

**No.10 Khachardzan**

# Information on Existing Water Sources (Tavush)

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

No.10 Community Khachardzan  
District Idjevan  
Marz Tavush

No.10 Community Khachardzan  
District Idjevan  
Marz Tavush  
Sampling date 03/Sep/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	43	4.8	45	2	4.3	1,301	2.0	3.0	3.0
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 Acceptance for water quality	Acceptable
Notes	
Alternative sources if any	The free springs at 7km distance from the community can be available.

	Parameters analysed	Units	No.1	Guidelines	
				WHO	Armenia
a	pH		8.5	6.5-8	6.0 - 9.0
b	Temperature	Deg.C	10.4		
c	TDS	Mg/L	350	1000	1000
1	Al:Aluminum	Mg/L	0.01	0.10	0.50
2	B:Boron	Mg/L	n.d.	0.70	0.50
3	Cl:Chloride	Mg/L	9	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	0.13	1.50	
7	Hardness	Mg/L	660	500	700
8	Fe:Iron	Mg/L	n.d.	0.30	0.30
9	Mn:Manganese	Mg/L	n.d.	0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d.	0.070	0.250
11	Ni:Nickel	Mg/L	n.d.	0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.3	50.0	45.0
13	SO4:Sulfate	Mg/L	21.0	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. 10 Marz Tavush Community Khachardzan**1. ACCESSIBILITY TO THE SITE**

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

**2. INTAKE STRUCTURE**

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°43'04.8"	45°02'04.3"	1,301	2000	Concrete	3.0	Yes

**3. TRANSMISSION PIPELINE**

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	2,000	80	Steel	3.0	2000	Little	Yes

**4. RESERVOIR**

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°43'01.1"	45°02'54.1"	1,136	Concrete	Rectangular	6x5x4	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	80	Steel	1990	Huge	Yes
2	400	50	Steel		Huge	Yes
3	400	40	Steel		Huge	Yes

**7. PUMP STATION**

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

**8. PUBLIC TAPS**

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

**9. DRAINAGE SYSTEM**

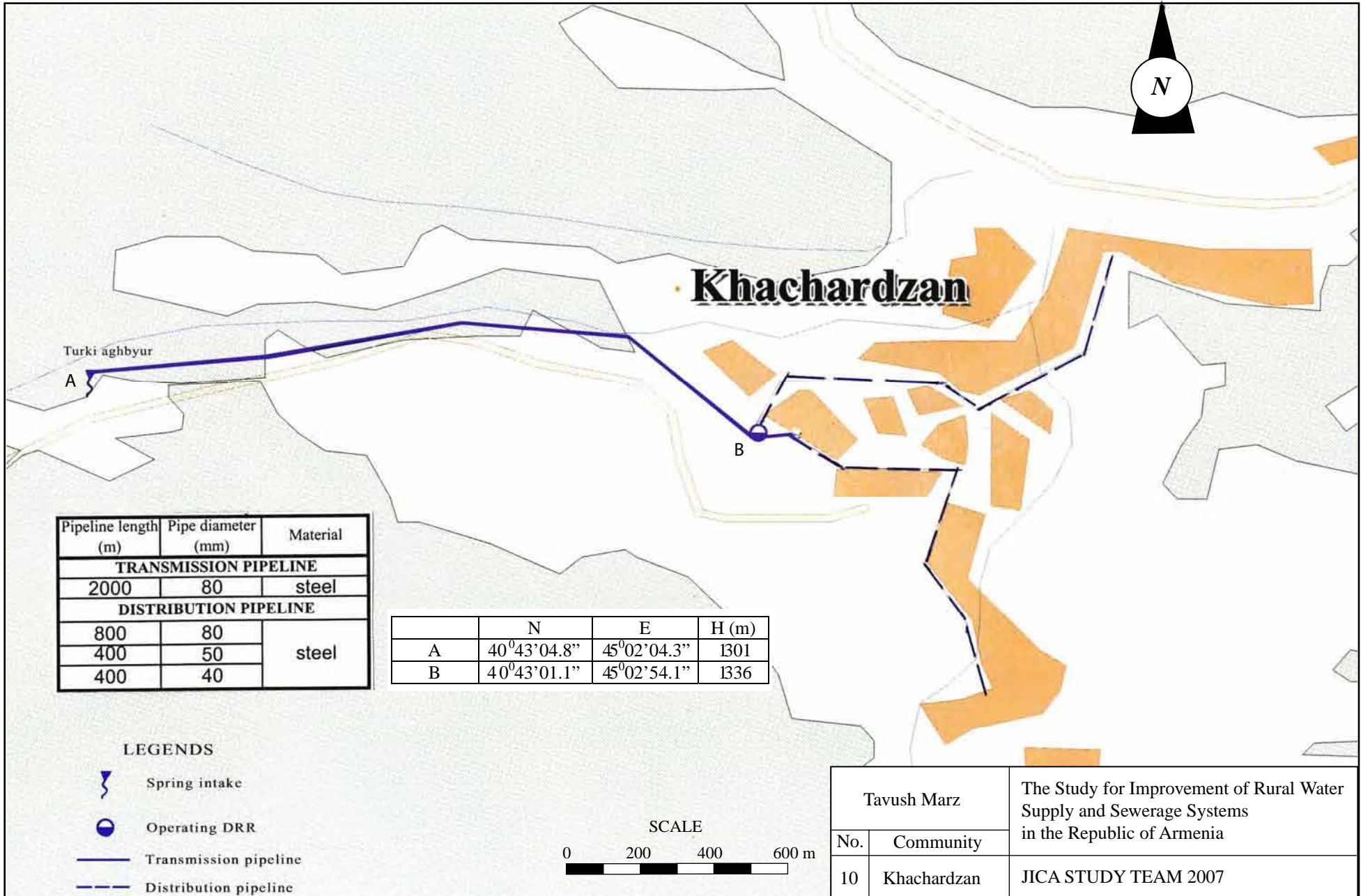
Existence	Rehabilitation	Remarks
No	Yes	

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

<b>Marz</b>	<b>Tavush</b>
<b>Number and Name of Community</b>	<b>No.10 Khachardzan</b>
<b>District</b>	<b>Idejevan</b>

No.	Question	Answer
<b>A: Baseline Data</b>		
A1	Actual population in 2001	559
A2	Actual population in 2007	498
A3	Number of households	142
A4.1	Elderly people	80
A4.2	Population in labor force (age from 16 to 62)	278
A4.3	Children	130
A5.1	Pensioners	85
A5.2	Unemployed	22
A5.3	Receiving benefits	13
A6	Average monthly income of household (AMD)	25,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	100
<b>B: Budget</b>		
B1	Annual Budget of the community 2004, in thousand AMD	800
	Annual Budget of the community 2005, in thousand AMD	800
	Annual Budget of the community 2006, in thousand AMD	1,200
	Annual Budget of the community 2007, in thousand AMD	800
	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
<b>C: Socio-Economic Survey</b>		
C1	Major industries of the community:	dairy
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	NGO "Women Unity"
<b>D: Water Usage and Water Demand Survey</b>		
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, only from public
D6	Present condition of the water supply volume of Irrigation water	absent
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	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?	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?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	200





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	difficult to answer
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1- Flate rate, 2- Having water tariff	-
D19	Where do you acquire the irrigation water?	absent
D20	Are you satisfied with irrigation water supply volume?	absent
<b>E: Present Operation and Maintenance Works</b>		
E1	Name of responsible for water supply	absent
E2	Position	-
E3	Telephone	-
E4	Quantity and present condition of the water supply facilities: spring/ intake	1-deteriorated
E5	Quantity and present condition of the water supply facilities:	1-non - operational
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1-non - operational
E7	Quantity and present condition of the water supply facilities: net/distribution	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	rehabilitated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community and residents
E12	How do you repair the water supply facilities?	nobody
E13	Who is in charge of the repair work in the community?	absent
E14	How you prepare O&M costs?	community and residents
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	0
	Others(AMD)	0
	Total (AMD)	0
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	water fee
<b>F: Initial Environmental Examination (IEE)</b>		
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.	present
	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

