

*Annex 9*

*Supplemental Interview Survey for Communal Enterprises*



JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)  
**THE STUDY**  
**ON**  
**INTEGRATED WATER RESOURCES DEVELOPMENT AND**  
**MANAGEMENT MASTER PLAN**  
**IN**  
**REPUBLIC OF MACEDONIA**

**QUESTIONNAIRES TO WATER SUPPLY COMPANY (VODOVODS)**

*Attention: The following inquiry aims to collect information to clarify the current condition of water supply in the country. The results of this questionnaire survey will be fully referred and utilized for water resources development and management plan in the region through the JICA Study. Some of data filled herein were collected or resulted in the present Study. You are kindly requested to fill up in the blanks.*

**1. Relevant Information**

- 1.1 Name of Water Supply Company : \_\_\_\_\_
- 1.2 Address : \_\_\_\_\_
- 1.3 Tel/Fax : \_\_\_\_\_
- 1.4 Name of contact person : \_\_\_\_\_
- 1.5 Type of water supply system  
                                   a. Regional      b. Local
- 1.6 Number of settlements which are supplied with water from the system  
     - Number of towns: \_\_\_\_\_  
     - Number of villages: \_\_\_\_\_
- 1.7 Type of water source (allowed plural answer)  
     a. Spring   b. Well   c. River   d. Reservoir   e. Natural lake   f. Others
- 1.8 Started year of system supply services      Year \_\_\_\_\_

**2. Current Situation of the Services**

- 2.1 Population covered by the water supply systems

Year	Population		
	Urban	Rural	Total
1990			
1991			
1992			
1993			
1994			
1995			
1996			

- 2.2 Shortage of water (if there is shortage of water, please answer to the followings, otherwise to skip to 2.3)

Month (please put circle on month(s) corresponded to)

- (1) Period of shortage :    1 2 3 4 6 7 8 9 10 11 12
- (2) Shortage amount : \_\_\_\_\_ lit/sec (approximate)
- (3) Restriction of services :(if experienced in past, any information will be valuable):



## 5. Organization

### 5.1 Structure of organization

- (1) Organization chart (please attach to this questionnaires)
- (2) Number of staff in each department, unit and section and please specify the numbers of management members, technicians and clerical staff.
- (3) Activities of each department, unit and section

### 5.2 Financial issues

- (1) Source of budget for overall operation of your company: \_\_\_\_\_
- (2) Amount of annual budget (for 3 years, 1996, 1997 and 1998) and its breakdown

	1996	1997	1998
Total amount of annual budget			
(a) Budget for operation and maintenance of water supply facilities			
(b) Budget for new facilities installation			
(c) Budget for personnel			
(d) Budget for company office operation			

- (3) Subsidiary from the Central Government

## 6 Tariff

Water price

- 6.1 Domestic water :    Buying \_\_\_\_\_ MKD/m<sup>3</sup>  
   Selling \_\_\_\_\_ MKD/m<sup>3</sup>  
   Rate of water fee collection \_\_\_\_%
- 6.2 Communal water :    Buying \_\_\_\_\_ MKD/m<sup>3</sup>  
   Selling \_\_\_\_\_ MKD/m<sup>3</sup>  
   Rate of water fee collection \_\_\_\_%
- 6.3 Industrial water :    Buying \_\_\_\_\_ MKD/m<sup>3</sup>  
   Selling \_\_\_\_\_ MKD/m<sup>3</sup>  
   Rate of water fee collection \_\_\_\_%
- 6.4 Other use (if any) : for \_\_\_\_\_ use, \_\_\_\_\_ MKD/m<sup>3</sup>

## 7. Future Development Plan

If there exits on-going or future development projects/plans, please write the names below.

- (1) \_\_\_\_\_
- (2) \_\_\_\_\_
- (3) \_\_\_\_\_

September 1998, Skopje

Item 1.5 Type of Water Supply System

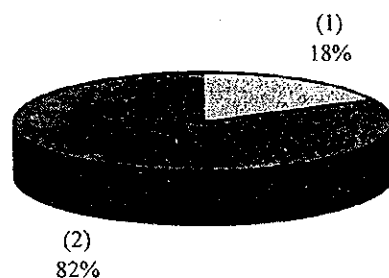
Number	Water Supply Company	Type of Water Supply System	
		Regional	Local
1	Skopje		•
2	Gostivar		•
3	Mavrovi Anovi		•
4	Tetovo		•
5	Kichevo	• *	
6	Makedonski Brod	• *	
7	Kumanovo		•
8	Kratovo		•
9	Kriva Palanka		•
10	Veles		•
11	Sveti Nikole		•
12	Shtip		•
13	Probishtip		•
14	Kochani		•
15	Vinica		•
16	Delchevo		•
17	Berovo		•
18	Demir Hisar		•
19	Krushevo	• *	
20	Bitola		•
21	Prilep	• *	•
22	Kavadarci	• **	
23	Negotino	• **	
24	Demir Kapija		•
25	Valandovo		•
26	Gevgelija		•
27	Bogdanci		•
28	Star Dojran		•
29	Ohrid		•
30	Struga		•
31	Debar		•
32	Resen		•
33	Radovish		•
34	Strumica		•
	<b>Total (%)</b>	<b>17.6</b>	<b>82.4</b>

Remarks: \* , Supplied by Studenchica System

\*\* , Supplied by Lukar System

Note: A part of answers was modified after confirmation of real situation by JICA Study Team

Figure 1.5.



(1): Regional

(2): Local

**Item 1.6 Number of Settlements which are Supplied with Water from the System**

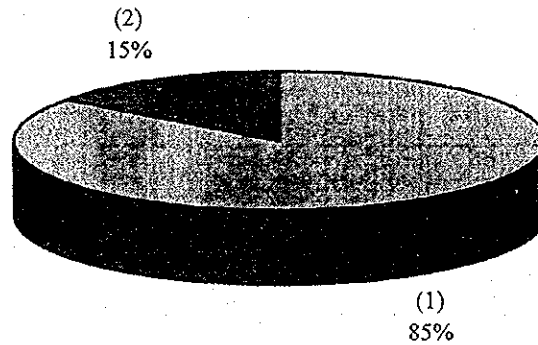
Number	Water Supply Company	Number of Settlements which are Supplied with Water from the System	
		Towns	Villages
1	Skopje	1	10
2	Gostivar	1	7
3	Mavrovi Anovi		4
4	Tetovo	1	1
5	Kichevo	1	2
6	Makedonski Brod	1	1
7	Kumanovo	1	5
8	Kratovo	1	14
9	Kriva Palanka	1	5
10	Veles	1	2
11	Sveti Nikole	1	
12	Shtip	1	
13	Probishtip	1	4
14	Kochani	1	12
15	Vinica	1	1
16	Delchevo	1	2
17	Berovo	1	1
18	Demir Hisar	1	2
19	Krushevo	1	8
20	Bitola	1	13
21	Prilep	1	5
22	Kavadarci	1	14
23	Negotino	1	3
24	Demir Kapija	1	
25	Valandovo	1	3
26	Gevgelija	1	4
27	Bogdanci	1	1
28	Star Dojran	1	
29	Ohrid	1	11
30	Struga	1	24
31	Debar	1	8
32	Resen	1	12
33	Radovish	1	3
34	Strumica	1	
	<b>Total</b>	<b>33</b>	<b>182</b>

Note: A part of answers was modified after confirmation of real situation by JICA Study Team

Item 1.6.a

			(%)
(1)	Number of Water Supply Companies which supply to villages	29	85.3
(2)	Number of Water Supply Companies which do not supply to villages	5	14.7

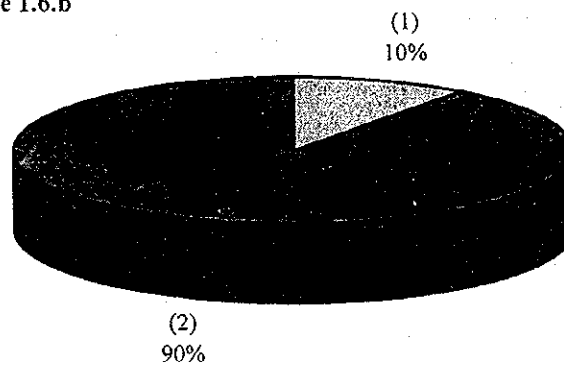
Figure 1.6.a



Item 1.6.b

			(%)
(1)	Number of villages which are supplied water from the Water Supply Companies	182	10.4
(2)	Number of villages which are not supplied water from the Water Supply Companies	1,571	89.6

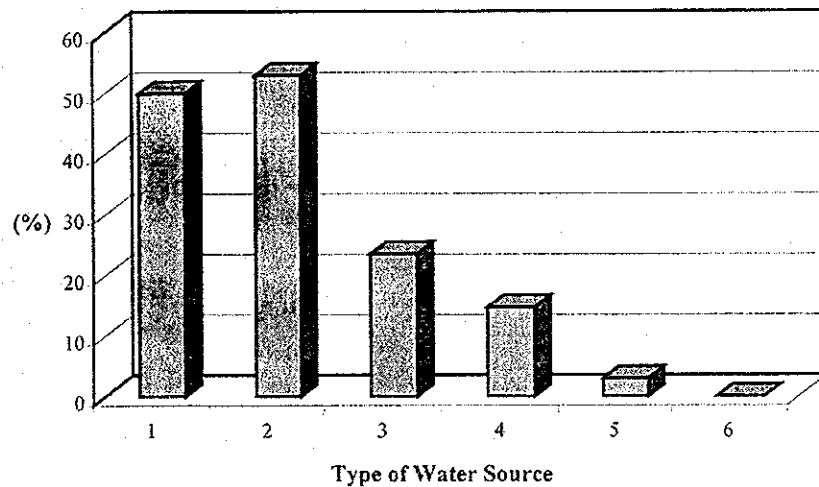
Figure 1.6.b





Item 1.7 Type of Water Source

No.	Water Supply Company	Type of Water Source					
		Spring (1)	Well (2)	River (3)	Reservoir (4)	Natural Lake (5)	Others (6)
1	Skopje	•	•				
2	Gostivar	•					
3	Mavrovi Anovi	•					
4	Tetovo	•					
5	Kichevo	•					
6	Makedonski Brod	•					
7	Kumanovo				•		
8	Kratovo			•			
9	Kriva Palanka	•	•				
10	Veles		•	•			
11	Sveti Nikole				•		
12	Shtip		•				
13	Probishtip		•	•			
14	Kochani		•				
15	Vinica		•	•			
16	Delchevo		•	•			
17	Berovo				•		
18	Demir Hisar		•				
19	Krushevo	•					
20	Bitola			•	•		
21	Prilep	•	•				
22	Kavadarci	•		•			
23	Negotino	•		•			
24	Demir Kapija		•				
25	Valandovo	•	•				
26	Gevgelija		•				
27	Bogdanci		•				
28	Star Dojran		•				
29	Ohrid	•	•			•	
30	Struga	•					
31	Debar	•					
32	Resen	•	•				
33	Radovish	•	•				
34	Strumica				•		
	<b>Total (%)</b>	<b>50.0</b>	<b>52.9</b>	<b>23.5</b>	<b>14.7</b>	<b>2.9</b>	<b>0.0</b>



Item 1.8 Started Year of System Supply Services

No.	Water Supply Company	Year
1	Skopje	No answer (*)
2	Gostivar	1956
3	Mavrovi Anovi	1973
4	Tetovo	1930
5	Kichevo	1959
6	Makedonski Brod	1982
7	Kumanovo	1958
8	Kratovo	1988
9	Kriva Palanka	1971
10	Veles	1954 & 1991
11	Sveti Nikole	1963 & 1979
12	Shtip	1960
13	Probishtip	1976
14	Kochani	1974
15	Vinica	1990
16	Delchevo	1963
17	Berovo	1954
18	Demir Hisar	1993
19	Krushevo	1986
20	Bitola	1928
21	Prilep	1981
22	Kavadarci	1974
23	Negotino	1977
24	Demir Kapija	1976
25	Valandovo	1956
26	Gevgelija	1983
27	Bogdanci	1969
28	Star Dojran	1976
29	Ohrid	1934
30	Struga	1959
31	Debar	1988
32	Resen	1979
33	Radovish	1965
34	Strumica	1978

(\*) No reply in the Questionnaire, but confirmed by JICA Study Team

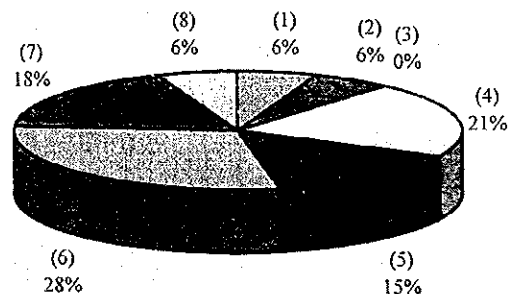
History of the Water Supply System of Skopje City

- 527-563 yr. The first central water supply system built in the period of Justinian I
- 1907 yr. First pumping station built near river Vardar (capacity 32 l/sec)
- 1907 yr. Service reservoir "Kale" (volume 250 m<sup>3</sup>)
- 1935-1936 yr. First intake structure of Rashche spring
- 1936-1937 yr. Main pipe (cast iron),  $\phi$ 400 mm, length 17.25 km, and distribution network with 40.7 km length
- 1949 yr. Bigger service reservoir "Kale" (volume 2,500 m<sup>3</sup>)
- 1968 yr. Volume of service reservoir "Kale" was increased for more 4,300 m<sup>3</sup>
- $\approx$ 1970 yr. After the earthquake the wells were constructed in Nerezi
- 1964 yr. New intake of Rashche spring, two main pipes of  $\phi$ 1,600 mm
- 1991 yr. Construction of the wells "Lepenev" (started working in 1992 yr.)

