House size (m)	Rehabilitation Necessity (Y/N)
Yes (1nos)	Commercial	Centrifugal	-	-	-	-	No

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
30	1955		Yes	100	Yes

9. DRAINAGE SYSTEM

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

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	Aragatsotn
Number and Name of Community	No.48 Norashen
District	Aragats

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

A: Baseline Data

A1	Actual population in 2001	1,164
A2	Actual population in 2007	1,180
A3	Number of households	240
A4.1	Elderly people	187
A4.2	Population in labor force (age from 16 to 62)	693
A4.3	Children	300
A5.1	Pensioners	217
A5.2	Unemployed	1
A5.3	Receiving benefits	28
A6	Average monthly income of household (AMD)	35,000
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	2,500
	Annual Budget of the community 2005, in thousand AMD	2,700
	Annual Budget of the community 2006, in thousand AMD	3,100
	Annual Budget of the community 2007, in thousand AMD	4,200
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	150
	Amount spent in drinking water sector 2005, in thousand AMD	270
	Amount spent in drinking water sector 2006, in thousand AMD	270
	Amount spent in drinking water sector 2007, in thousand AMD	150
	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, wool, cereals
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no

D: Water Usage and Water Demand Survey

D1	Does the community hold water use permit? 1-Yes, 2-No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	is not planned
D5	Present condition of the water supply volume of Domestic use	sufficient
D6	Present condition of the water supply volume of Irrigation water	sufficient
D7	Number of house connection to drinking water system	200
D8	How many house connection household set the water meter	0
D9	Number of public taps	30yard tap
D10.1	How is the regime of water supply in your community in the dry season?	regularly.11 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?	19-8;
D12	Are you pleased with duration of domestic water supply?	mainly pleased
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?	-

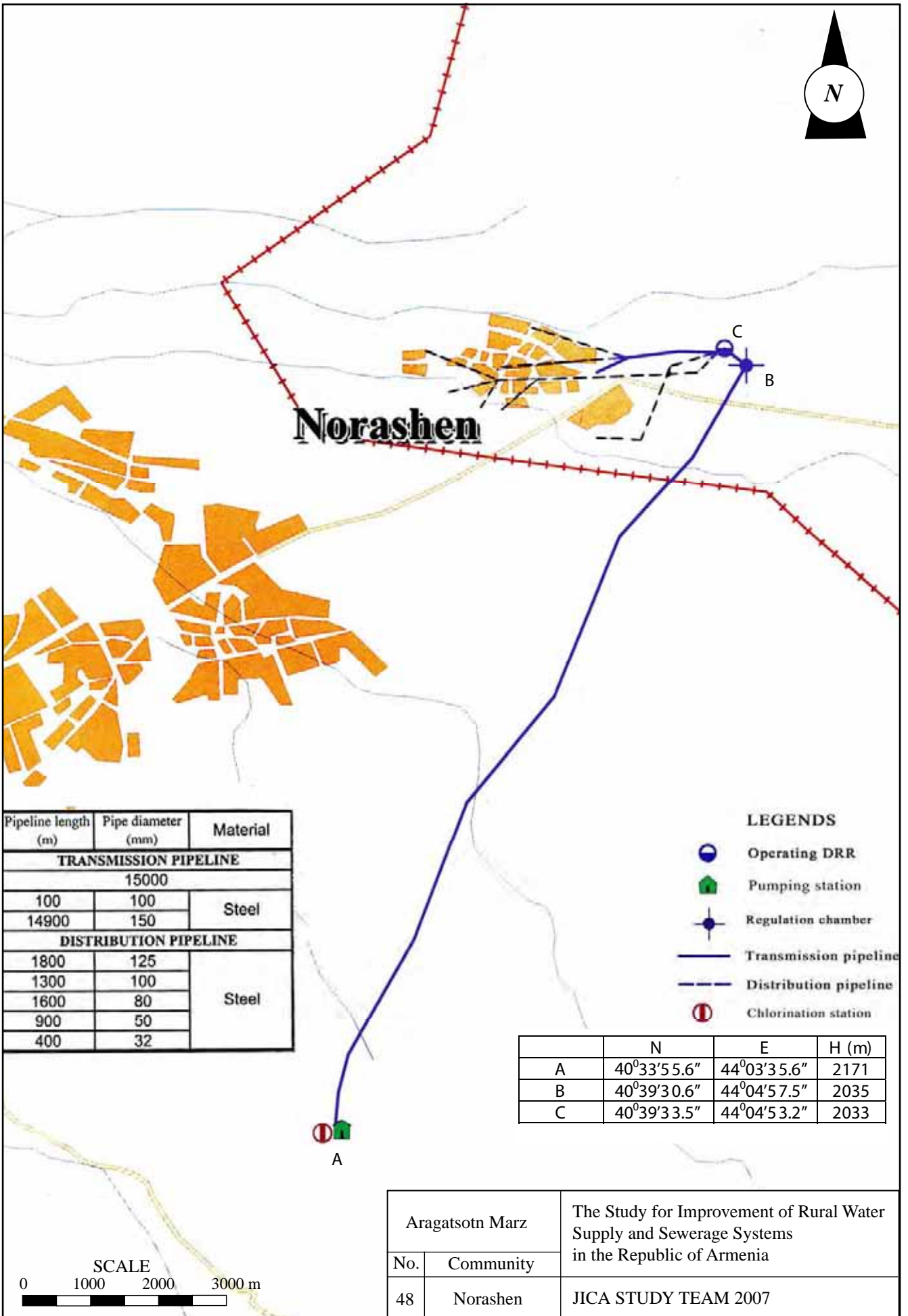
No.	Question	Answer
D14.2	Estimate quantity of domestic water use of each household (litter per day)	1,000
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	1,000
D16	Drinking water monthly water fee per household	250d
D17	How often do you usually pay water fees?	each month
D18	Water fee structure 1Flat rate, 2 Having water tariff	flat rate
D19	Where do you acquire the irrigation water?	from Mantash 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	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	rehabilitated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community
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?	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)	150,000
	Others(AMD)	0
	Total (AMD)	150,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	water fee