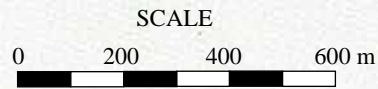


Pipeline length (m)	Pipe diameter (mm)	Material
<b>TRANSMISSION PIPELINE</b>		
2000	80	steel
<b>DISTRIBUTION PIPELINE</b>		
800	80	steel
400	50	
400	40	

	N	E	H (m)
A	40°43'04.8"	45°02'04.3"	1301
B	40°43'01.1"	45°02'54.1"	1336

**LEGENDS**

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



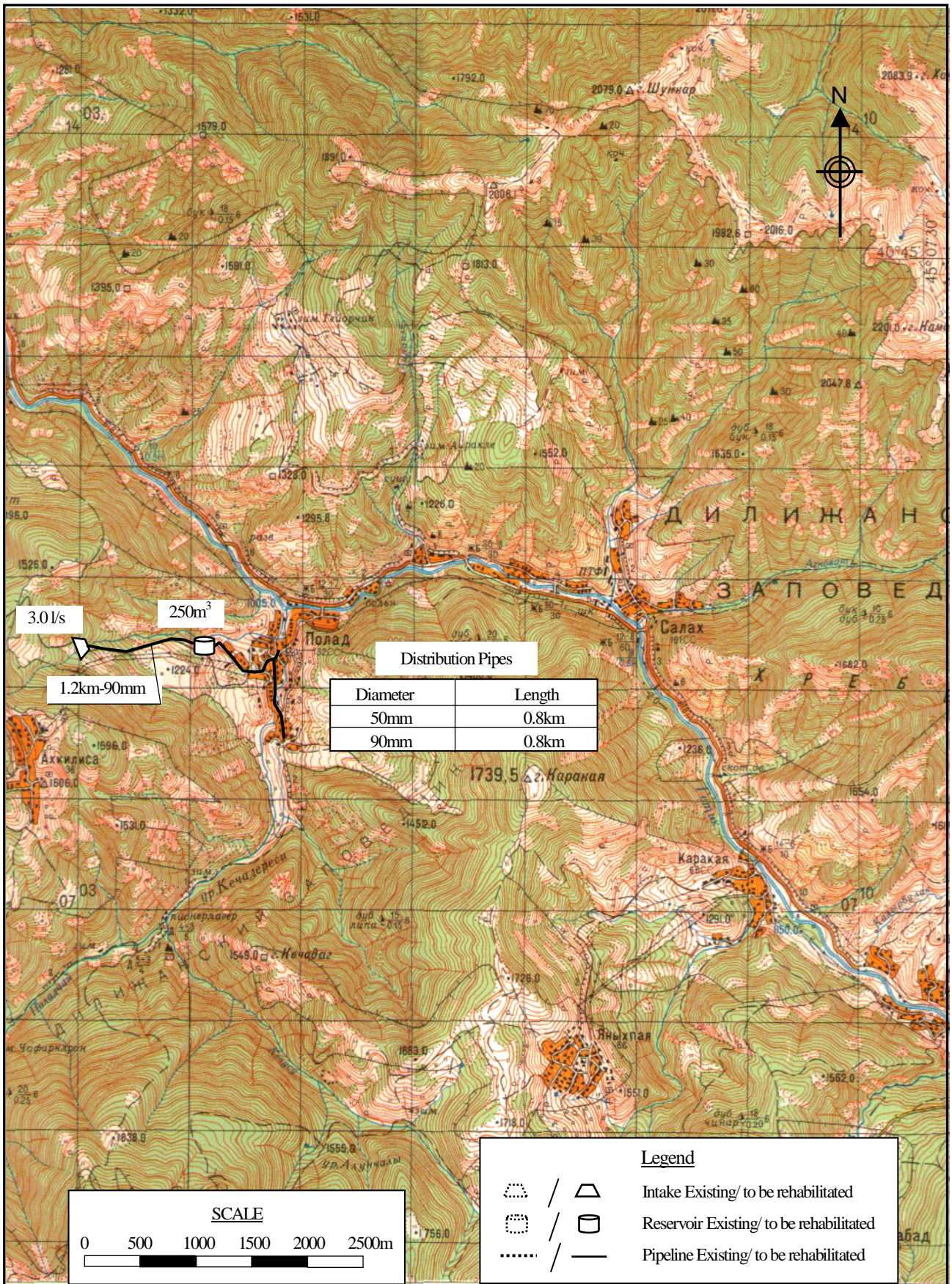
Tavush Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
10	Khachardzan	JICA STUDY TEAM 2007

Marz : **Tavush**  
Name : **Khachardzan**

No.10

No.	Item	Quantity	Unit	Water demand (m3/d)
<b>A. WATER DEMAND</b>				
	1 Population	498	persons	49.8
	2 Factory	-	nos	0.0
	3 School (pupils)	100	pupils	1.0
	4 Medical Ambulance Station	-	nos	-
	5 Polyclinic	-	nos	-
	6 Livestocks (87lit/household)	142	household	12.4
	Sub-total			63.2
	Unaccounted for water (20%)			12.6
1	Average Daily Water Demand			75.8 m3/day
2	Maximum Daily Water Demand			91.0 m3/day
3	Maximum Hourly Water Demand			17.3 m3/hr
<b>B. WATER SUPPLY PLAN</b>				
	1 Water source type	Nr.	Total vol.	
	a Spring	1	3.0 lit/sec	259.2 m3/day
	Total			259.2 m3/day
	2 Required reservoir volume			207 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	1,200	m	
	110mm diameter		m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			
	250m3 capacity	1	nos	
4	Distribution pipe			
	50mm diameter	800	m	
	75mm diameter		m	
	90mm diameter	800	m	
	110mm diameter		m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	142	nos	
6	Water meter installation	142	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	Tavush	
No. 10	Khachardzan	JICA STUDY TEAM



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

Marz : **Tavush**  
No. : **10**  
Name : **Khachardzan**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake	1m3	1	nos	367,700	367,700
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					367,700
2	Transmission Pipe	50mm		m	5,520	
		75mm		m	7,160	
		90mm	1,200	m	8,040	9,648,000
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					9,648,000
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	800	m	5,520	4,416,000
		75mm		m	7,160	
		90mm	800	m	8,040	6,432,000
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					10,848,000
5	House Connection		142	nos	74,000	10,508,000
6	Water Meter Installation		142	nos	80,000	11,360,000
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		640	m	3,600	2,304,000
<b>Total</b>					<b>AMD</b>	<b>71,668,500</b>
					Equivalent to USD	234,579
					Equivalent to JPY	24,748,058
					<b>AMD</b>	<b>USD</b>
	Investment Cost per household		142	HH	504,708	1,652
	Investment Cost per person		498	persons	143,913	471





**No.11 Hovq**

# Information on Existing Water Sources (Tavush)

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

No.11 Community Hovq  
District Idjevan  
Marz Tavush

No.11 Community Hovq  
District Idjevan  
Marz Tavush  
Sampling date 06/Sep/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	49	39.7	45	0	57.8	1,471	6.0	8.0	5.0
2	spring intake	40	47	31.2	45	2	4.7	1,165			1.0
3	spring intake	40	47	29.2	45	1	17.3	1,281			0.5
4	spring intake	40	46	53.9	45	1	56.2	1,011			1.5
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 Acceptance for water quality	Acceptable
Notes	The community has not irrigation water, farmlands are irrigated with drinking water. Alternative source will not be needed after renovation of spring intakes and network.
Alternative sources if any	