Item 1.8.a

No.	Year	Number of Water Supply Companies	(%)
(1)	until 1929	2	5.9
(2)	from 1930 to 1939	2	5.9
(3)	from 1940 to 1949	0	0.0
(4)	from 1950 to 1959	7	20.6
(5)	from 1960 to 1969	5	14.7
(6)	from 1970 to 1979	10	29.4
(7)	from 1980 to 1989	6	17.6
(8)	from 1990 to 1997	2	5.9

Figure 1.8.a



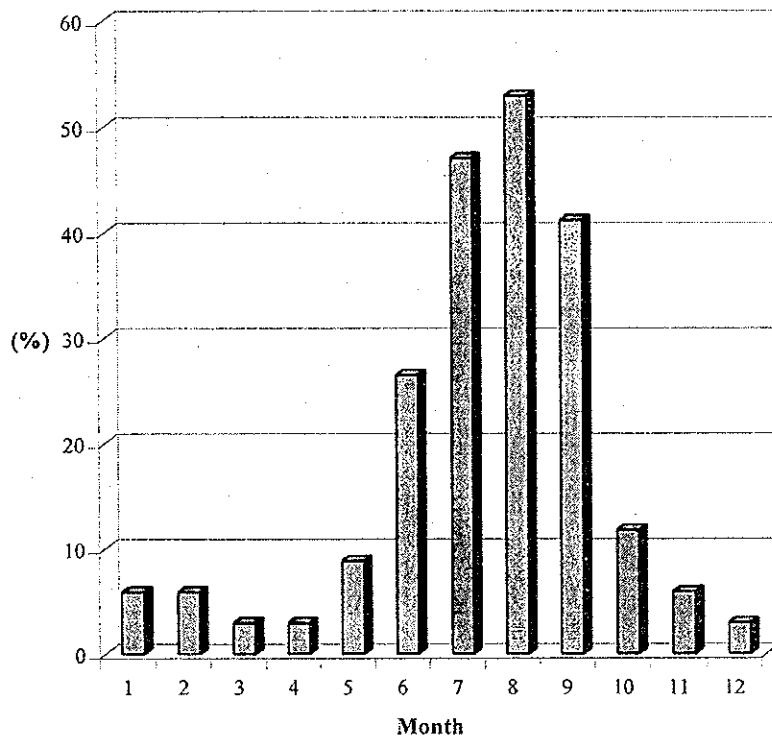
Item 2.1 Population Covered by the Water Supply Systems

No.	Water Supply Company	Population 1996			% 1994 data	
		Urban	Rural	Total	Urban	Rural
1	Skopje	426,271	19,626	445,897	95.6	4.4
2	Gostivar	38,400	No answer	38,400		
3	Mavrovi Anovi		5,000	5,000		100.0
4	Tetovo	50,800	980	51,780	98.1	1.9
5	Kichevo	30,143	1,620	31,763	94.9	5.1
6	Makedonski Brod	3,600	200	3,800	94.7	5.3
7	Kumanovo	65,000	5,000	70,000	92.9	7.1
8	Kratovo	6,000	4,500	10,500	57.1	42.9
9	Kriva Palanka	9,865	2,889	12,754	77.3	22.7
10	Veles	48,000	3,000	51,000	94.1	5.9
11	Sveti Nikole	13,214		13,214	100.0	
12	Shtip	43,800		43,800	100.0	
13	Probishtip	11,300	800	12,100	93.4	6.6
14	Kochani	28,000	17,000	45,000	62.2	37.8
15	Vinica	2,793	239	3,032	92.1	7.9
16	Delchevo	12,900	1,600	14,500	89.0	11.0
17	Berovo	8,200	1,100	9,300	88.2	11.8
18	Demir Hisar	756	280	1,036	73.0	27.0
19	Krushevo	5,300	3,142	8,442	62.8	37.2
20	Bitola	71,716	7,494	79,210	90.5	9.5
21	Prilep	67,371	3,367	70,738	95.2	4.8
22	Kavadarci	No answer	No answer	No answer		
23	Negotino	13,000	2,500	15,500	83.9	16.1
24	Demir Kapija	3,400		3,400	100.0	
25	Valandovo	4,000	1,000	5,000	80.0	20.0
26	Gevgelija	15,000	5,000	20,000	75.0	25.0
27	Bogdanci	6,080	450	6,530	93.1	6.9
28	Star Dojran	1,796		1,796	100.0	
29	Ohrid	44,176	5,496	49,672	88.9	11.1
30	Struga	17,140	26,353	43,493	39.4	60.6
31	Debar	No answer	No answer	No answer		
32	Resen	9,736	4,711	14,447	67.4	32.6
33	Radovish	15,000	4,000	19,000	78.9	21.1
34	Strumica	38,067		38,067	100.0	
	<b>Total (%)</b>				<b>82.5</b>	<b>17.5</b>

Item 2.2 Shortage of Water

No	Water Supply Company	Shortage of Water												Shortage amount m <sup>3</sup> /s	Restriction of services
		Period of Shortage (month)													
		1	2	3	4	5	6	7	8	9	10	11	12		
1	Skopje						•							300	
2	Gostivar				•	•	•	•						20	Time restrictions in lower zones for supplying water to upper zones
3	Mavrovi Anovi					•	•	•	•					15	Restriction are not desirable
4	Tetovo	•	•	•				•	•	•	•	•	•	107	During the months of shortage, night restriction is introduced with a partial closure of the service reservoirs
5	Kichevo														
6	Makedonski Brod													1	Shortage in upper zones
7	Kumanovo				•	•	•	•	•					200	The restriction is not productive - it increase the water losses. It is possible to disconnect the new connected settlements.
8	Kratovo									•	•	•		100	There is enough water in other months
9	Kriva Palanka	•	•											26	
10	Veles													130	There is a restriction of services of about 10 to 12 hours per day
11	Sveti Nikole				•	•	•	•	•					30-50	A shortage of water being experienced in drought period of the year, insufficient quantity of supplying water in the reservoir, artificial supplementation by "Kalmanci" reservoir - Kochani is required.
12	Ship					•	•	•	•					20-30	Restriction are not effective
13	Probiship					•	•	•	•					40	Partial restriction by sectors
14	Kochani														
15	Vinica													30	There is no restrictions, there is a shortage of water in upper zones in the afternoon period in those months
16	Delchevo				•	•	•	•	•					30	With closing valves i.e. with disconnecting of some particular areas for supplying the upper zones
17	Berovo														
18	Demir Hisar														
19	Krushevo														
20	Bitola														
21	Prilep														
22	Kavadarci					•	•	•	•					50	In the period 1995 - 1998 there wasn't a shortage of water
23	Negotino					•	•	•	•	•	•	•	•	50	Stoppage of water in 00 a.m. and start in 05 a.m. (total 5 hours) for filling the service reservoir
24	Demir Kapija					•	•	•	•	•	•	•	•	8-10	From May to October from 20 p.m. to 04 a.m. every day
25	Valandovo														
26	Gevgelija														
27	Bogdanci					•	•	•	•	•	•	•	•	50	Constantly decrease of discharge in lower zones with closures (valves)
28	Star Dojran													15	We don't practice restriction
29	Ohrid														
30	Struga													100	
31	Debar														Restriction because the town of Debar has an old network, inadequate profiles and small service reservoir
32	Resen													30-40	Irrational water utilization is not recommended from sanitary point of view
33	Radovish													50	Periodically
34	Strumica														
	<b>Total (%)</b>	5.9	5.9	2.9	2.9	8.8	26.5	47.1	52.9	41.2	11.8	5.9	2.9		

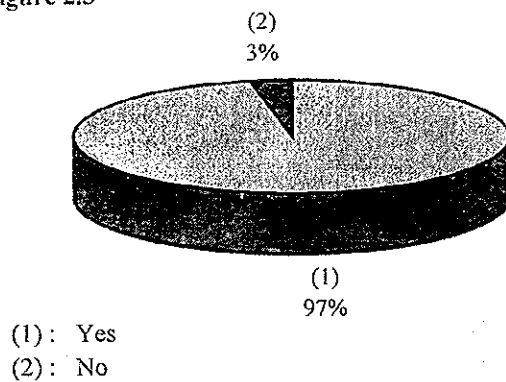
Figure 2.2



Item 2.3 Water Supply to Industry

No.	Water Supply Company	Water Supply to Industry		
		Yes (1)	No (2)	q (lit/sec)
1	Skopje	•		1,500
2	Gostivar	•		30
3	Mavrovi Anovi		•	
4	Tetovo	•		60
5	Kichevo	•		No answer
6	Makedonski Brod	•		0.1
7	Kumanovo	•		72
8	Kratovo	•		90
9	Kriva Palanka	•		18.6
10	Veles	•		85
11	Sveti Nikole	•		30-60
12	Shtip	•		90
13	Probishtip	•		20
14	Kochani	•		80
15	Vinica	•		20
16	Delchevo	•		10
17	Berovo	•		10
18	Demir Hisar	No answer	No answer	No answer
19	Krushevo	•		No answer
20	Bitola	•		292
21	Prilep	•		50
22	Kavadarci	•		50
23	Negotino	•		40
24	Demir Kapija	•		8
25	Valandovo	•		15
26	Gevgelija	•		30
27	Bogdanci	•		20
28	Star Dojran	•		3
29	Ohrid	•		38.65
30	Struga	•		50
31	Debar	•		60
32	Resen	•		14
33	Radovish	•		40
34	Strumica	•		30
	Total (%)	97.0	3.0	

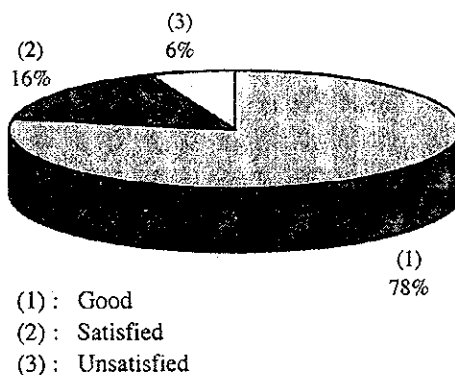
Figure 2.3



Item 2.4 Condition of Quality of Raw Water from the Source

No.	Water Supply Company	Condition of Quality of Raw Water from the Source			Specific Problem
		Good (1)	Satisfied (2)	Unsatisfied (3)	
1	Skopje	•			
2	Gostivar		•		Bluring (opalescence) of water in some particular periods
3	Mavrovi Anovi	•			
4	Tetovo	•			Periodic opalescence when the spring yield is maximum
5	Kichevo	•			
6	Makedonski Brod	•			
7	Kumanovo	•			At the low water level in the reservoir the water is more muddy than usual
8	Kratovo	•			Water treatment in period of rain
9	Kriva Palanka	•			
10	Veles	•			In the summer months the water quality is unsatisfied
11	Sveti Nikole			•	Appearance of organic substances, plankton and deposits
12	Shtip			•	
13	Probishtip		•		Shortage in summer months
14	Kochani		•		Higher values of manganese and ammonia
15	Vinica	•			In specific periods - spring, increased consumption of organic substances
16	Delchevo		•		Increased quantity of $KMnO_4$
17	Berovo	•			
18	Demir Hisar	•			
19	Krushevo		•		
20	Bitola	No answer			Increased quantity of zoo and fito planktons in raw water of the system "Strezevo" in the summer period
21	Prilep	•			
22	Kavadarci	•			
23	Negotino	•			
24	Demir Kapija	•			
25	Valandovo	•			
26	Gevgelija	•			
27	Bogdanci	•			Small profile of thrust pipeline
28	Star Dojran	•			
29	Ohrid	•			Presence of plankton in the lake water
30	Struga	•			
31	Debar	•			The chlorination is not completely solved especially in villages
32	Resen	•			
33	Radovish	•			Service reservoir space
34	Strumica	No answer			With different quality
Total (%)		78.13	15.63	6.25	

Figure 2.4



Item 3.1 Water Supply Facilities

No.	Water Supply Company	Water Supply Facilities																
		-1	-2		-3		-4	-5	-6						-7			
			max	min	max	min			I			II			a	b	c	d
									a	b	c	a	b	c				
1	Skopje	4,000	No answer	No answer	3,600	2,500	Spring and ground capture	35,000	2 x 17	1,600	Steel	No answer	80-1400	90% cast iron, 10% AC, steel, PVC	60	20-230	No answer	364
2	Gostivar	300	490	200	300	200	Capture	No answer	6	350-500	Salonit	42	50-280	Salonit, PVC				
3	Mavrovi Anovi	30	40	10	25	25	No answer	No answer	0.01	No answer	No answer	No answer	No answer	No answer	2	10	12	150
4	Tetovo	600	418	259	431	199	Drainages and galleries	4,444	38.7	150-450	Cast iron, AC, PVC, steel	84.7	25-400	Cast iron, zincd, AC, PVC				
5	Kichevo	470	360	220	360	220	Connection on main pipe of "Studenchica" system	2,000	3.2	500-600	Steel spiral welded, salonit	No answer	50-400	Cast iron, salonit, Plastic, zincd				
6	Makedonski Brod	15	20	9	No answer	No answer	Service reservoir	160	0.16	160-180	Steel	20.5	63-200	PVC and AC				
7	Kumanovo	440	500	250	250	200	Tunnel intake	5,600	10	450-500	Steel	133.62	25-475	AC, PVC, steel, zincd, cast	3	50	150	55
8	Kratovo	180	90	60	80	60	No answer	600	40	323-500	Steel	80	50-250	PVC and salonit				
9	Kriva Palanka	95	75	48	95	22	Springs with drainage	1,000	285	150-250	PVC and iron	16.2	50-200	AC, cast iron, zincd, PVC	3	3	9	32
10	Veles	210	260	170	200	140	Wells and river intake	4,300	19.5	500-1,160	Steel	51	50-500	Steel, PVC, salonit, zincd, cast iron	11	10-50	205	80
11	Sveti Nikole	120	140	60	105	30	Tower intake in reservoir	1,800	1.75	300-500	AC	27.3	50-300	AC, PVC, iron	3	30	90	37
12	Shtip	250	260-270	No answer	280	160	Pipe wells and radial wells	No answer	6	300-500	PVC, salonit, steel	122	20-500	PVC, salonit, steel				
13	Probishtip	100	85	40	60	40	Galery and wells	600	10.7	219-329	Steel	17.3	80-300	Cast iron	3	50	150	240
14	Kochani	300	260	150	260	150	Wells	1,750	5.5	508	Steel	120	12-300	Salonit, plastic, steel	12	20-40	300	143
15	Vinica	110	100	50	80	40	Tirol intake	970	3	200-300	Salonit, plastic	No answer	50-200	Salonit, plastic	6	20	60	70
16	Delchevo	120	90	45	60	30	Tirol intake	1,400	16	200-450	AC and PVC	No answer	50-250	AC and PVC	3	30	90	No answer
17	Berovo	200	30	20	30	20	No answer	250	7.5	700	Cast iron	24.3	50-400	AC and PVC				
18	Demir Hisar	70	50	No answer	48	No answer	No answer	300	6	150-250	PVC and salonit	12	50-150	PVC and salonit	4	10	25	95
19	Krushevo	50	27	22	27	22	No answer	1,000	35	50-350	AC, PVC, steel	20	12.5-100	AC, PVC, zincd	4	25 (20)	100 (80)	400 (60)
20	Bitola	1,400	720	310	720	310	Tirol intake	8,850	29	500-800	Cast iron and steel	25.6	12.5-450	Zincd, PVC, AC	4	100 / 200	600	120
21	Prilep	700	450	320	450	320	Re-enforced concrete capture, tube wells	11,000	85.5	150-1,016	AC, steel, cast iron	148	50-700	AC, PVC, cast iron	4	10	40	90
22	Kavadarci	400	430	300	360	300	No answer	5,000	30	450-507	Steel	90	80-350	Different type of pipes				
23	Negotino	140	140	80	80	50	Tirol intake	2,800	11	300-500	Steel	55	50-300	No answer				
24	Demir Kapija	28	38	18	28	18	Intake (serial) with two wells	200	6	150-200	Salonit and plastic	10	50-100	Salonit, plastic and water supply hose	3	17-28	28	110
25	Valandovo	120	60	20	56	15	Well	1,600	9	150-250	AC	20.1	50-125	Divers pipes	1	55		90
26	Gevgelija	195	140	110	180	100	Service reservoir	4,500	5	300-450	Steel	62	80-300	Salonit, plastic	7	40	195	120
27	Bogdanci	50	80	25	50	25	No answer	330	4	200	Steel and salonit	1.8	50-150	Salonit and PVC	3	2x25+1x50	100	155
28	Star Dojran	25	40	25	25	15	No answer	1,250	6.8	160-250	PVC	33.5	50-160	PVC, salonit	7	5-50	80	98
29	Ohrid	700	420	200	420	200	Intake on the lake, spring capture, well	3,500	19.3	300-711	Salonit	102.45	12.5-600	Zincd, salonit, plastic, cast iron	2	250	500	95
30	Struga	300	350	150	250	100	Re-enforced concrete capture on carst spring	1,400	9	175-400	AC	130	50-300	AC and PVC	5	60	300	80
31	Debar	190	130	100	190	160	With perforated pipes $\phi$ 1,000 mm	500	20	355	Steel welded pipes	84	50-200	Plastic and cast iron				
32	Resen	80	95	55	80	55	Capture of outlet spring and collecting chamber on two springs	1,150	39	110-315	PVC	58	63-200	PVC and AC	2	20	40	85
33	Radovish	200	150	70	100	60	No answer	1,000	6	150-250	PVC and AC	20	50-150	PVC and AC	10	10	100	130
34	Strumica	250	312	No answer	303	No answer	No answer	1,250	15.6	500-600	Salonit	41	50-400	Zincd, salonit and plastic	2	15	30	75