F: Initial Environmental Examination (IEE)

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



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
15000		
100	100	Steel
14900	150	
DISTRIBUTION PIPELINE		
1800	125	Steel
1300	100	
1600	80	
900	50	
400	32	

- LEGENDS**
-  Operating DRR
 -  Pumping station
 -  Regulation chamber
 -  Transmission pipeline
 -  Distribution pipeline
 -  Chlorination station

	N	E	H (m)
A	40°33'5 5.6"	44°03'3 5.6"	2171
B	40°39'3 0.6"	44°04'5 7.5"	2035
C	40°39'3 3.5"	44°04'5 3.2"	2033



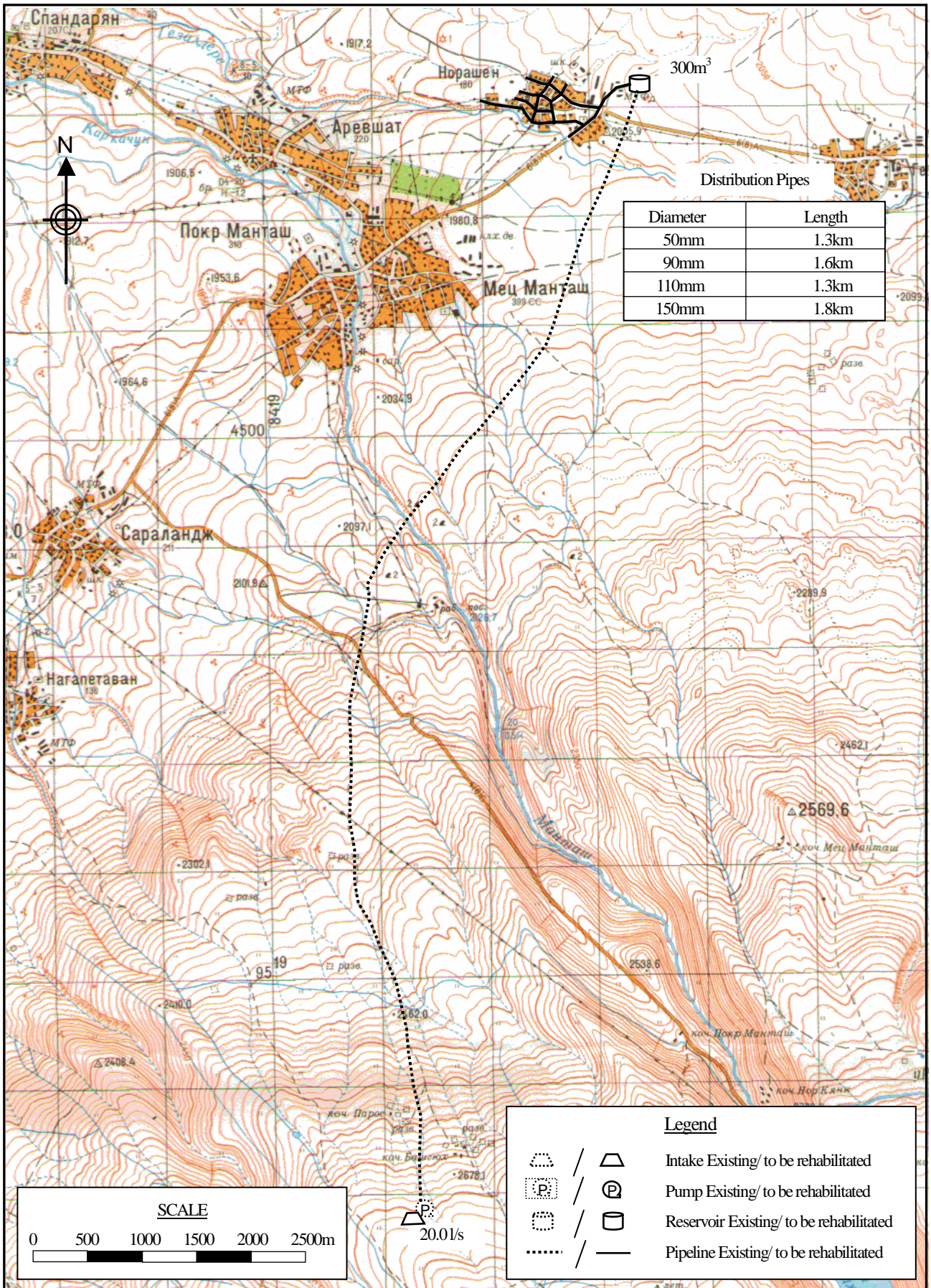
Aragatsotn Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
48	Norashen	JICA STUDY TEAM 2007