	Parameters analysed	Units	No.1 I line	No.2 II line	No.3 III line	No.4 IV line	Guidelines	
							WHO	Armenia
a	pH		8.2	8.4	8.2	8.2	6.5-8	6.0 - 9.0
b	Temperature	Deg.C	12.3	20	18.3	15.6		
c	TDS	Mg/L	191	293	304	198	1000	1000
1	Al:Aluminum	Mg/L	n.d.	0.01	n.d.	<0.008	0.10	0.50
2	B:Boron	Mg/L	n.d.	n.d.	n.d.	n.d.	0.70	0.50
3	Cl:Chloride	Mg/L	4	8	11	6	250	350
4	Cr:Chrome	Mg/L	<0.01	<0.01	<0.01	<0.01	0.05	0.05
5	Cu:Copper	Mg/L	n.d.	n.d.	n.d.	n.d.	2	1
6	F:Fluoride	Mg/L	0.02	0.14	0.50	0.07	1.50	
7	Hardness	Mg/L	395	555	530	390	500	700
8	Fe:Iron	Mg/L	n.d.	n.d.	n.d.	n.d.	0.30	0.30
9	Mn:Manganese	Mg/L	n.d.	n.d.	n.d.	n.d.	0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d.	n.d.	n.d.	n.d.	0.070	0.250
11	Ni:Nickel	Mg/L	n.d.	n.d.	n.d.	n.d.	0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.3	3.1	2.2	3.6	50.0	45.0
13	SO4:Sulfate	Mg/L	5.0	18.0	32.0	6.0	250.0	500.0
14	Zn:Zink	Mg/L	n.d.	n.d.	n.d.	n.d.	3.0	5.0
15	As:Arsenic	Mg/L	n.d.	n.d.	n.d.	n.d.	0.0	0.1
16	Ba:Barium	Mg/L	0.01	0.01	0.01	0.01	0.70	0.10
17	Be:Berillium	Mg/L	n.d.	n.d.	n.d.	n.d.	NA	0.00020
18	Cd:Cadmium	Mg/L	0.0001	0.0001	0.0001	0.0001	0.0030	0.0010
19	Pb:Lead	Mg/L	0.001	0.001	0.001	0.001	0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002	<0.0002	<0.0002	<0.0002	0.00100	0.00050
21	Se:Selenium	Mg/L	<0.001	<0.001	<0.001	<0.001	0.010	0.010
22	Sr:Strontium	Mg/L	<0.7	<0.7	<0.7	<0.7	NA	7.0
23	CN:Cyanide	Mg/L	n.d.	n.d.	n.d.	n.d.	0.070	0.035
24	Coli form bacteria	bacteria per 100 ml					-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
26	Total bacteria	bacteria per 1 ml					-	50



No. 11 Marz Tavush Community Hovq**1. ACCESSIBILITY TO THE SITE**

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Possible	Difficult	
	Intake	Possible	Difficult	
	Intake	Possible	Difficult	
	Intake	Possible	Difficult	
2	Transmission pipeline	Possible	Difficult	Pipeline is mostly far from 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°47'29.2"	45°01'17.3"	1,281	1960	Concrete	0.5	Yes
2	Spring	40°47'31.2"	45°02'04.7"	1,165	1980	Concrete	1.0	Yes
3	Spring	40°49'39.7"	45°00'57.8"	1,471	1950	Concrete	5.0	Yes
4	Spring	40°46'53.9"	45°01'56.2"	1,011	1970	Concrete	1.5	Yes

**3. TRANSMISSION PIPELINE**

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	6,000	100	Steel	5.0	1950	Medium	Yes
2	500	50	Steel	1.0	1980	Medium	Yes
3	600	80	Steel	0.5	1950	Huge	Yes
4	500	50	Steel	1.5	1970	Medium	Yes

**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	1,000	100	Steel	1950	Huge	Yes
2	500	80	Steel		Huge	Yes
3	250	50	Steel		Huge	Yes
4	500	50	Steel		Huge	Yes

**7. PUMP STATION**

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

**8. PUBLIC TAPS**

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

**9. DRAINAGE SYSTEM**

Existence	Rehabilitation	Remarks
No	Yes	

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

<b>Marz</b>	<b>Tavush</b>
<b>Number and Name of Community</b>	<b>No.11 Hovq</b>
<b>District</b>	<b>Idejevan</b>

No.	Question	Answer
<b>A: Baseline Data</b>		
A1	Actual population in 2001	500
A2	Actual population in 2007	510
A3	Number of households	187
A4.1	Elderly people	89
A4.2	Population in labor force (age from 16 to 62)	278
A4.3	Children	143
A5.1	Pensioners	92
A5.2	Unemployed	0
A5.3	Receiving benefits	33
A6	Average monthly income of household (AMD)	17,000
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	108
<b>B: Budget</b>		
B1	Annual Budget of the community 2004, in thousand AMD	7,517
	Annual Budget of the community 2005, in thousand AMD	6,026
	Annual Budget of the community 2006, in thousand AMD	1,181
	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	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
<b>C: Socio-Economic Survey</b>		
C1	Major industries of the community:	cereals, dairy, meat, agricultural products
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
<b>D: Water Usage and Water Demand Survey</b>		
D1	Does the community hold water use permit? 1-Yes, 2-No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	unknown
D5	Present condition of the water supply volume of Domestic use	almost sufficient
D6	Present condition of the water supply volume of Irrigation water	absent
D7	Number of house connection to drinking water system	180
D8	How many house connection household set the water meter	0
D9	Number of public taps	0
D10.1	How is the regime of water supply in your community in the dry season?	24 hrs-50%, no water at all 50%
D10.2	How is the regime of water supply in your community in the wet season?	24 hrs
D11	What time of day water is given?	-
D12	Are you pleased with duration of domestic water supply?	mainly pleased
D13	Are hours of water supply convenient?	-
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each household a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	500