Remarks:

- 1 Maximum water supply capacity of the existing system (lit/sec)
- 2 Current water needs of consumers
  - Maximum (lit/sec)
  - Minimum (lit/sec)
- 3 Current flow in the water supply system
  - Maximum (lit/sec)
  - Minimum (lit/sec)
- 4 Type of catch basin or intake structure
- 5 Volume of service reservoir (m<sup>3</sup>)

-6 Pipeline

- I. Main line
  - a. Total length (km)
  - b. Diameter (mm)
  - c. Material
- II. Distribution line
  - a. Total length (km)
  - b. Diameter (mm)
  - c. Material

-7 Pumping station

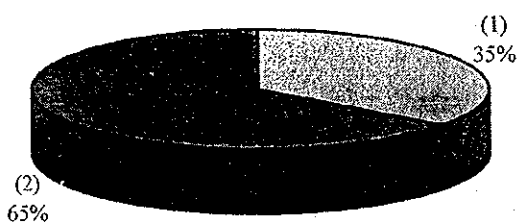
- a. Numbers of unit of pump (units)
- b. Capacity of one unit (lit/sec)
- c. Total capacity (lit/sec)
- d. Maximum head of pumping (m)



Item 3.2 Filter Station

No.	Water Supply Company	Filter station			
		Yes (1)	No (2)	Maximum capacity (existing) lit/sec	Present capacity (existing) lit/sec
1	Skopje		•		
2	Gostivar		•		
3	Mavrovi Anovi		•		
4	Tetovo		•		
5	Kichevo		•		
6	Makedonski Brod		•		
7	Kumanovo	•		440	440
8	Kratovo	•		180 ( I filter station) and 80 ( II filter station)	60 ( I filter station) and 20 ( II filter station)
9	Kriva Palanka		•		
10	Veles	•		300	300
11	Sveti Nikole	•		I phase 120 (II ph.240)	120
12	Shtip	•		500	500
13	Probishtip		•		
14	Kochani		•		
15	Vinica	•		120	110
16	Delchevo	•		60	No answer
17	Berovo	•		200	30
18	Demir Hisar		•		
19	Krushevo		•		
20	Bitola	•		1,080	600
21	Prilep		•		
22	Kavadarci	•		200	No answer
23	Negotino		•		
24	Demir Kapija		•		
25	Valandovo		•		
26	Gevgelija		•		
27	Bogdanci		•		
28	Star Dojran		•		
29	Ohrid	•		250	200
30	Struga		•		
31	Debar		•		
32	Resen		•		
33	Radovish		•		
34	Strumica	•		250	164
	Total (%)	35.3	64.7		

Figure 3.2



(1): Yes

(2): No



Item 4. Operation and Maintenance Condition of Existing Water Supply Facilities

No.	Water Supply Company	Operation and Maintenance Condition																																			
		1.Intake				2.Service Reservoir				3.Pipeline(main)				4.Pipeline(distribution)				5.Pumping Station				6.Filter Station															
		a	b	c	d	a	b	c	d	a	b	c	d	a	b	c	d	a	b	c	d	a	b	c	d												
1	Skopje																									nonexistent											
2	Gostivar				under construction (*)				under construction (*)																	under construction (*)											
3	Mavrovi Anovi																									nonexistent											
4	Tetovo				frequent damages on protection fence																					nonexistent											
5	Kichevo								required provision of automatic closing device																	nonexistent											
6	Makedonski Brod																									nonexistent											
7	Kumanovo				the reservoir is clogged with deposits				necessity of bigger service reservoir storage					there is no cathodic protection												expired pumps over 30 years	regular repairs of filters and sedimentation pool because inappropriate foundation										
8	Kratovo				deposits				issufficient service reservoir																	nonexistent	capability is a problem										
9	Kriva Palanka																									nonexistent	under construction										
10	Veles								shortage of service reservoir space of 2,500 m3																	expired pumps produced by different manufactures	variable quality of raw water because there is no reservoir										
11	Sveti Nikole													casting iron pipes													old technology of water treatment, unsatisfying equipment										
12	Shtip				the variation of the yield can not be predicted																						filter fields is not functioning properly										
13	Probishtip								small capacity																		imported equipment	nonexistent									
14	Kochani				wells in good condition (*)									obsolete pipeline, insufficient profile													under construction (*)										
15	Vinica				necessity of sedimentation pools																																
16	Delchevo																																				
17	Berovo								necessity of additional service reservoir																		necessity of reconstruction and a replacement of the active coal										
18	Demir Hisar																										nonexistent										
19	Krushevo																										nonexistent										
20	Bitola								presence seepage from fissures																		necessity of reconstruction of obsolete filter fields										
21	Prilep																										nonexistent										
22	Kavadarci																										nonexistent										
23	Negotino																										necessity of reconstruction (replacement of sand)										
24	Demir Kapija								cracked wall of the service reservoir																		nonexistent										
25	Valandovo								there is no automatization																		nonexistent										
26	Gevgelija																										nonexistent										
27	Bogdanci				protection of intake structure is required				small service reservoir storage (necessity of 1,500 m3)					insufficient profile and internal corrosion													there is no reserve engine for electricity	nonexistent									
28	Star Dojran																										nonexistent										
29	Ohrid				obsolete concrete				obsolete concrete																		admission of fito planktons										
30	Struga																										nonexistent										
31	Debar				insufficient facilities for protecting collection chamber				small capacity of service reservoir					bridge crossing and incomplete facilities													nonexistent										
32	Resen								reservoir I (600 m <sup>3</sup> ): cracked and leaked reservoir II (550 m <sup>3</sup> ): good condition					inappropriate construction and crossing part of river is not properly constructed													there is no reserve pump	nonexistent									
33	Radovish																										necessity of reconstruction and replacement of equipment	nonexistent									
34	Strumica																										nonexistent										
	Total (%)	47	44	9						42	45	12																33	63	4					36	27	36

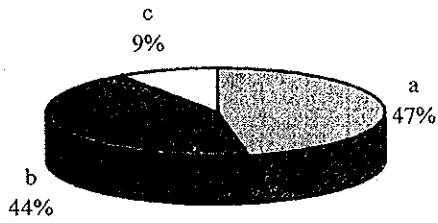
Remarks:  
a. Good  
b. Satisfied  
c. Unsatisfied  
d. Specific problems

(\*) No reply in the Questionnaire, but confirmed by JICA Study Team

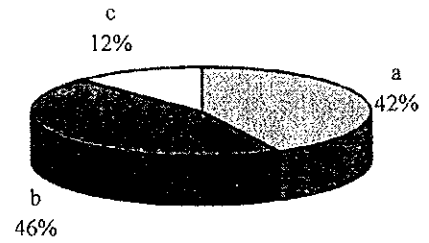


Figure 4.

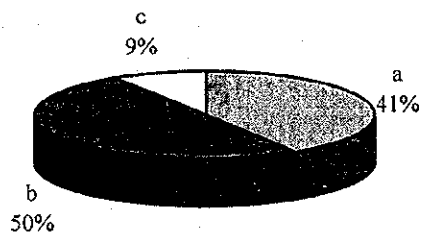
1. Intake



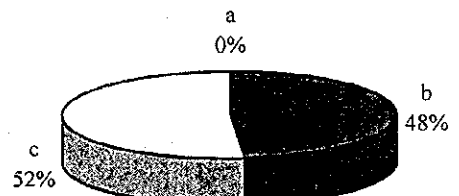
2. Service Reservoir



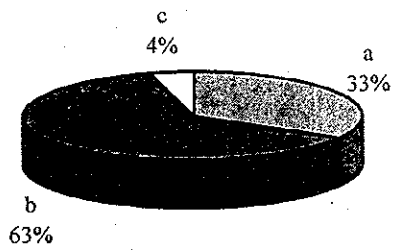
3. Pipeline (main)



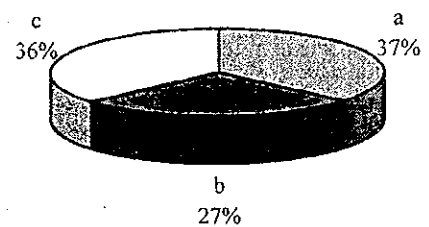
4. Pipeline (distribution)