Marz : **Aragatsotn**
Name : **Norashen**

No.48

No.	Item	Quantity	Unit	Water demand (m3/d)
A. WATER DEMAND				
1	Population	1,180	persons	118.0
2	Factory	-	nos	0.0
3	School (pupils)	190	pupils	1.9
4	Medical Ambulance Station	-	nos	-
5	Policlinic	-	nos	-
6	Livestocks (87lit/household)	240	household	20.9
	Sub-total			140.8
	Unaccounted for water (20%)			28.2
1	Average Daily Water Demand			169.0 m3/day
2	Maximum Daily Water Demand			202.8 m3/day
3	Maximum Hourly Water Demand			22.0 m3/hr
B. WATER SUPPLY PLAN				
	1 Water source type	Nr.	Total vol.	
	a Existing water treatment plant	1	20.0 lit/sec	1,728.0 m3/day
	Total			1,728.0 m3/day
	2 Required reservoir volume			264 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			
	300m3 capacity	1	nos	
4	Distribution pipe			
	50mm diameter	1,300	m	
	75mm diameter		m	
	90mm diameter	1,600	m	
	110mm diameter	1,300	m	
	150mm diameter	1,800	m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	40	nos	
6	Water meter installation	240	nos	
7	Public tap	3	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. 48	Norashen	
		JICA STUDY TEAM

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

Marz : **Aragatsotn**

No. : **48**

Name : **Norashen**

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	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	1,300	m	5,520	7,176,000	
		75mm		m	7,160		
		90mm	1,600	m	8,040	12,864,000	
		110mm	1,300	m	9,680	12,584,000	
		150mm	1,800	m	13,140	23,652,000	
		200mm		m	19,440		
		250mm		m	27,040		
	Sub-total					56,276,000	
5	House Connection		40	nos	74,000	2,960,000	
6	Water Meter Installation		240	nos	80,000	19,200,000	
7	Public Tap		3	nos	90,000	270,000	
8	Chlorilation Equipment		1	nos	500,000	500,000	
9	Pump Replacement			nos	10,000,000		
10	Drainage and Sewerage concrete surfa		2,400	m	3,600	8,640,000	
Total					AMD	118,021,400	
					Equivalent to USD	386,297	
					Equivalent to JPY	40,754,313	
					AMD	USD	
Investment Cost per household				240	HH	491,756	1,610
Investment Cost per person				1,180	persons	100,018	327