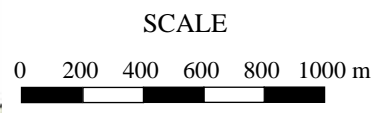
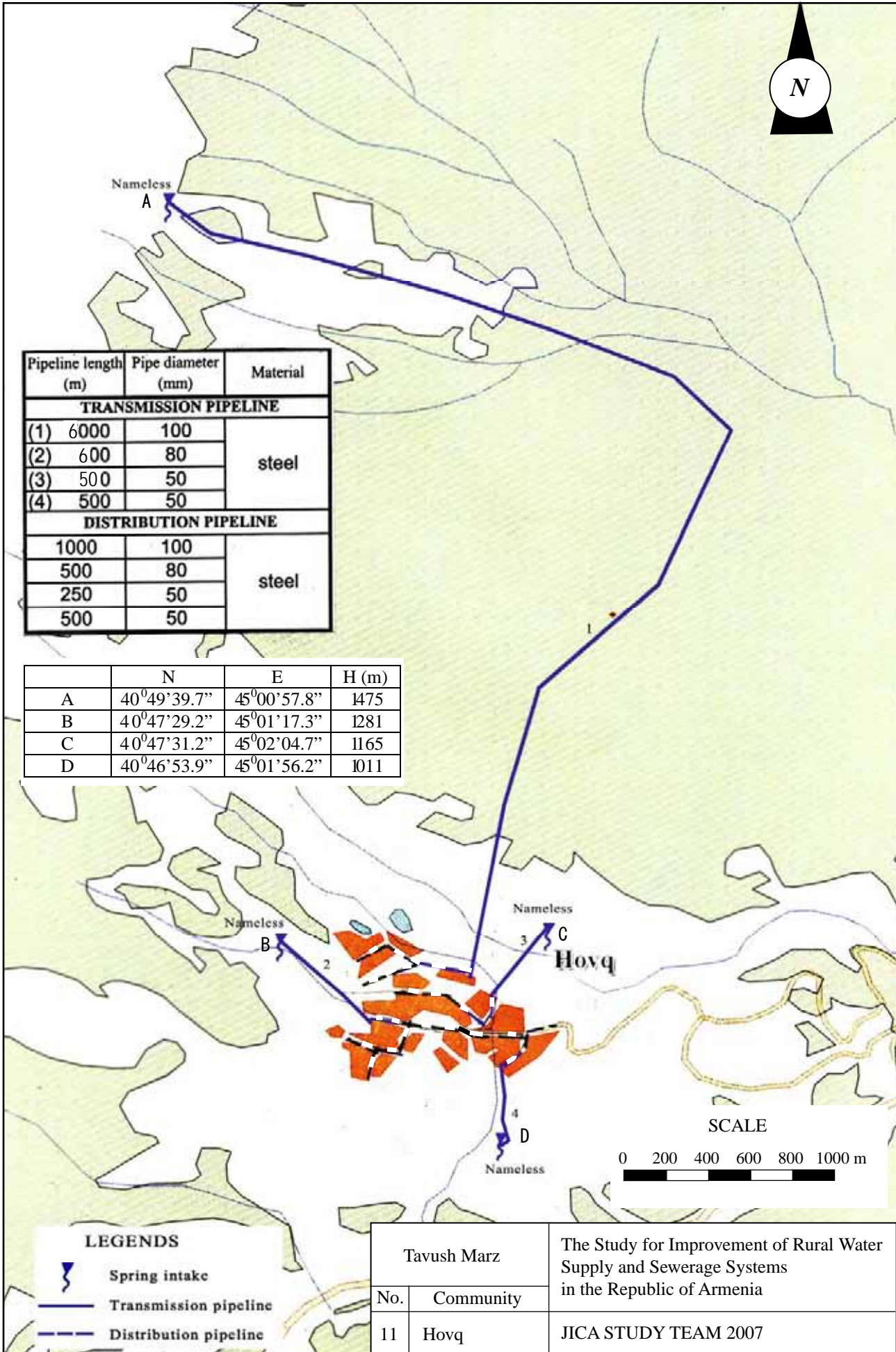
No.	Question	Answer
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	difficult to answer
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1- Flate rate, 2- Having water tariff	-
D19	Where do you acquire the irrigation water?	absent
D20	Are you satisfied with irrigation water supply volume?	absent
<b>E: Present Operation and Maintenance Works</b>		
E1	Name of responsible for water supply	absent
E2	Position	-
E3	Telephone	-
E4	Quantity and present condition of the water supply facilities: spring/ intake	3-partially repaired
E5	Quantity and present condition of the water supply facilities:	3-deteriorated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	absent
E7	Quantity and present condition of the water supply facilities: net/distribution	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	deteriorated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community and residents
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	administration head
E14	How you prepare O&M costs?	community and residents
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	100,000
	Others(AMD)	0
	Total (AMD)	100,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	resident participation, reduce water fee
<b>F: Initial Environmental Examination (IEE)</b>		
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 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>		
(1) 6000	100	steel
(2) 600	80	
(3) 500	50	
(4) 500	50	
<b>DISTRIBUTION PIPELINE</b>		
1000	100	steel
500	80	
250	50	
500	50	

	N	E	H (m)
A	40°49'39.7"	45°00'57.8"	1475
B	40°47'29.2"	45°01'17.3"	1281
C	40°47'31.2"	45°02'04.7"	1165
D	40°46'53.9"	45°01'56.2"	1011



**LEGENDS**

	Spring intake
	Transmission pipeline
	Distribution pipeline

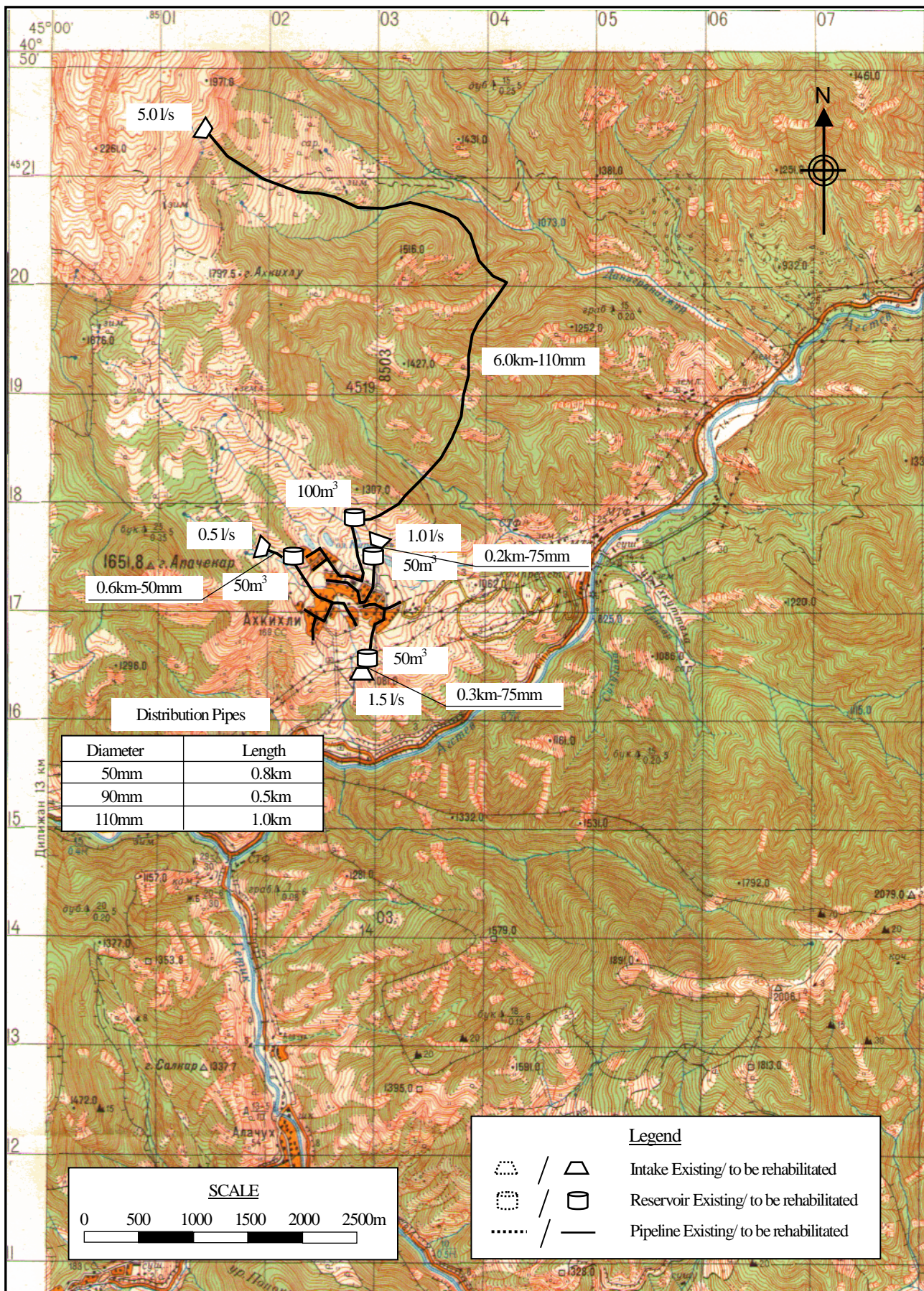
Tavush Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
11	Hovq	JICA STUDY TEAM 2007

Marz : **Tavush**  
Name : **Hovq**

No.11

No.	Item	Quantity	Unit	Water demand (m3/d)
<b>A. WATER DEMAND</b>				
	1 Population	510	persons	51.0
	2 Factory	-	nos	0.0
	3 School (pupils)	108	pupils	1.1
	4 Medical Ambulance Station	-	nos	-
	5 Polyclinic	-	nos	-
	6 Livestocks (87lit/household)	187	household	16.3
	Sub-total			68.4
	Unaccounted for water (20%)			13.7
1	Average Daily Water Demand			82.1 m3/day
2	Maximum Daily Water Demand			98.5 m3/day
3	Maximum Hourly Water Demand			13.3 m3/hr
<b>B. WATER SUPPLY PLAN</b>				
	1 Water source type	Nr.	Total vol.	
	a Spring	4	8.0	lit/sec
				691.2 m3/day
	Total			691.2 m3/day
	2 Required reservoir volume			160 m3