5. Pumping Station

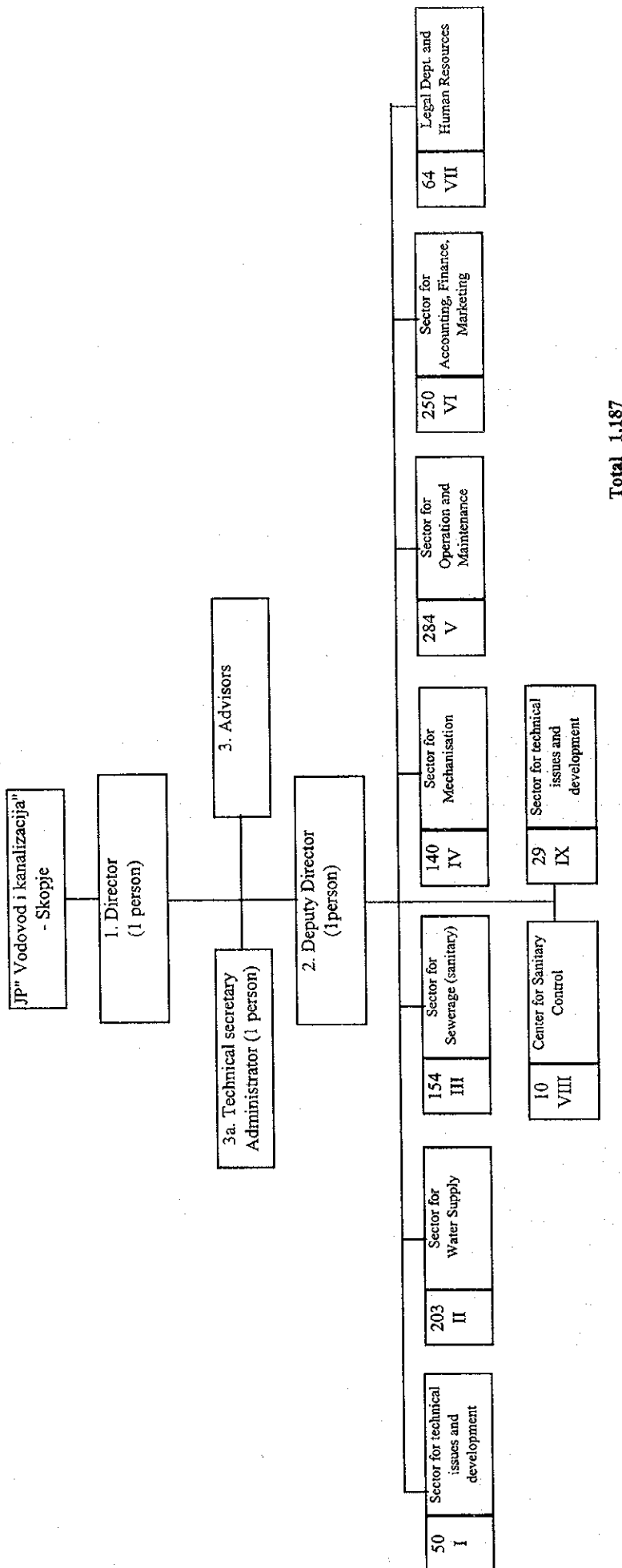


6. Filter Station

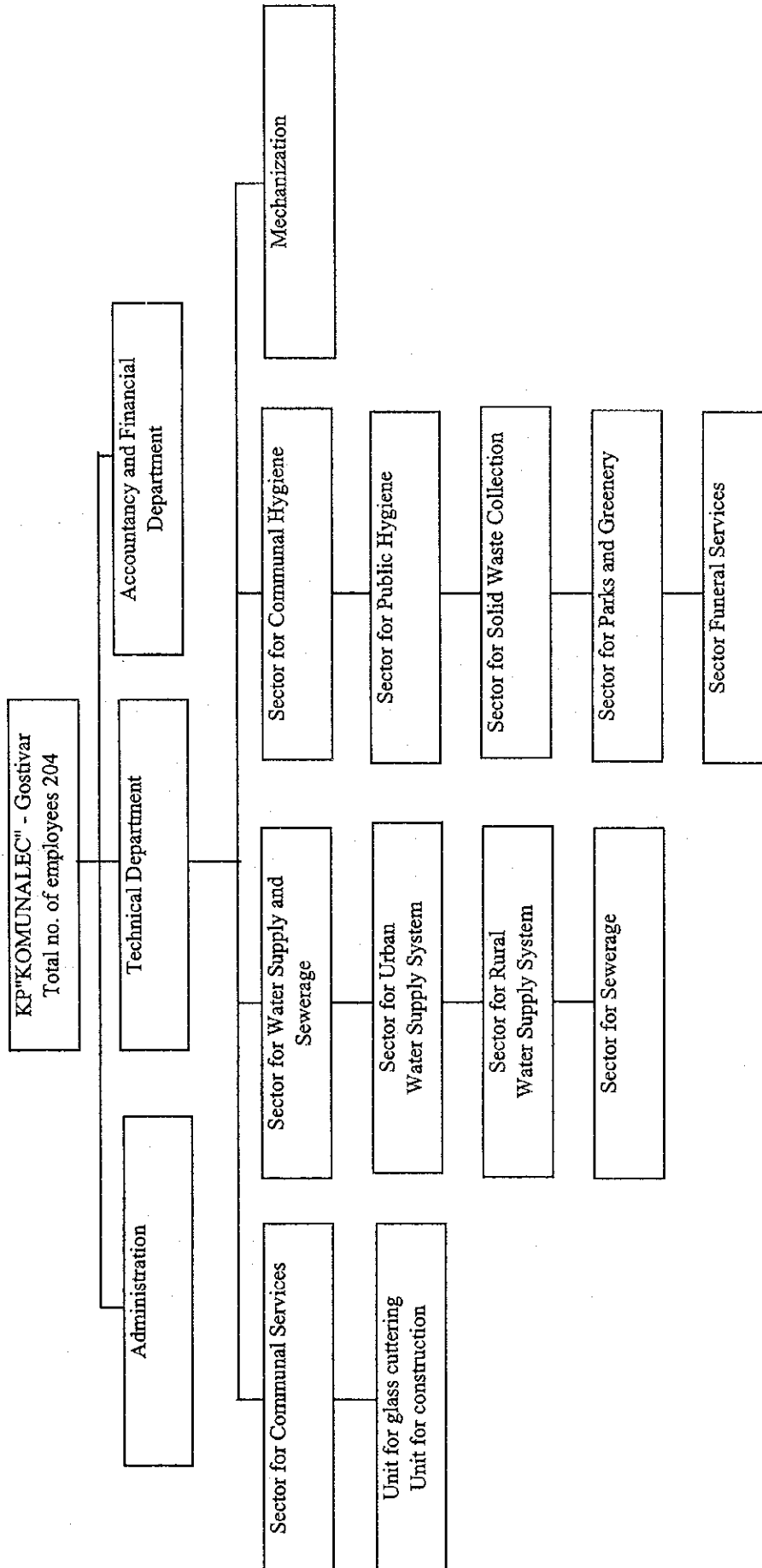


Remarks: a. Good  
b. Satisfied  
c. Unsatisfied

JP "VODOVOD I KANALIZACIJA" - SKOPJE  
 Organization Chart

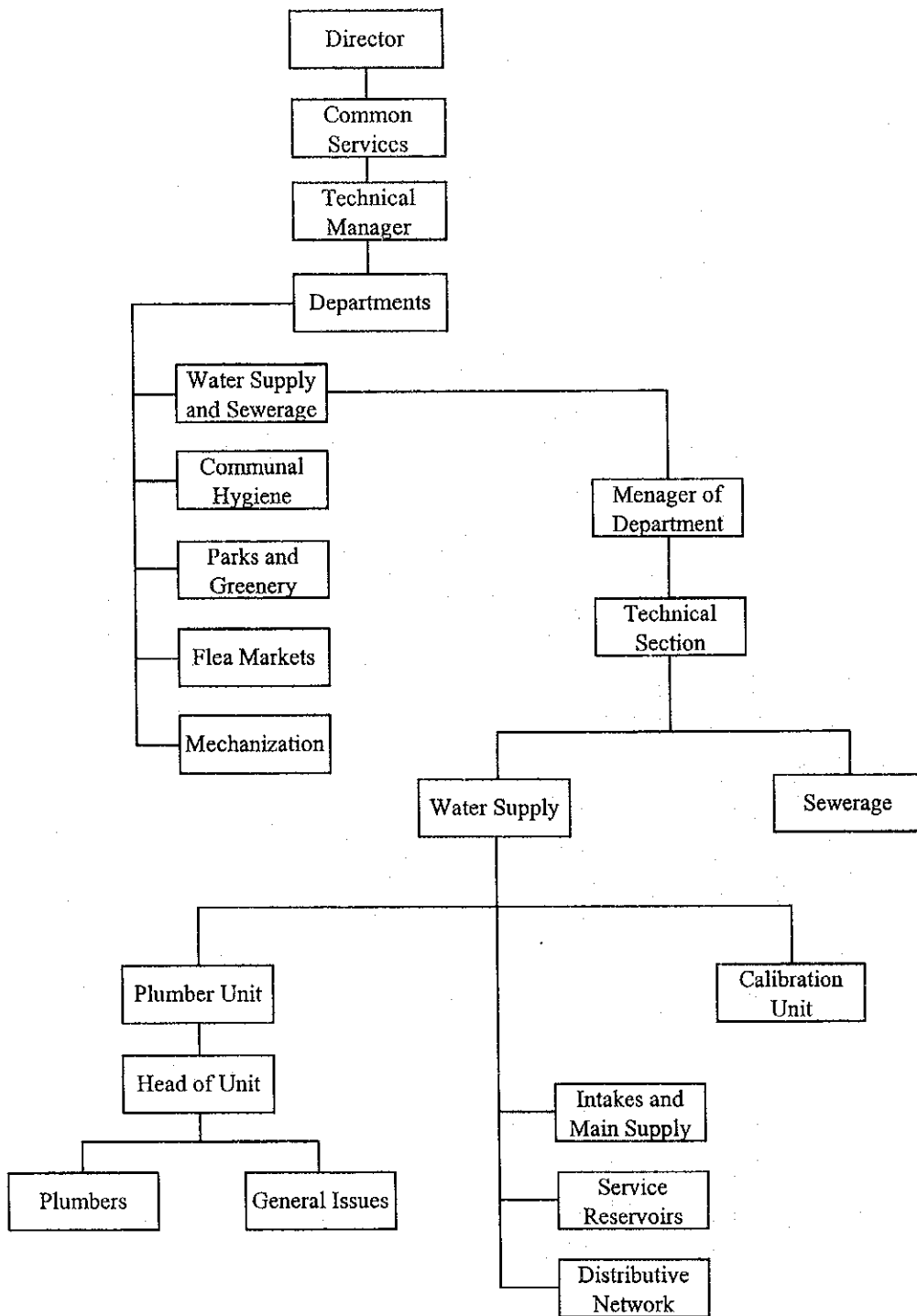


JP "KOMUNALEC" - GOSTIVAR  
Organization Chart



Total 204

JKP "TETOVO" - TETOVO  
 Organization Chart





JP "KOMUNALEC" - KICHEVO  
Organization Chart

Director

1. Department for Legal Issues and Administration

- Head of Department	1
- Clerk for Legal Issues	1
- Clerk for Archiving	1
- Typist	1
- Technical Secretary	1
- Driver of Sedan	1
- Courier	1
- Cleaner	1
- Guardian	8
Sub-total	16

2. Department for Commerce

- Head of Department	1
- Chief Accountant	1
- Counter - Main accountant	1
- Financial Accountant	1
- Analyst - Book Keeping	1
- Liquidator	1
- Counter Clerk	1
- Personal Wages Clerk	1
- Clerk for Planning and Analysis	1
- Clerk for Supplies	1
- Storage Clerk	1
- Invoicing Clerk	1
- Charge Collection Clerk - Chief	1
- Charge Collection Clerks	14
Sub-total	27

3. Department for Water Supply and Sewerage

- Head of Department	1
- Clerk for Connection to the W/S system	1
- Clerk for Groundwater inventory	1
- Clerk for safety of water	1
- Clerk for supervision and control of water meters	1
- Qualified plumbers	7
- Low qualified workers	3
- Workers in the Sewerage	4
Sub-total	19

4. Department for Construction

- Head of Department	1
- Chief Engineer	1
- Junior engineer	1
- Qualified construction workers	3
- Semi-qualified construction workers	10
Sub-total	16

5. Administration

- Head of Department	1
Sub-total	1

6. Department for Communal Hygiene and Public Greenery

- Head of Department	1
- Clerk for Administration	1
- Solid Waste Collection Workers	11
- Maintenance of Public Hygiene	3
- Funeral Service Workers	4
- Florist	2
- Maintenance of Public Greenery	3
Sub-total	25

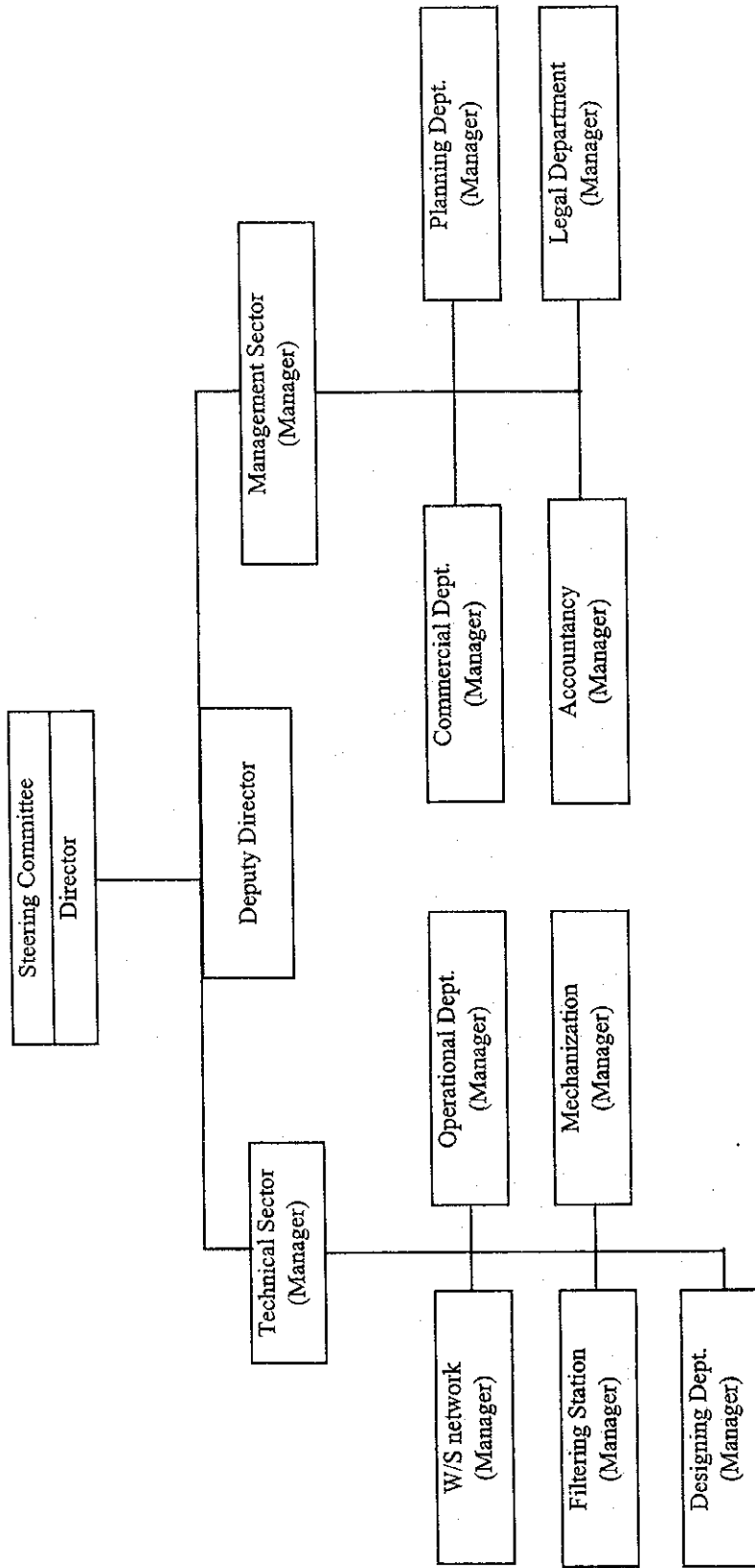
7. Department for Public Markets

- Head of Department	1
- Guardians	2
- Charge Collection Clerks	same people from the Dept. 2
- Cleaners	1
Sub-total	4

8. Department for Mechanization

- Head of Department	1
- Mechanics for vehicles	2
- Drivers of Construction Machine	2
- Driver of Buldozer	1
- Driver of Truck 3.5 tonnes	11
- Driver of Sedan	1
Sub-total	18
Grand-total	126

JP"VODOVOD " - KUMANOVO  
 Organization Chart(1/2)



JP"VODOVOD " - KUMANOVO  
Organization Chart(2/2)

Management Sector

Technical Sector

Commercial Dept.	Planning Dept.	W/S network	Designing Dept.
Manager	1	Manager	1
Clerk for Supplies	1	Chief of Operational Unit	1
Storage Clerks	2	Plumbers	3
Charge Collection Clerks	14	Workers	3
Supervisors	2		3
Accountants	3		1
Charge Collection (at the counter)	2		
<b>SUB-TOTAL</b>	<b>25</b>	<b>SUB-TOTAL</b>	<b>SUB-TOTAL</b>
			9

Accountancy	Legal Dept.	Operational Dept.	Filtering Station
Manager	1	Manager	1
Treasurer	1	Chief of Operational Unit	1
Accountancy encoder	1	Repairmen	5
Liquidator	1	Construction Workers	9
Accountants	3		4
<b>SUB-TOTAL</b>	<b>7</b>	<b>SUB-TOTAL</b>	<b>SUB-TOTAL</b>
			20

Mechanization
Manager
Chief of Operational Unit
Mechanics + Locksmiths
Oper.of Constr. Machinery Drivers
Mechanics - Calibration
<b>SUB-TOTAL</b>
1
2
4 + 3
5
5
29

**Grand-total 156**

Total number of 159 employees. In cases of increased demand, the company employs seasonal workers (17), mostly needed in the technical sector.  
If needed, small groups are formed (2-3 persons) for execution of special tasks (forced collection charge, identification of unauthorised connection to the system.