<b>C. WATER SUPPLY FACILITIES REHABILITATION PLAN</b>				
No	Item	Quantity	Unit	
1	Intake			
	1m3	4	nos	
	2m3		nos	
	3m3		nos	
	4m3		nos	
2	Transmission pipe			
	50mm diameter	600	m	
	75mm diameter	500	m	
	90mm diameter		m	
	110mm diameter	6,000	m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			
	50m3 capacity	3	nos	
	100m3 capacity	1	nos	
4	Distribution pipe			
	50mm diameter	800	m	
	75mm diameter		m	
	90mm diameter	500	m	
	110mm diameter	1,000	m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	7	nos	
6	Water meter installation	187	nos	
7	Public tap	2	nos	
8	Chlorination	3	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	Tavush	
No. 11	Hovq	JICA STUDY TEAM

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

Marz : **Tavush**  
No. : **11**  
Name : **Hovq**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake	1m3	4	nos	367,700	1,470,800
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					1,470,800
2	Transmission Pipe	50mm	600	m	5,520	3,312,000
		75mm	500	m	7,160	3,580,000
		90mm		m	8,040	
		110mm	6,000	m	9,680	58,080,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					64,972,000
3	Reservoir	50m3	3	nos	8,363,900	25,091,700
		100m3	1	nos	12,968,300	12,968,300
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					38,060,000
4	Distribution Pipe	50mm	800	m	5,520	4,416,000
		75mm		m	7,160	
		90mm	500	m	8,040	4,020,000
		110mm	1,000	m	9,680	9,680,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					18,116,000
5	House Connection		7	nos	74,000	518,000
6	Water Meter Installation		187	nos	80,000	14,960,000
7	Public Tap		2	nos	90,000	180,000
8	Chlorilation Equipment		3	nos	500,000	1,500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage concrete surfa		920	m	3,600	3,312,000
<b>Total</b>					<b>AMD</b>	<b>143,088,800</b>
					Equivalent to USD	468,345
					Equivalent to JPY	49,410,410
					<b>AMD</b>	<b>USD</b>
Investment Cost per household			187	HH	765,181	2,505
Investment Cost per person			510	persons	280,566	918

TAVUSH MARZ  
Ijevan District  
No 11 Hovq

**PROJECTED INCOME STATEMENT**

Unit: million AMD

Description	Unit	Total	Year																																								
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
<b>A Water Sales Revenue</b>																																											
Consumption water volume	1000m3/yr	25.0																																									
Unit rate	AMD/m3																																										
<b>Sub-total</b>		138.85	0.00	0.00	0.00	0.63	0.90	0.93	1.57	1.62	1.68	1.73	2.60	2.68	2.77	2.86	2.96	3.06	3.16	3.26	3.37	3.48	3.60	3.71	3.84	3.96	4.09	4.23	4.37	4.51	4.66	4.82	4.97	5.14	5.31	5.48	5.66	5.85	6.04	6.24	6.45	6.66	
<b>B Operating Costs</b>																																											
1. Staff salary	person																																										
Inspectors	person	1																																									
Pump operators	person	0																																									
Base Salary	AMD/m/p	20,000	20,660	21,342	22,046	22,774	23,525	24,301	25,103	25,932	26,788	27,672	28,585	29,528	30,502	31,509	32,549	33,623	34,732	35,879	37,063	38,286	39,549	40,854	42,202	43,595	45,034	46,520	48,055	49,641	51,279	52,971	54,719	56,525	58,390	60,317	62,308	64,364	66,488				
Sub-total		17.70	0.24	0.25	0.26	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.37	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.51	0.52	0.54	0.56	0.58	0.60	0.62	0.64	0.66	0.68	0.70	0.72	0.75	0.77	0.80			
2. Chlorine	kg/yr																																										
Pouring volume	kg/yr	150																																									
Unit rate	AMD/kg	6.52	0.00	0.06	0.10	0.10	0.10	0.11	0.11	0.11	0.12	0.12	0.12	0.13	0.13	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.17	0.18	0.18	0.19	0.20	0.20	0.22	0.22	0.23	0.24	0.25	0.25	0.26	0.27	0.28	0.29	0.30				
Sub-total		6.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
3. Electricity (for pump)		0.00																																									
4. Maintenance cost		25.71	0.00	0.25	0.37	0.39	0.40	0.41	0.43	0.44	0.45	0.47	0.48	0.50	0.52	0.53	0.55	0.57	0.59	0.61	0.63	0.65	0.67	0.69	0.71	0.74	0.76	0.79	0.81	0.84	0.87	0.90	0.93	0.96	0.99	1.02	1.06	1.09	1.13	1.16			
Pump repair		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Pipe repair		0.00	0	0.25	0.37	0.39	0.40	0.41	0.43	0.44	0.45	0.47	0.48	0.50	0.52	0.53	0.55	0.57	0.59	0.61	0.63	0.65	0.67	0.69	0.71	0.74	0.76	0.79	0.81	0.84	0.87	0.90	0.93	0.96	0.99	1.02	1.06	1.09	1.13	1.16			
5. Pump replacement		0.00																																									
Sub-total		49.93	0.00	0.00	0.24	0.56	0.73	0.75	0.77	0.80	0.83	0.85	0.88	0.91	0.93	0.97	1.00	1.04	1.07	1.11	1.14	1.19	1.22	1.26	1.30	1.34	1.38	1.44	1.48	1.53	1.58	1.64	1.69	1.75	1.81	1.87	1.92	1.98	2.05	2.12	2.19	2.26	
<b>C Gross Income (A-B)</b>		89.27	0.00	0.00	-0.24	0.07	0.17	0.18	0.80	0.82	0.85	0.88	1.72	1.77	1.84	1.89	1.96	2.02	2.09	2.15	2.23	2.29	2.38	2.45	2.54	2.62	2.71	2.79	2.89	2.98	3.08	3.18	3.28	3.39	3.50	3.61	3.74	3.87	3.99	4.12	4.26	4.40	
<b>D Depreciation cost</b>		135.80																																									
<b>E Interest paid</b>		43.84	0.04	0.07	0.10	1.34	1.89	1.90	1.90	1.90	1.90	1.90	1.85	1.79	1.74	1.68	1.62	1.56	1.51	1.45	1.39	1.33	1.27	1.21	1.15	1.08	1.02	0.96	0.89	0.83	0.76	0.70	0.63	0.56	0.50	0.43	0.36	0.29	0.22	0.15	0.07		
<b>F Net Income</b>		-90.37	-0.04	-0.07	-0.34	-1.27	-1.72	-5.60	-4.98	-4.96	-4.93	-4.90	-4.06	-3.96	-3.83	-3.73	-3.60	-3.48	-3.35	-3.24	-3.10	-2.98	-2.83	-2.70	-2.55	-2.41	-2.25	-2.11	-1.95	-1.79	-1.63	-1.46	-1.30	-1.12	-0.94	-0.77	-0.57	-0.37	-0.18	0.02	0.23	0.45	
<b>G Tax and duties</b>		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<b>H Net Income after deduction of TAX</b>		-90.37	-0.04	-0.07	-0.34	-1.27	-1.72	-5.60	-4.98	-4.96	-4.93	-4.90	-4.06	-3.96	-3.83	-3.73	-3.60	-3.48	-3.35	-3.24	-3.10	-2.98	-2.83	-2.70	-2.55	-2.41	-2.25	-2.11	-1.95	-1.79	-1.63	-1.46	-1.30	-1.12	-0.94	-0.77	-0.57	-0.37	-0.18	0.02	0.23	0.45	
<b>OM Cost Recovery Ratio (A/B)</b>		278%	0%	0%	0%	112%	123%	124%	204%	203%	202%	204%	295%	295%	298%	295%	296%	294%	295%	294%	296%	292%	295%	294%	295%	296%	296%	294%	295%	295%	295%	294%	294%	294%	293%	293%	295%	295%	295%	294%	295%	295%	295%