**JKP"DERVEN" - VELES**  
**Organization Chart**

Department "Vodovod i kanalizacija" (Water Supply and Sewerage)

1. Sector for production of water and water treatment with following units:

- 1.1. Water Treatment facility
- 1.2. Pumping and re-pumping stations, reservoirs and their maintenance
- 1.3. Water Quality Control

2. Sector for distribution of water and maintenance of the water supply system

- 2.1. Maintenance of the water supply network
- 2.2. Connections to the water supply network and calibration unit

3. Sector for Development

The Department for Water Supply (without the employees in sewerage section) has 89 employees.

Administration	7
Technical Staff	14
Other	68
Total	89

JKP"EDINSTVO" - SVETI NIKOLE  
Organization Chart

No.	Post	No. of staff	Necessary conditions Knowledge - qualifications
<b>I. COMMON SERVICES</b>			
1	Director	1	
2	Vice Director	1	
3	Technical Secretary	1	
4	Secretary	1	
5	Advisor for Institutional issues	1	
6	Archivist - typist	1	
7	Chief of Accountance	1	
8	Liquidator	1	
9	Financial Accounter	1	
10	Accountant	2	
11	Cashier	1	
12	Data Encoder	1	
13	Warehouse clerk	2	
14	Common Manager	1	
15	Hydro-engineer	1	
16	Surveyor	1	
17	Driver	1	
18	Hygienist - courier	1	
19	Manager of payment section	1	
20	Charge Collection Clerk	4	
21	Guardian	8	
	Sub-total	33	
<b>II. WATER PRODUCTION AND DISTRIBUTION</b>			
1	Manager	1	
2	Chief of Laboratory	1	
3	Chemical Laboratory Technician	4	
4	Locksmith	2	
5	Electrician	2	
6	Maintenance Personnel for filtering station	4	
	Sub-total	14	
<b>III. SOLID WASTE MANAGEMENT, CITY GREENERY AND PARKS, CEMETERY</b>			
1	Manager	1	
2	Administrator of Solid Waste Management	1	
3	Maintenance Personnel for Parks and Greener	4	
4	Broomer (Sweeper)	6	
5	Communal hygienist	10	
6	Adiminstrator for Funeral Services	1	
7	Gravedigger	4	
	Sub-total	27	
<b>IV. WATER SUPPLY AND SEWERAGE</b>			
1	Manager	1	
2	Water Supply Maintenance Personnel	4	
3	Maintenance Plumber	2	
4	Common workers	4	
5	Sewerage Maintenance Personnel	2	
	Sub-total	13	
<b>V. CITY MARKET</b>			
1	Manager	1	
2	Charge Collection Clerk	2	
3	Office Cleaner	1	
	Sub-total	4	
<b>VI. TECHNICAL DEPT., MAINTENANCE AND MECHANIZATION</b>			
1	Chief of the Department	1	
2	Mechanic	2	
3	Drivers	10	
4	Storage Clerk	1	
	Sub-total	14	
<b>VII. ELECTRICS WORK STATION</b>			
1	Chief of Department	1	
2	Chief of The Work Station	1	
3	Storage Clerk	1	
4	Winkler	1	
5	TV Mechanics	1	
6	Repairman for Domestic Appliances	1	
	Sub-total	6	
	<b>Grand-total</b>	<b>111</b>	

JP"FORTUNA" - SHTIP  
Organization Chart

Organization Structure of the Company

1. Department for Water Supply and Sewerage

maintenance, reconstruction and construction of the water supply and drainage facilities, maintenance of the systems for cleaning of the water supply and sewerage facilities, and other activities related to water supply, drainage and water treatment

2. Department for Communal Hygiene

maintenance of the tidy environment and public parks and greenery, collection and disposal of the soild waste from the households, public and commercial institutions, operation and maintenance of the sanitary landfill, cleaning of the public toilets and their disinfection.

3. Department for Funeral Services

Funeral services, maintenance and operation of the public cemetery and preparation of the tumb-stones

4. Department for Public Market and Charge Collection

maintenance of the market and water charge collection and soild waste collection fees from the households

5. Department for Greenery and Sports Facilities

operation and maintenance of the parks, green surfaces and recreational terrains, maintenance of the sporting facilities and protection of the forests in the suburban area

6. Kezhovica spa and dry-cleaning

maintainance of the conditions for safe bathing in the spa, providing over-night stay, food and drinks for them, dry-cleaning of every type of wear, washing, etc.

7. Administration

The administration of this company consists of the following Sectors:

1) Sector for Legal Issues and Human Resources

delegation of the company in front of Courts of Justice and keeping records of every claim bared or submitted, preparation of general legislation, keeping records of human resources, undertaking general activities in the procedure of employment document typing, archiving the documents, and other general matters.

2) Sector for Accountancy and Finance

keeping the records of accountancy, and finances, preparation of the profit/loss balance sheets, and statistical analysis

3) Commercial Sector

all kinds of supplies, storage and keeping records for the storage, etc.

4) Sector for Security, Protection and Civil Defense

provides security of the facilities, and technical means for permanent undisturbed operation of the facilities, safety art work, protection against fire and civil defense.

W/S	94
Communal Hygiene	30
Funeral Services	11
Public Markets and Charge collection	28
Greenery and Sporting Facilities	14
Kezhovica spa and dry-cleaning	10
Administration	24
<b>TOTAL</b>	<b>211</b>

KRO"ILINDEN" - PROBISHTIP  
Organization Chart

- Director
- Technical Manager
- Head of "Water Supply, Sewerage and Pumping Station" Department
- Head of "Communal Hygiene and Greenery" Department
- Head of "Public Cemetery and Maintenance" Department
- Chief of "Water Supply and Sewerage" Department
- Chief of "Communal Hygiene and Greenery" Department
- Chief of "Construction Group and Public Cemetery" Department
- Main Technician of motor vehicles
- Main electrician
- Main machine-technician
- Chief of pumping station
- Surveyor - technician
- Laboratory technician
- Qualified pump operator
- High-qualified plumber
- High-qualified worker in the Sewerage
- Mechanization driver
- High-qualified auto-mechanic worker
- High-qualified locksmith - welder
- High-qualified construction worker
- High-qualified worker in Greenery
- Driver of special vehicle
- Driver of truck, tractor and light car
- Qualified plumber
- Qualified worker in the Sewerage
- Qualified auto-mechanic worker
- Qualified construction worker
- Solid waste collection worker
- Qualified worker in Greenery
- Cleaner
- Maintenance of Public Cemetery
- Guardian
- Semi-qualified worker

KO"VODOVOD" - KOCHANI  
Organization Chart

(1) Organization Chart

- Director, Deputy Director, Technical Manager  
managers of the departments  
(KJP"VODOVOD" is multidisciplinary company)
  
- Manager of the Pumping Station, operators of the  
pumping station, operators of particular re-pumping stations
- Manager of the maintenance mechanization and  
executives (mechanics and electricitians)
- Manager of maintenance of the water supply network  
executives

(2) Number of employees in each department

- Unit "Communal Activities"	
- Sections	
Water Supply and Sewerage	55
Parks and Greenery	12
Cleaning of Public Surfaces	13
Solid Waste Collection	18
Construction Mechanization	23
Mechanization and maintenance	38
Funeral Services	8
- Unit "Geothermal Water"	20
- Administration (accountancy, commercial, human resources)	35
<b>Total</b>	<b>222</b>



KRO"BREGALNICA" - DELCHEVO  
Organization Chart

Organization Chart for:

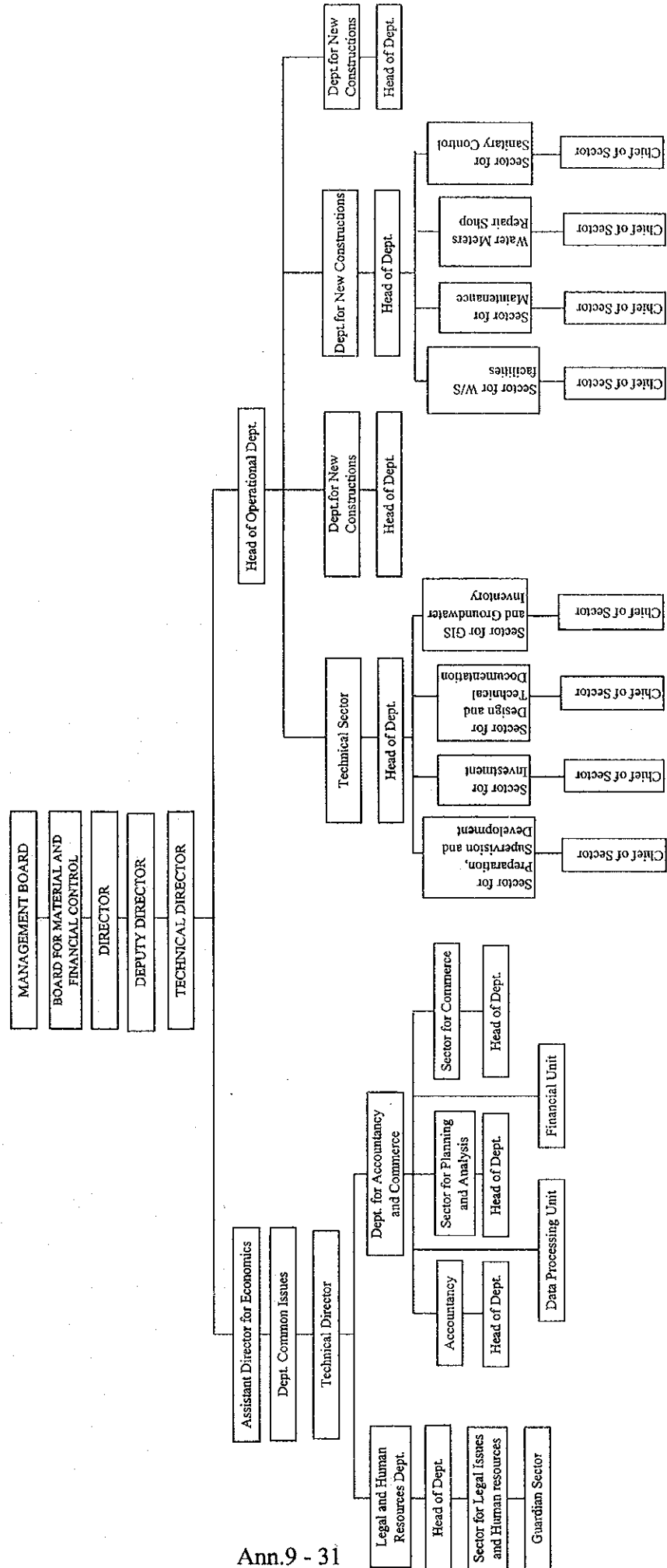
Pumping Station and Filter Station

1. Pumping Station Trebovishte village and Filtering Station Trebovishte village	
- maintenance	4
- maintenance of the tyrolian intake at Loshana river	2
2. Pumping Station - Delchevo	
- maintenance	2
- electritian	1
3. Pumping Station - Razlovci village	
- maintenance	1
- charge collection clerk	1
4. Pumping Station - Gabrovo village	
- maintenance	1
- charge collection clerk	1
- head of the unit, civil engineer, construction technitian	
- water meter readers	3
- charge collection clerks	2
- Data processing	2
<b>Total</b>	<b>20</b>

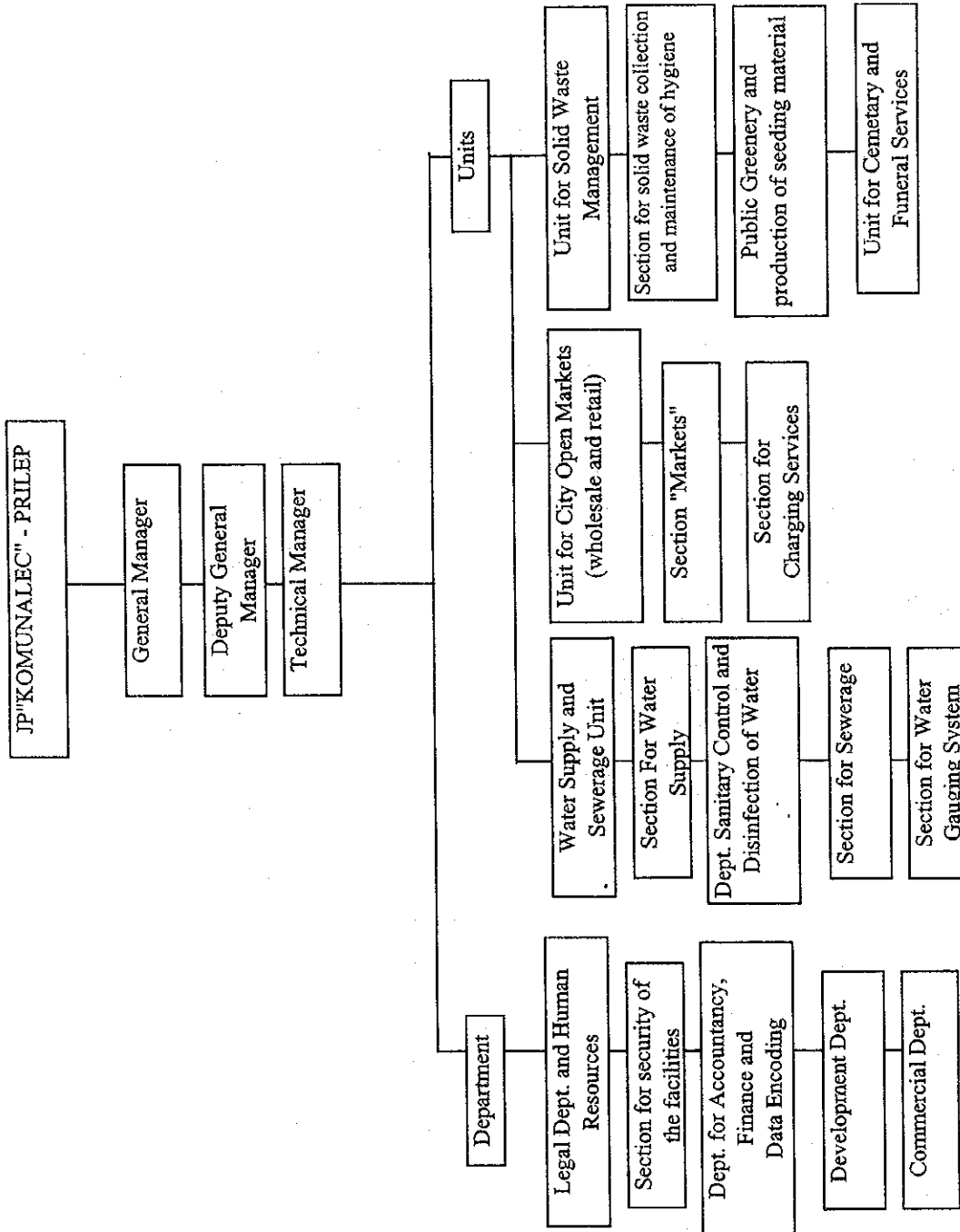
**JP"USLUGA" - BEROVO**  
**Organization Chart**