**PROJECTED CASH FLOW STATEMENT**

Unit: million AMD

Description	Unit	Total	Year																																											
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40				
<b>SOURCES OF FUNDS</b>																																														
<b>A Internal Cash Generation</b>																																														
1. Net Income		-90.37	-0.04	-0.07	-0.34	-1.27	-1.72	-5.60	-4.98	-4.96	-4.93	-4.90	-4.06	-3.96	-3.83	-3.73	-3.60	-3.48	-3.35	-3.24	-3.10	-2.98	-2.83	-2.70	-2.55	-2.41	-2.25	-2.11	-1.95	-1.79	-1.63	-1.46	-1.30	-1.12	-0.94	-0.77	-0.57	-0.37	-0.18	0.02	0.23	0.45				
2. Depreciation cost		135.80	0.00	0.00	0.00	0.00	0.00	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88			
3. Interest Paid		43.84	0.04	0.07	0.10	1.34	1.89	1.90	1.90	1.90	1.90	1.90	1.85	1.79	1.74	1.68	1.62	1.56	1.51	1.45	1.39	1.33	1.27	1.21	1.15	1.08	1.02	0.96	0.89	0.83	0.76	0.70	0.63	0.56	0.50	0.43	0.36	0.29	0.22	0.15	0.07					
Sub-total		89.27	0.00	0.00	-0.24	0.07	0.17	0.18	0.80	0.82	0.85	0.88	1.72	1.77	1.84	1.89	1.96	2.02	2.09	2.15	2.23	2.29	2.38	2.45	2.54	2.62	2.71	2.79	2.89	2.98	3.08	3.18	3.28	3.39	3.50	3.61	3.74	3.87	3.99	4.12	4.26	4.40				
<b>B Finances</b>																																														
1. Project Loan		190.11	3.91	2.79	3.72	123.56	55.10	0.58	0.45																																					
2. Local fund		64.97	1.29	0.91	1.25	42.80	18.59	0.07	0.06																																					
Sub-total		255.08	5.20	3.70	4.97	166.36	73.69	0.65	0.51																																					
<b>C Subsidy from Government</b>																																														
1. Subsidy for O&M cost		0.24	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
2. Subsidy for debt services		144.46	0.04	0.07	0.10	1.27	1.72	1.72	1.10	1.08	1.05	1.02	5.65	5.60	5.53	5.48	5.41	5.34	5.27	5.22	5.14	5.08	4.99	4.92	4.83	4.75	4.65	4.58	4.48	4.38	4.29	4.18	4.09	3.98	3.86	3.76	3.63	3.50	3.38	3.25	3.11	2.96				
Sub-total		144.70	0.04	0.07	0.34	1.27	1.72	1.72	1.10	1.08	1.05	1.02	5.65	5.60	5.53	5.48	5.41	5.34	5.27	5.22	5.14	5.08	4.99	4.92	4.83	4.75	4.65	4.58	4.48	4.38	4.29	4.18	4.09	3.98	3.86	3.76	3.63	3.50	3.38	3.25	3.11	2.96				
<b>Total Cash Inflow</b>		489.05	5.24	3.77	5.07	167.70	75.58	2.55	2.41	1.90	1.90	1.90	7.37	7.37	7.37	7.37	7.36	7.36	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.36	7.37	7.36	7.37	7.36	7.37	7.37	7.36	7.37	7.37	7.37	7.37	7.37	7.37				
<b>APPLICATION OF FUNDS</b>																																														
<b>D Project disbursement</b>		255.08	5.20	3.70	4.97	166.36	73.69	0.65	0.51																																					
<b>E Total debt services</b>																																														
1. Loan repayment		190.13	0.04	0.07	0.10	1.34	1.89	1.90	1.90	1.90	1.90	1.90	1.85	1.79	1.74	1.68	1.62	1.56	1.51	1.45	1.39	1.33	1.27	1.21	1.15	1.08	1.02	0.96	0.89	0.83	0.76	0.70	0.63	0.56	0.50	0.43	0.36	0.29	0.22	0.15	0.07					
2. Interest paid		43.84	0.04	0.07	0.10	1.34	1.89	1.90	1.90	1.90	1.90	1.90	1.85	1.79	1.74	1.68	1.62	1.56	1.51	1.45	1.39	1.33	1.27	1.21	1.15	1.08	1.02	0.96	0.89	0.83	0.76	0.70	0.63	0.56	0.50	0.43	0.36	0.29	0.22	0.15	0.07					
Sub-total		233.97	0.04	0.07	0.10	1.34	1.89	1.90	1.90	1.90	1.90	1.90	1.85	1.79	1.74	1.68	1.62	1.56	1.51	1.45	1.39	1.33	1.27	1.21	1.15	1.08	1.02	0.96	0.89	0.83	0.76	0.70	0.63	0.56	0.50	0.43	0.36	0.29	0.22	0.15	0.07					
<b>Total Cash Outflow</b>		489.05	5.24	3.77	5.07	167.70	75.58	2.55																																						



**No.12 Navur**

# Information on Existing Water Sources (Tavush)

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

No.12 Community Navur  
District Tavush  
Marz Tavush

No.12 Community Navur  
District Tavush  
Marz Tavush  
Sampling date 12/Sep/2007

No	Water source	Latitude			Longitude			Atitude	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	spring intake	40	51	59.2	45	20	20.6	1,462	3.0	3.5	0.5
2	Existing pipeline	40	51	15.7	45	19	40.4	1,569			1.0
3	spring intake	40	51	25.9	45	14	17.2	1,750			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	
Alternative sources if any	The lower located parts of the community can receive water by gravity from the alternative spring with 3 km distance (up to 5l/sec).

	Parameters analysed	Units	No.12 Gyughi aghbyur				Guidelines	
							WHO	Armenia
a	pH		8.1	8.5	8		6.5-8	6.0 - 9.0
b	Temperature	Deg.C	10.4	18.4	14.1			
c	TDS	Mg/L	285	27	231		1000	1000
1	Al:Aluminum	Mg/L	n.d.	0.01	n.d.		0.10	0.50
2	B:Boron	Mg/L	n.d.	n.d.	n.d.		0.70	0.50
3	Cl:Chloride	Mg/L	14	4	4		250	350
4	Cr:Chrome	Mg/L	<0.01	<0.01	<0.01		0.05	0.05
5	Cu:Copper	Mg/L	n.d.	n.d.	n.d.		2	1
6	F:Fluoride	Mg/L	0.12	0.16	0.11		1.50	
7	Hardness	Mg/L	635	70	560		500	700
8	Fe:Iron	Mg/L	n.d.	0.02	n.d.		0.30	0.30
9	Mn:Manganese	Mg/L	n.d.	n.d.	n.d.		0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d.	<0.02	n.d.		0.070	0.250
11	Ni:Nickel	Mg/L	n.d.	n.d.	n.d.		0.020	0.100
12	Nitrate(NO3+)	Mg/L	6	1.3	1.3		50.0	45.0
13	SO4:Sulfate	Mg/L	10	3.0	7.0		250.0	500.0
14	Zn:Zink	Mg/L	n.d.	n.d.	n.d.		3.0	5.0
15	As:Arsenic	Mg/L	n.d.	n.d.	n.d.		0.0	0.1
16	Ba:Barium	Mg/L	0.01	0.01	0.01		0.70	0.10
17	Be:Berillium	Mg/L	n.d.	n.d.	n.d.		NA	0.00020
18	Cd:Cadmium	Mg/L	n.d.	n.d.	n.d.		0.0030	0.0010
19	Pb:Lead	Mg/L	0.001	0.001	0.001		0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002	n.d.	<0.0002		0.00100	0.00050
21	Se:Selenium	Mg/L	<0.001	<0.001	<0.001		0.010	0.010
22	Sr:Strontium	Mg/L	<0.7	n.d.	<0.7		NA	7.0
23	CN:Cyanide	Mg/L	n.d.	n.d.	n.d.		0.070	0.035
24	Coli form bacteria	bacteria per 100 ml					-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
26	Total bacteria	bacteria per 1 ml					-	50





No. 12 Marz Tavush Community Navur**1. ACCESSIBILITY TO THE SITE**

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

**2. INTAKE STRUCTURE**

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°51'25.9"	45°14'17.2"	1750	2003	Concrete	2.0	No
2	Existing pipeline	40°51'15.7"	45°19'40.4"	1569	1950	Concrete	1.0	Yes
3	Spring	40°51'59.2"	45°20'20.6"	1462	1950	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	11,500	100	Steel	2.0	2003		No
2	300	100	Steel	1.0	1956	Medium	Yes

**4. RESERVOIR**

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°51'59.8"	45°19'46.9"	1,525	Concrete	Rectangular	6x12x4	2x250	Yes
2	40°51'19.8"	45°19'51.0"	1,565	Concrete	Rectangular	3x6x4	60	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	6,000	100	Steel	1956	Huge	Yes
2	1,000	100	Cast iron		Huge	Yes
3	2,000	50	Steel		Huge	Yes

**7. PUMP STATION**

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

**8. PUBLIC TAPS**

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

**9. DRAINAGE SYSTEM**

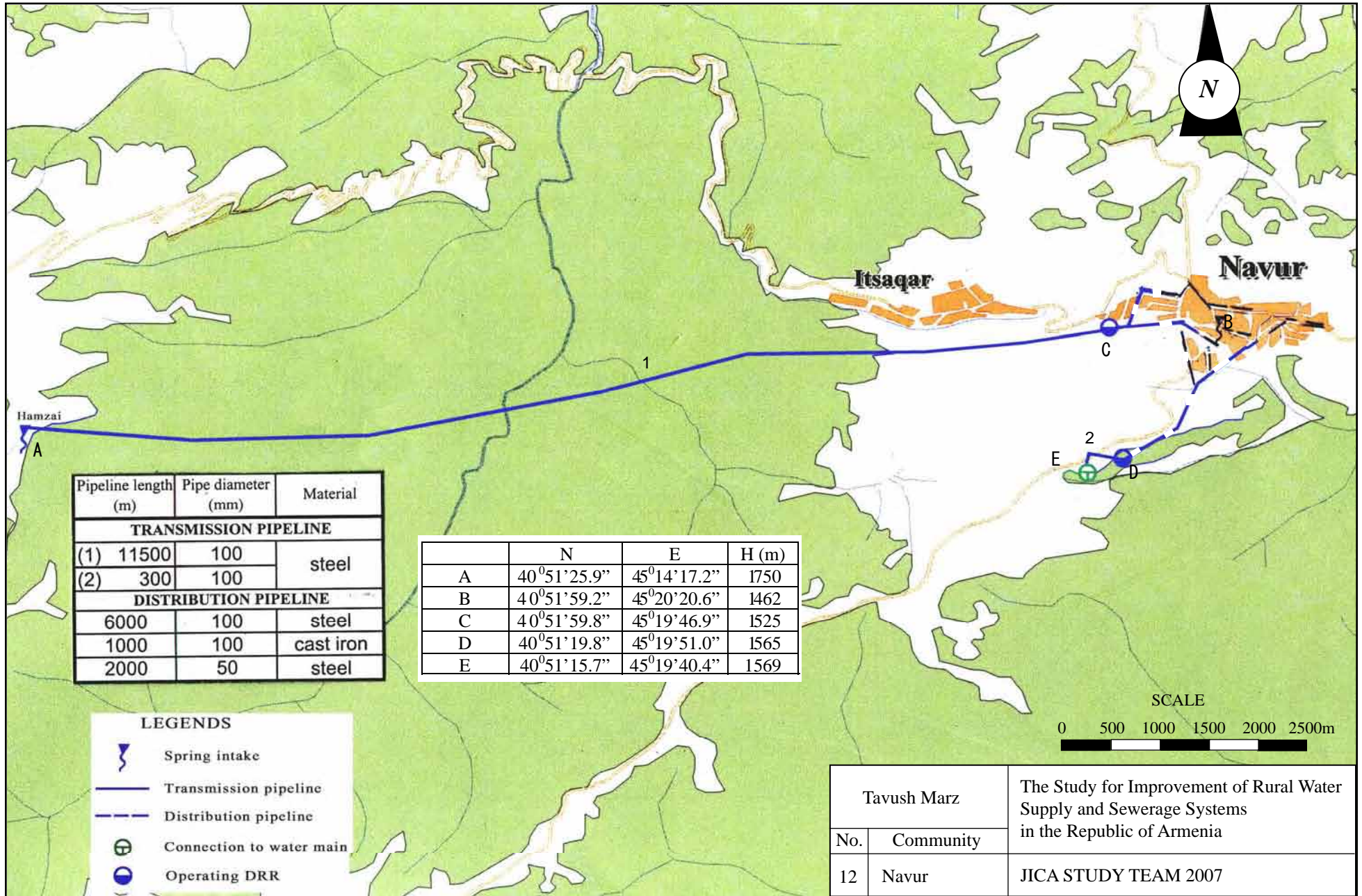
Existence	Rehabilitation	Remarks
Yes	Yes	

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

<b>Marz</b>	<b>Tavush</b>
<b>Number and Name of Community</b>	<b>No.12 Navur</b>
<b>District</b>	<b>Tavush</b>

No.	Question	Answer
<b>A: Baseline Data</b>		
A1	Actual population in 2001	1,300
A2	Actual population in 2007	1,365
A3	Number of households	300
A4.1	Elderly people	234
A4.2	Population in labor force (age from 16 to 62)	666
A4.3	Children	337
A5.1	Pensioners	250
A5.2	Unemployed	22
A5.3	Receiving benefits	85
A6	Average monthly income of household (AMD)	30,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	250
<b>B: Budget</b>		
B1	Annual Budget of the community 2004, in thousand AMD	7,190
	Annual Budget of the community 2005, in thousand AMD	7,900
	Annual Budget of the community 2006, in thousand AMD	11,190
	Annual Budget of the community 2007, in thousand AMD	2,650
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	1,290
	Amount spent in drinking water sector 2005, in thousand AMD	1,250
	Amount spent in drinking water sector 2006, in thousand AMD	1,250
	Amount spent in drinking water sector 2007, in thousand AMD	1,250
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
<b>C: Socio-Economic Survey</b>		
C1	Major industries of the community:	dairy, meat, agricultural products
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
<b>D: Water Usage and Water Demand Survey</b>		
D1	Does the community hold water use permit? 1-Yes, 2-No	yes
D2	Water use permit number	0202
D3	Date of expiry of water use permit	29.01.06-29.01.09
D4	Planned date of obtaining water use permit	-
D5	Present condition of the water supply volume of Domestic use	sufficient
D6	Present condition of the water supply volume of Irrigation water	absent
D7	Number of house connection to drinking water system	250
D8	How many house connection household set the water meter	0
D9	Number of public taps	5
D10.1	How is the regime of water supply in your community in the dry season?	regularly - 4hrs
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?	10 <sup>00</sup> -12 <sup>00</sup> , 18 <sup>00</sup> -20 <sup>00</sup>
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?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	200