No.	Departments	Number of Employees	Number of Managers	Number of Workers	Activity of Departments
1	General and Accounting	13	3	10	Administration, logistic, accountancy, and water charge collection
2	Water Supply, Filter Station and Sewerage	13	2	11	Water supplying inhabitants and industry with drinking water, and maintenance of sewerage system
3	Garbage Collectors	9	1	8	Collecting and disposal of solid waste
4	Mechanization	9	1	8	Supporting communal activities with mechanization
5	Maintenance of Flea Market and Cemetery Services	13	1	12	Funeral services, maintenance of parks, greenery and flea market
	<b>Total</b>	<b>57</b>	<b>8</b>	<b>49</b>	

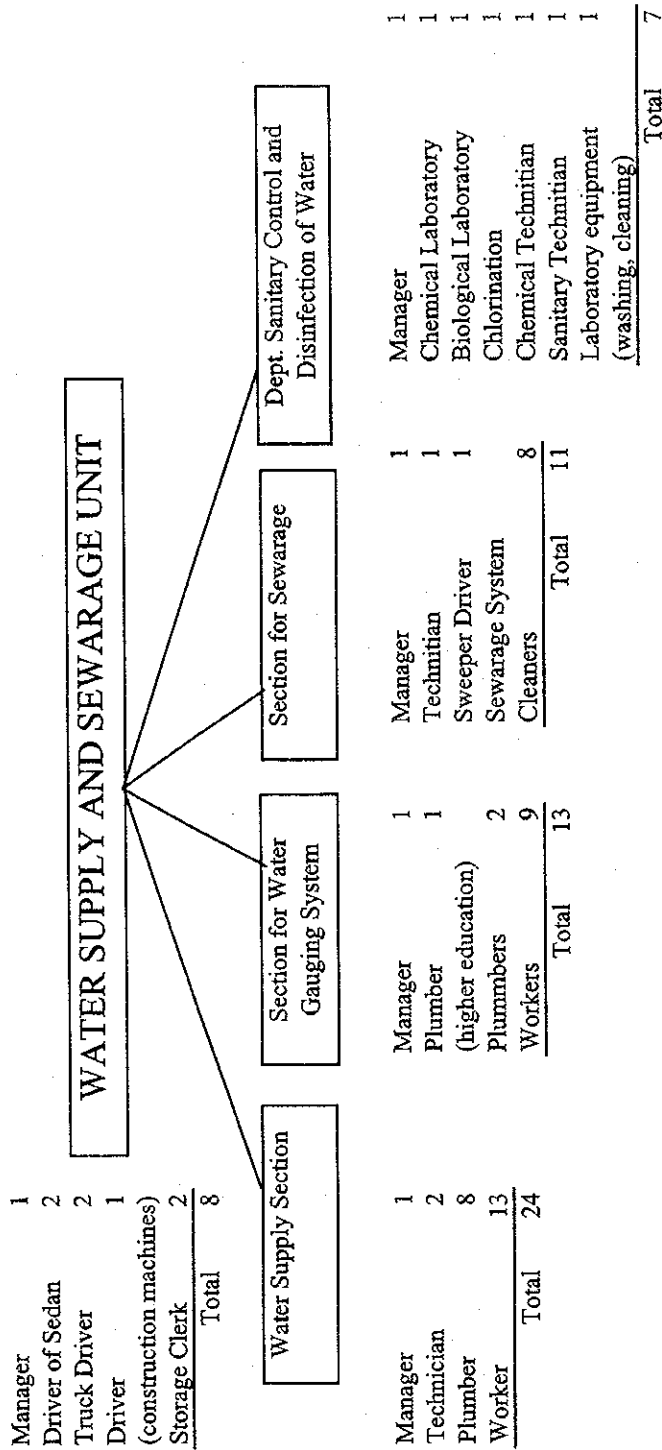
JP"VODOVOD" - BITOLA  
Organization Chart



KRO"KOMUNALEC" - PRILEP  
 Organization Chart (1/2)



KRO "KOMUNALEC" - PRILEP  
 Organization Chart (2/2)



Grand-total 63

**WATER SUPPLY SECTION**  
 Main activities are construction and maintenance of the water supply facilities distribution network.

**SECTION FOR GAUGING SYSTEM**  
 Main activities are installation of gauging devices (water meters) to all water users.

**SECTION FOR SEWERAGE**  
 Main activity is maintenance of the sewerage system and all its facilities.

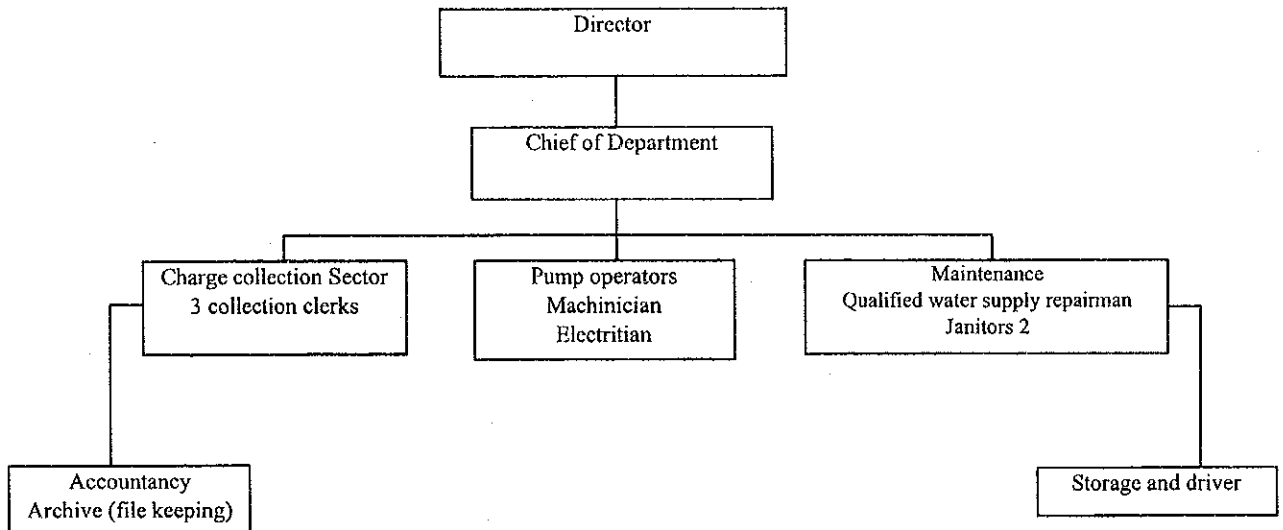
**LABORATORY**  
 Main activities are connected to the regular analysis of the potable water quality and its chlorination

KRO"BOSHAVA" - DEMIR KAPIJA  
Organization Chart

Number of Employees:

1. Director	1
Administration	
1. Chief of Department	1
2. Accountant	1
3. Charge collecting clerk	1
4. Cleaner	1
O/M Sector	
1. Chief of Department	1
2. Plumbers	2
3. Construction worker	1
4. Tractorist	1
5. Solid Waste collectors	2
6. Street sweeper	1
<b>Total</b>	<b>13</b>

KOMUNALEN SERVIS - VALANDOVO  
Organization Chart



KP"KOMUNALEC" - GEVGELIJA  
Organization Chart

1) ORGANIZATION

Number of Employees in each Department, Unit and Section  
(by managing, technical and administration staff)

"Water Supply and Sewerage"			
TOTAL		23	
Managers		1	
Technicians		1	
Electrical Engineer		1	
	<b>Sub-total</b>	<b>26</b>	
"Public Surface Cleaning"			
TOTAL		27	
Managers		1	
	<b>Sub-total</b>	<b>28</b>	
"Construction Section"			
TOTAL		8	
	<b>Sub-total</b>	<b>8</b>	
Administration			
TOTAL		19	
Director		1	
Managers		2	
Charge collection clerks		6	
	<b>Sub-total</b>	<b>28</b>	<b>Grand total 90</b>

ACTIVITIES OF EACH DEPARTMENT, UNIT AND SECTION

"Water Supply and Sewerage"

maintenance of the existing water supply system and its expansion; maintenance and expansion of the sewerage system

"Public Surface Cleaning"

Solid waste collection from households and industrial facilities and disposition management of the sanitary landfill, cleaning and sweeping of the streets in the urban area, maintenance and management of the cemetery, and management of the city open market.

"Construction Section"

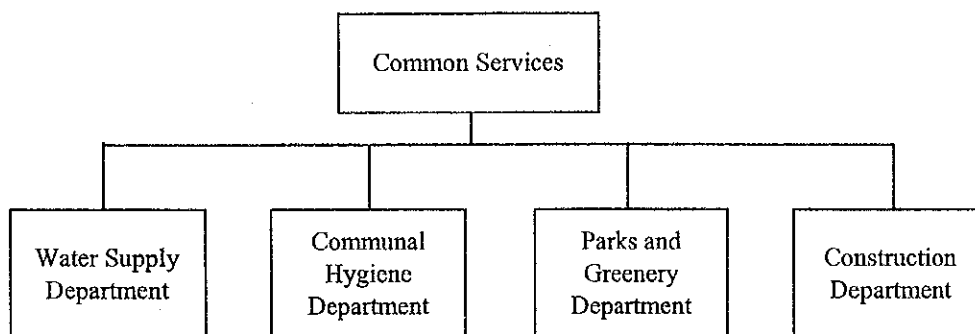
Undertaking of construction works  
Preparation of terrain for construction of new streets

Administration

Accountancy, administration works for all departments and units  
charge collection clerks belong to the Administration



**RO"VODOVOD" - BOGDANCI**  
**Organization Chart**



**1. Common Services**

- Administrative issues of all departments

Director	1
Accountant	1
Administrator	2
Counter Clerk	1
Pumping station operators	5
Water fee collector	2
<b>Total</b>	<b>12</b>

**2. Water Supply Department**

- Regular supplying of settlement with quality drinking water

- Maintenance and extension of the water supplying system and the sewerage network