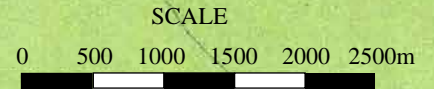
No.	Question	Answer
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	difficult to answer
D16	Drinking water monthly water fee per household	100 dram/ capita/month
D17	How often do you usually pay water fees?	each month
D18	Water fee structure 1- Flate rate, 2- Having water tariff	flat rate
D19	Where do you acquire the irrigation water?	absent
D20	Are you satisfied with irrigation water supply volume?	absent
<b>E: Present Operation and Maintenance Works</b>		
E1	Name of responsible for water supply	Esyan Sarjoja
E2	Position	water distributor
E3	Telephone	with the help of administration head
E4	Quantity and present condition of the water supply facilities: spring/ intake	2-partially repaired
E5	Quantity and present condition of the water supply facilities:	1--partially repaired
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	2-rehabilitated, 1-non - operational
E7	Quantity and present condition of the water supply facilities: net/distribution	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	rehabilitated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community and residents
E12	How do you repair the water supply facilities?	by ourselves, hired specialist
E13	Who is in charge of the repair work in the community?	hired specialist from community (S.Malyan )
E14	How you prepare O&M costs?	water fee
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	0
	Others(AMD)	0
	Total (AMD)	0
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	water fee
<b>F: Initial Environmental Examination (IEE)</b>		
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 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>		
(1) 11500	100	steel
(2) 300	100	
<b>DISTRIBUTION PIPELINE</b>		
6000	100	steel
1000	100	cast iron
2000	50	steel

	N	E	H (m)
A	40°51'25.9"	45°14'17.2"	1750
B	40°51'59.2"	45°20'20.6"	1462
C	40°51'59.8"	45°19'46.9"	1525
D	40°51'19.8"	45°19'51.0"	1565
E	40°51'15.7"	45°19'40.4"	1569

LEGENDS	
	Spring intake
	Transmission pipeline
	Distribution pipeline
	Connection to water main
	Operating DRR



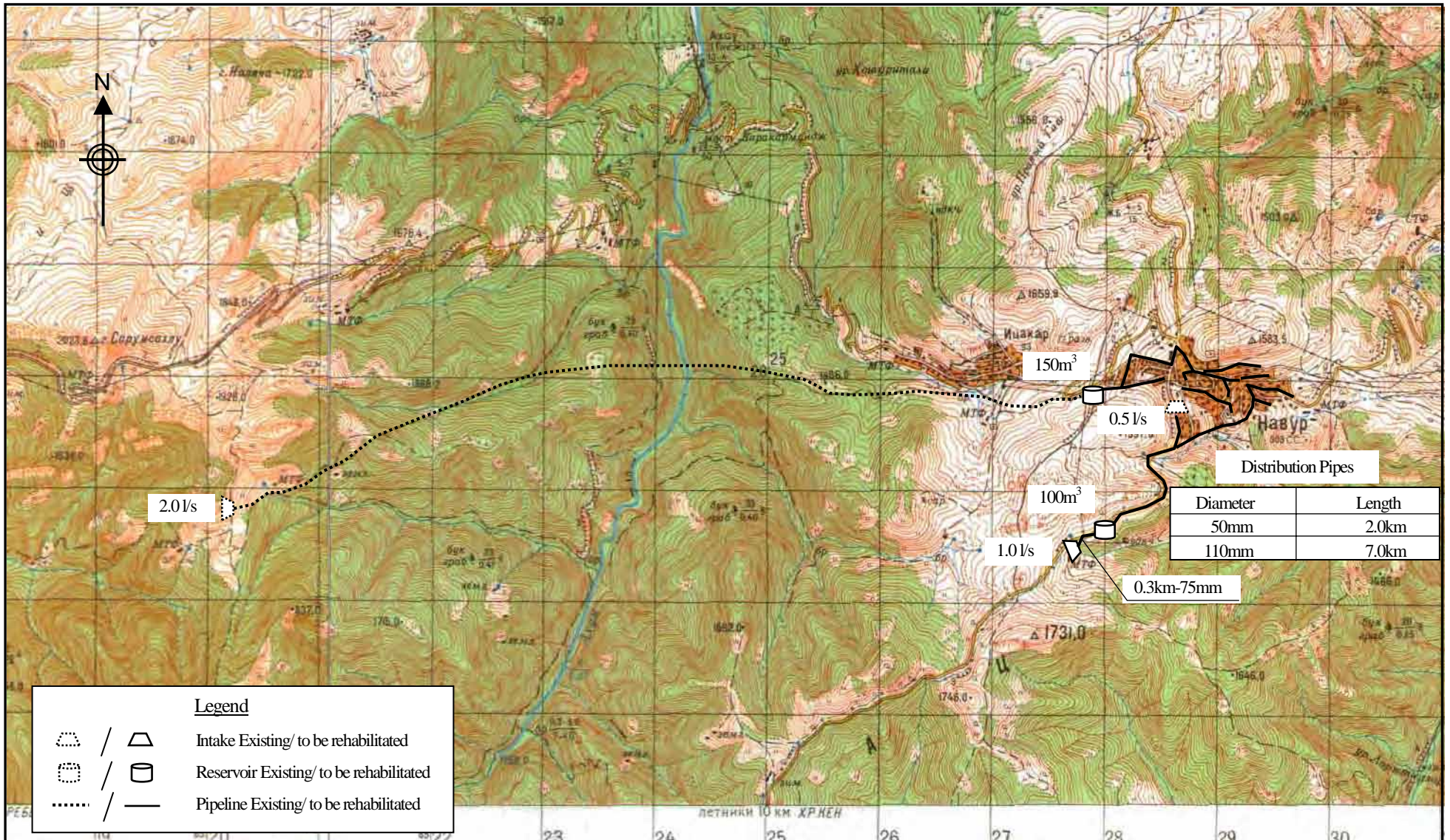
Tavush Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
12	Navur	JICA STUDY TEAM 2007

Marz : **Tavush**  
Name : **Navur**

No.12

No.	Item	Quantity	Unit	Water demand (m3/d)
<b>A. WATER DEMAND</b>				
	1 Population	1,365	persons	136.5
	2 Factory	-	nos	0.0
	3 School (pupils)	250	pupils	2.5
	4 Medical Ambulance Station	-	nos	-
	5 Polyclinic	-	nos	-
	6 Livestocks (87lit/household)	300	household	26.1
	Sub-total			165.1
	Unaccounted for water (20%)			33.0
1	Average Daily Water Demand			198.1 m3/day
2	Maximum Daily Water Demand			237.7 m3/day
3	Maximum Hourly Water Demand			25.8 m3/hr
<b>B. WATER SUPPLY PLAN</b>				
	1 Water source type	Nr.	Total vol.	
	a Spring	2	2.5	lit/sec
	b Existing pipeline	1	1	lit/sec
	Total			302.4 m3/day
	2 Required reservoir volume			309 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	300	m	
	90mm diameter		m	
	110mm diameter		m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			
	100m3 capacity	1	nos	
	150m3 capacity	1	nos	
4	Distribution pipe			
	50mm diameter	2,000	m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter	7,000	m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	50	nos	
6	Water meter installation	300	nos	
7	Public tap	3	nos	
8	Chlorination	2	nos	
9	Pumps	-	nos	



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

Marz : **Tavush**  
No. : **12**  
Name : **Navur**

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	300	m	7,160	2,148,000
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					2,148,000
3	Reservoir	50m3		nos	8,363,900	
		100m3	1	nos	12,968,300	12,968,300
		150m3	1	nos	18,804,500	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					31,772,800
4	Distribution Pipe	50mm	2,000	m	5,520	11,040,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	7,000	m	9,680	67,760,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					78,800,000
5	House Connection		50	nos	74,000	3,700,000
6	Water Meter Installation		300	nos	80,000	24,000,000
7	Public Tap		3	nos	90,000	270,000
8	Chlorilation Equipment		2	nos	500,000	1,000,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage concrete surfa		3,600	m	3,600	12,960,000
<b>Total</b>					<b>AMD</b>	<b>155,018,500</b>
					Equivalent to USD	507,392
					Equivalent to JPY	53,529,889
					<b>AMD</b>	<b>USD</b>
Investment Cost per household			300	HH	516,728	1,691
Investment Cost per person			1,365	persons	113,567	372