Head of department	1
Plumbers	6
Low qualified workers	3
<b>Total</b>	<b>10</b>

**3. Communal Hygiene Department**

- Collecting and disposal of solid waste outside of the settlement

- Maintenance of cemetery

- Maintenance and cleaning of public area

- Maintenance of flea markets

Head of department	1
Drivers	2
Low qualified workers	11
<b>Total</b>	<b>14</b>

**4. Parks and Greenery Department**

- Maintenance and extension of public greenery

Low qualified workers	3
<b>Total</b>	<b>3</b>

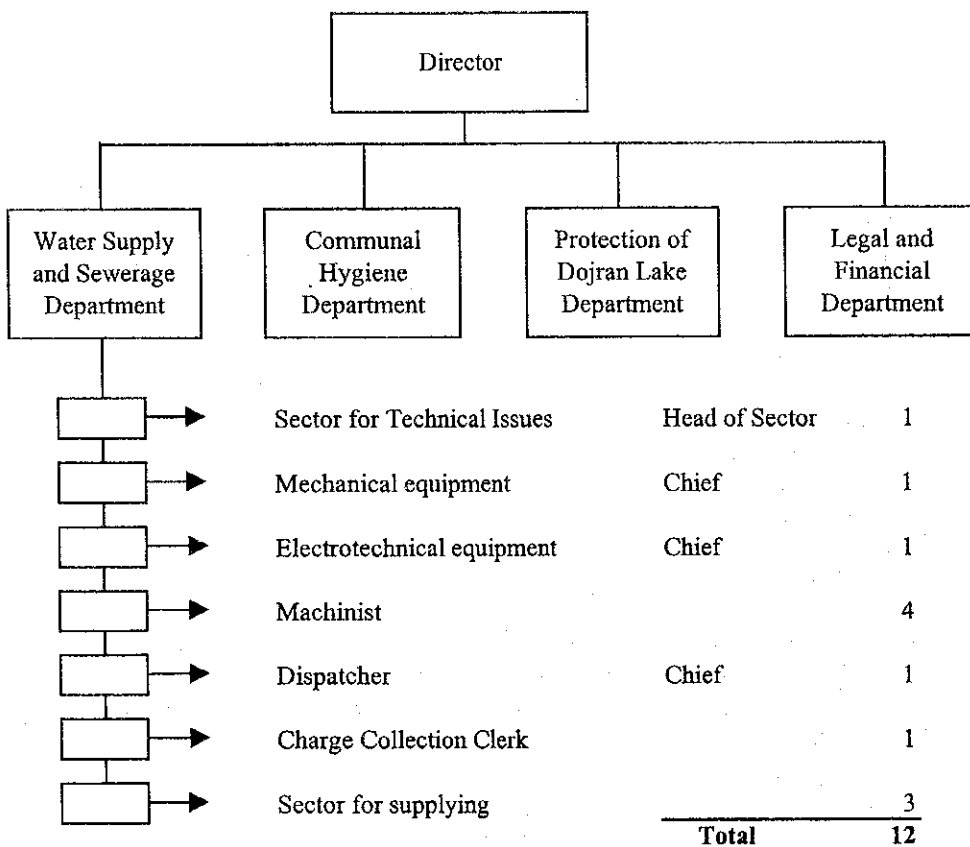
**5. Construction Department**

- Construction of roads, hydro objects and height limited buildings

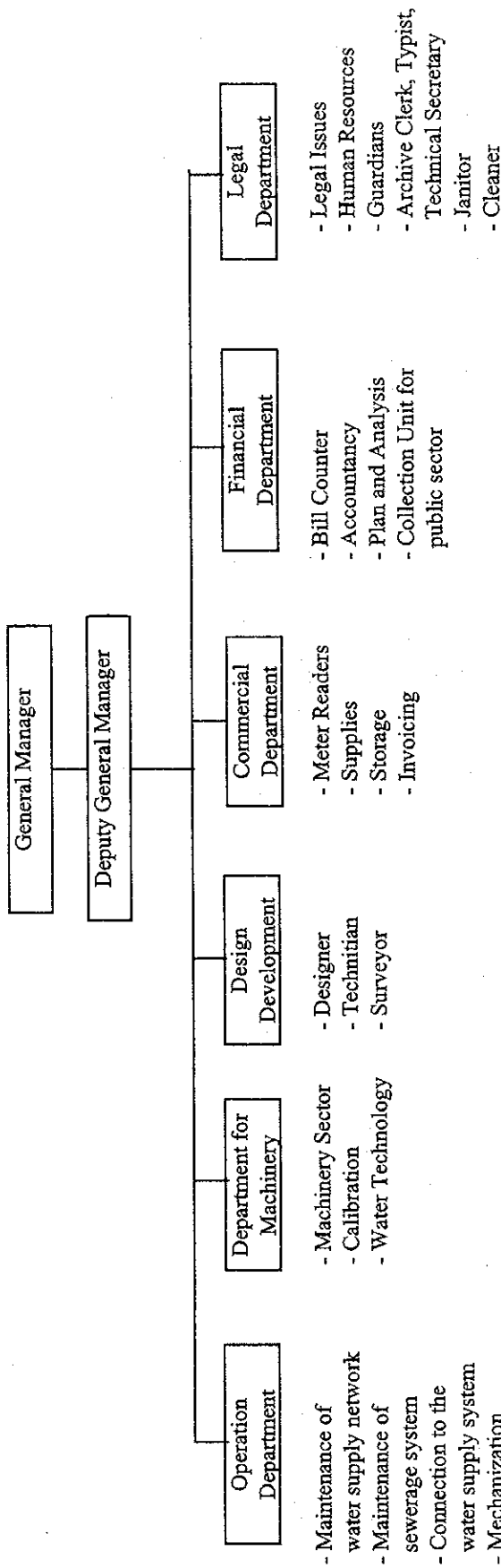
Head of department	1
Drivers	4
Low qualified workers	3
Bricklayer	2
<b>Total</b>	<b>10</b>

<b>Grand total</b>	<b>49</b>
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**PKD"DOJARAN" - STAR DOJRAN**  
**Organization Chart**

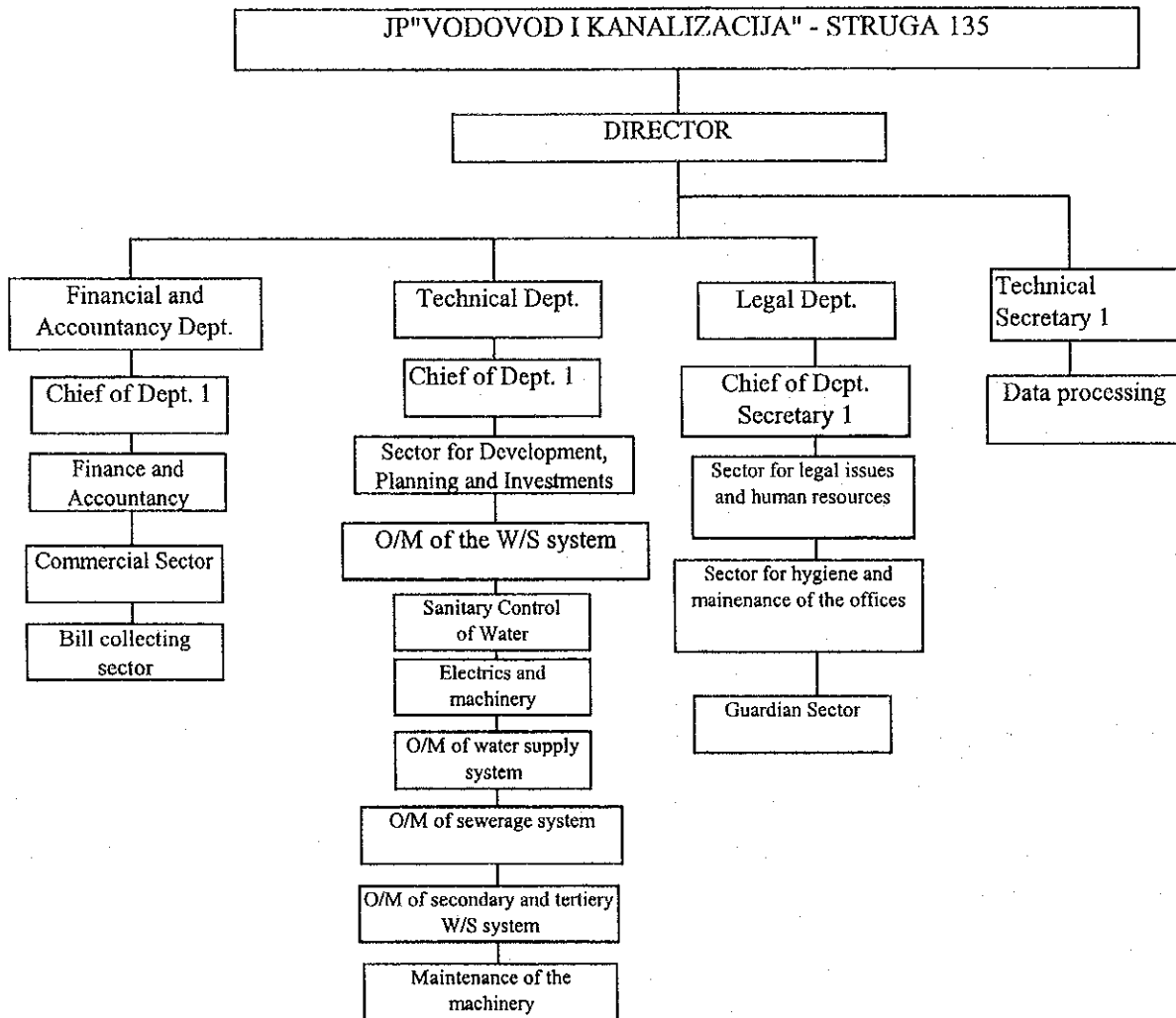


JP"VODOVOD" - OHRID  
Organization Chart



University Education	20
College Education	4
High School Education	50
Qualified Workers	94
Semi-Qualified Workers	32
<b>Total</b>	<b>200</b>

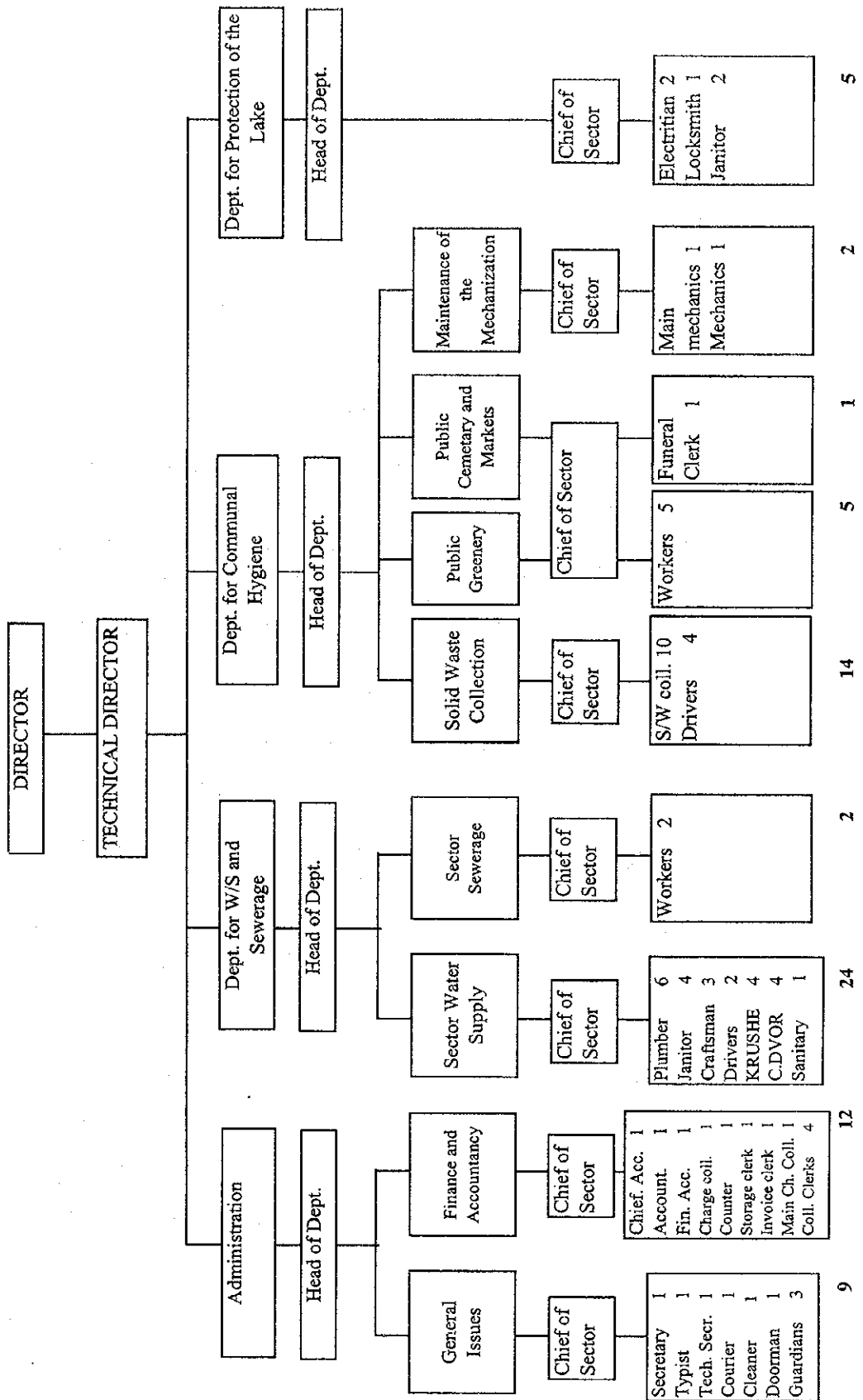
**JP"VODOVOD I KANALIZACIJA" - STRUGA**  
**Organization Chart**



**REVIEW OF THE PERSONNEL BY EDUCATIONAL BACKGROUND**

University ed. background	7
College ed. background	3
High school ed. background	39
High Qualified workers	2
Qualified workers	45
Semi-qualified workers	18
Low qualified workers	23
<b>Total</b>	<b>137</b>

JKP"PROLETER" - RESEN  
Organization Chart



Total 74

JP "KOMUNALEC" - STRUMICA  
Organization Chart

Department for Water Supply	35 + 5
Department for Construction	29 + 15
Department for Greenery, Markets and Solid Waste Management	71 + 19

Department for Water Supply

Production and distribution of potable water
--

Department for Construction

Construction of water supply networks, sewerage facilities, construction of approach and traffic roads
--

Department for Greenery, Markets and Solid Waste Management

Maintenance of public greenery, organized trade with flowers and seeding material, maintenance and operation of the cemetery, cleaning and sweeping of the city, operation and maintenance of the public markets, etc.
--

Sectors:

Sector for Legal Issues and Administration:

Finance, accountancy, planning and analysis	45 + 3
---	--------

Technical Sector

Technical preparation, designing and supervision	2
--	---

Commercial Sector

Commercial activities	3
-----------------------	---

Repair Service

Operation and maintenance of the mechanization and vehicles, repair of the vehicles, other craft activities	31
---	----

Total 216 + 42

The numbers express the permanent employees + seasonal workers  
(eg. 45 + 3)

**Item 5.2 Financial Issues**

**Skopje**

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a						
b						
c						
d						
Total	565,918,000		613,683,327		613,000,000	

**Gostivar**

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	49,654,152	65	45,569,154	65		
b						
c	26,736,851	35	24,537,234	35		
d						
Total	76,391,003	100	70,106,388	100	84,127,600	100

**Mavrovi Anovi**

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	1,951,432	36	1,925,990	35	2,118,589	35
b						
c	1,688,077	31	1,835,075	33	2,018,582	33
d	1,259,082	23	1,322,081	24	1,454,289	24
e	492,075	9	410,154	7	451,170	7
Total	5,390,666	100	5,493,300	100	6,042,630	100

**Kichevo**

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a						
b						
c	2,395,711		2,542,220		354,260	
d						
e	13,297,272		13,601,230		21,297,764	
Total	15,692,983		16,143,450		21,652,024	

Note: (a) Budget for operation and maintenance of water supply facilities  
 (b) Budget for new facilities installation  
 (c) Budget for personnel  
 (d) Budget for company office operation  
 (e) Unidentified budget (by the judgement of JICA Study Team)  
 Total = Total amount of annual budget

### Makedonski Brod

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	292,476	20	292,476	21	292,476	19
b						
c	662,724	46	535,628	38	539,024	34
d	485,000	34	592,000	42	748,500	47
Total	1,440,200	100	1,420,104	100	1,580,000	100

### Kumanovo

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	56,370,000	47	57,734,000	47	60,587,000	49
b	918,000	1	2,163,000	2	2,500,000	2
c	53,783,000	45	53,096,000	44	51,696,000	42
d	9,154,000	8	8,707,000	7	8,150,000	7
Total	120,225,000	100	121,700,000	100	122,933,000	100

### Kriva Palanka

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	6,140,500	17	2,636,800	6	3,500,000	8
b	12,900,667	36	11,395,411	27	11,500,448	26
c	14,316,832	40	20,025,666	47	22,161,602	50
d						
e	2,136,200	6	8,256,561	20	7,200,000	16
Total	35,494,199	100	42,314,438	100	44,362,050	100

### Veles

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	35,672,000	64	34,975,400	62	36,860,000	63
b	4,700,000	8	5,100,000	9	5,400,000	9
c	15,691,000	28	15,917,000	28	16,430,000	28
d						
Total	56,063,000	100	55,992,400	100	58,690,000	100

Note: (a) Budget for operation and maintenance of water supply facilities  
 (b) Budget for new facilities installation  
 (c) Budget for personnel  
 (d) Budget for company office operation  
 (e) Unidentified budget (by the judgement of JICA Study Team)  
 Total = Total amount of annual budget



### Sveti Nikole

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	2,013,888	6	1,629,698	5	1,850,000	6
b	2,655,090	8	2,066,760	6	1,960,000	6
c	15,717,243	46	17,108,878	49	16,260,000	49
d	13,943,788	41	13,813,517	40	13,120,000	40
Total	34,330,009	100	34,618,853	100	33,190,000	100

### Shtip

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	2,988,518	3	16,360,269	17		
b	26,134,816	26	18,705,758	19		
c	48,438,282	48	45,188,886	46		
d	24,107,956	24	18,343,044	19		
Total	101,669,572	100	98,597,957	100		

### Probishtip

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a						
b						
c						
d						
Total	13,771,000		13,865,000		14,000,000	

### Kochani

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	15,693,000	13	12,221,000	10	15,933,000	14
b	15,469,000	13	16,353,000	14	16,753,000	14
c	34,535,000	28	35,398,000	30	34,854,000	30
d	56,779,000	46	54,083,000	46	49,408,000	42
Total	122,476,000	100	118,055,000	100	116,948,000	100

Note: (a) Budget for operation and maintenance of water supply facilities  
 (b) Budget for new facilities installation  
 (c) Budget for personnel  
 (d) Budget for company office operation  
 Total = Total amount of annual budget

### Delchevo

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	7,225,850	16	5,659,107	16	8,500,000	16
b	306,225	1	169,204	0	400,000	1
c	16,271,786	36	16,929,765	47	17,000,000	33
d	20,964,762	47	12,921,996	36	25,900,000	50
Total	44,768,623	100	35,680,072	100	51,800,000	100

### Berovo

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	1,626,300	20	2,034,169	22	2,135,870	23
b						
c	4,020,620	50	4,049,584	45	4,056,730	43
d	2,439,430	30	3,002,180	33	3,152,280	34
Total	8,086,350	100	9,085,933	100	9,344,880	100

### Demir Hisar

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a						
b						
c	1,690,210	24	2,024,522	25	2,125,748	20
d	2,402,424	33	3,223,740	40	3,868,488	37
e	3,084,058	43	2,890,012	36	4,585,520	43
Total	7,176,692	100	8,138,274	100	10,579,756	100

### Krushevo

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	2,300,000	20	3,920,000	30	2,920,000	22
b						
c	5,647,787	49	5,153,004	39	5,600,000	43
d	3,478,397	30	4,022,117	31	4,480,000	34
Total	11,426,184	100	13,095,121	100	13,000,000	100

Note: (a) Budget for operation and maintenance of water supply facilities  
 (b) Budget for new facilities installation  
 (c) Budget for personnel  
 (d) Budget for company office operation  
 (e) Unidentified budget (by the judgement of JICA Study Team)  
 Total = Total amount of annual budget

### Bitola

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	63,780,000	43	67,657,000	35	79,740,000	43
b	6,700,000	5	45,400,000	23	12,974,000	7
c	56,426,000	38	57,077,000	30	64,000,000	35
d	21,777,000	15	23,092,000	12	27,400,000	15
Total	148,683,000	100	193,226,000	100	184,114,000	100

### Prilep

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	24,079,509	14	26,353,543	13	26,393,307	13
b	11,879,196	7	13,382,365	7	14,921,702	7
c	58,681,015	34	62,451,437	32	62,451,437	31
d	38,609,917	22	40,258,948	20	40,360,262	20
e	41,571,664	24	54,967,187	28	55,099,999	28
Total	174,821,301	100	197,413,480	100	199,226,707	100

### Kavadarci

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	16,272,036	47	18,567,151	49	18,971,456	45
b					2,420,000	6
c	7,651,719	22	8,695,743	23	8,956,615	21
d	10,985,464	31	10,300,962	27	11,558,974	28
Total	34,909,219	100	37,563,856	100	41,907,045	100

### Negotino

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	10,944,500	77	11,020,000	77	11,500,000	78
b						
c	3,264,960	23	3,215,040	23	3,215,040	22
d						
Total	14,209,460	100	14,235,040	100	14,715,040	100

Note: (a) Budget for operation and maintenance of water supply facilities  
 (b) Budget for new facilities installation  
 (c) Budget for personnel  
 (d) Budget for company office operation  
 (e) Unidentified budget (by the judgement of JICA Study Team)  
 Total = Total amount of annual budget

### Demir Kapija

	1996		1997		1998*	
	MKD	%	MKD	%	MKD	%
a	136,727	4	133,582	4	69,270	4
b	246,250	7				
c	1,513,102	45	1,609,612	47	776,319	49
d	1,312,089	39	1,629,504	47	745,672	47
e	173,665	5	74,452	2		
Total	3,381,833	100	3,447,150	100	1,591,261	100

(\*) The data for 1998 are taken from semi-annual financial statement

### Valandovo

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a						
b						
c	3,694,463	36	3,665,529	46		
d						
e	6,454,067	64	4,383,546	54		
Total	10,148,530	100	8,049,075	100		

### Gevgelija

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	7,349,700	15	6,392,620	15	7,800,000	17
b	1,604,596	3	3,513,700	8	1,000,000	2
c	19,541,570	39	20,004,312	47	20,250,000	45
d	20,034,758	40	10,569,745	25	15,000,000	33
e	1,190,473	2	1,944,623	5	1,350,000	3
Total	49,721,097	100	42,425,000	100	45,400,000	100

### Bogdanci

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	1,927,755	6	1,401,561	4	1,300,000	4
b	143,000	0			435,000	1
c	5,505,479	16	5,553,836	17	5,600,000	19
d	27,306,946	78	25,429,319	79	22,665,000	76
Total	34,883,180	100	32,384,716	100	30,000,000	100

Note: (a) Budget for operation and maintenance of water supply facilities  
 (b) Budget for new facilities installation  
 (c) Budget for personnel  
 (d) Budget for company office operation  
 (e) Unidentified budget (by the judgement of JICA Study Team)  
 Total = Total amount of annual budget

### Star Dojran

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	650,000	30	380,000	20	420,000	20
b						
c	1,419,264	65	1,419,264	76	1,419,264	68
d	121,264	6	75,098	4	252,111	12
Total	2,190,528	100	1,874,362	100	2,091,375	100

### Ohrid

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	39,852,162	44	34,891,596	41	42,000,000	42
b	1,192,230	1	2,918,182	3	2,000,000	2
c	31,238,197	34	32,023,816	38	36,000,000	36
d	18,811,244	21	15,445,177	18	20,000,000	20
Total	91,093,833	100	85,278,771	100	100,000,000	100

### Struga

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	42,958,325	56	35,949,820	53	36,594,000	53
b	232,254	0	293,309	0	300,000	0
c	28,874,191	38	28,001,607	41	28,000,000	41
d	4,773,147	6	3,994,424	6	4,066,000	6
Total	76,837,917	100	68,239,160	100	68,960,000	100

### Debar

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a	5,063,618	20	5,153,446	21	5,200,000	20
b	1,101,000	4	1,230,000	5	1,040,000	4
c	13,356,483	54	13,595,652	55	15,000,000	58
d	5,203,649	21	4,760,513	19	4,760,000	18
Total	24,724,750	100	24,739,611	100	26,000,000	100

Note: (a) Budget for operation and maintenance of water supply facilities  
 (b) Budget for new facilities installation  
 (c) Budget for personnel  
 (d) Budget for company office operation  
 Total = Total amount of annual budget

**Resen**

	1996		1997		1998	
	MKD	%	MKD	%	MKD	%
a						
b						
c	15,586,445	44	15,856,632	47	15,975,000	45
d						
e	19,469,484	56	18,180,310	53	19,525,000	55
Total	35,055,929	100	34,036,942	100	35,500,000	100

Note: (a) Budget for operation and maintenance of water supply facilities  
 (b) Budget for new facilities installation  
 (c) Budget for personnel  
 (d) Budget for company office operation  
 (e) Unidentified budget (by the judgement of JICA Study Team)  
 Total = Total amount of annual budget

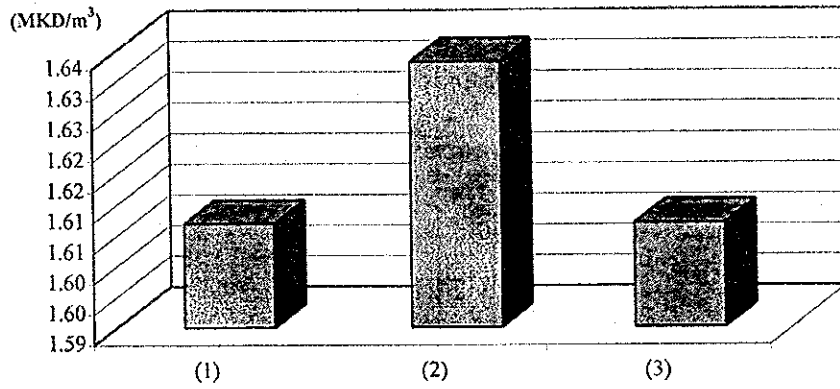
No answer from: Tetovo, Kratovo, Vinica, Radovish and Strumica

Item 6. Tariff

No	Water Supply Company	(1) Domestic Water			(2) Communal Water			(3) Industrial Water			(4) Other Use	
		(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	MKD/m <sup>3</sup>	Note
		MKD/m <sup>3</sup>	MKD/m <sup>3</sup>	(%)	MKD/m <sup>3</sup>	MKD/m <sup>3</sup>	(%)	MKD/m <sup>3</sup>	MKD/m <sup>3</sup>	(%)		
1	Skopje		11.77	66					26.37	53		
2	Gostivar		6.00	60					13.00	40		
3	Mavrovi Anovi		7.20	70		25.00						
4	Tetovo		8.08						11.68			
5	Kichevo	0.84	7.50					0.84	11.00			
6	Makedonski Brod	1.30	8.00	60				1.30	14.00	50		
7	Kumanovo	2.20	18.50	80	2.20	20.20	50	2.20	23.00	50	21.30	Health-care institutions
8	Kratovo		10.00						16.00			
9	Kriva Palanka		10.80						15.10			
10	Veles		12.00						23.80	66		
11	Sveti Nikole	2.00	11.90					2.00	21.40			
12	Shtip		9.40	79		9.40			14.00	70		
13	Probishtip		9.97						17.89			
14	Kochani		13.50	61					24.20	70		
15	Vinica		12.00						21.00		105.00	Stores
16	Delchevo		10.37			10.37			29.96			
17	Berovo	1.60	12.40	61				1.60	24.70	30		
18	Demir Hisar		9.00									
19	Krushevo	1.70	15.20		1.70	25.00		1.70	25.00			
20	Bitola	1.00	11.00	81	1.00	14.30	69	1.00	21.00	89		
21	Prilep	1.70	11.56	60				1.70	20.60	40	15.38	Institutions
22	Kavadarci		9.24	65					18.45			
23	Negotino		6.50	75					13.00	80		
24	Demir Kapija	1.20	6.00					1.20	12.00			
25	Valandovo		8.00	70					10.00	90		
26	Gevgelija		9.40	54		9.40	54		20.00	54		
27	Bogdanci		10.30	40					21.07	40		
28	Star Dojran		11.50	48		14.00	15		15.00	45		
29	Ohrid		14.00	72					23.00	68		
30	Struga		17.00	64					29.50	45		
31	Debar		8.00						17.00			
32	Resen		9.45	82					18.90	46		
33	Radovish		14.40	75					26.54			
34	Strumica	2.53	16.00					2.53	22.50	81		
	<b>Average</b>	<b>1.61</b>	<b>10.76</b>	<b>66</b>	<b>1.63</b>	<b>15.96</b>	<b>47</b>	<b>1.61</b>	<b>19.40</b>	<b>55</b>	<b>47.23</b>	

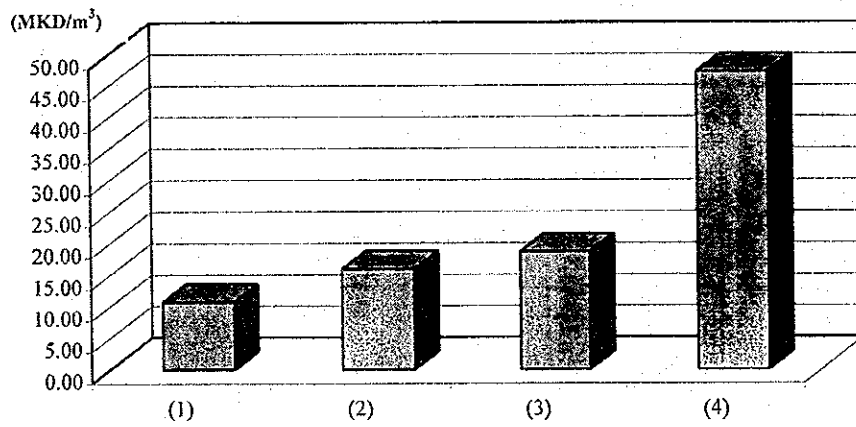
Remarks: (a) Buying  
(b) Selling  
(c) Fee Collection Rate

Figure 6.a Average Buying Price



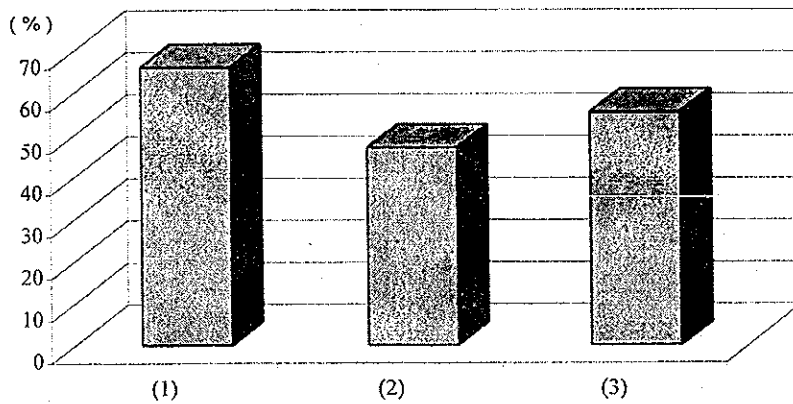
- (1): Domestic
- (2): Communal
- (3): Industrial

Figure 6.b Average Selling Price



- (1): Domestic
- (2): Communal
- (3): Industrial
- (4): Other Use

Figure 6.c Average Fee Collection Rate



- (1): Domestic
- (2): Communal
- (3): Industrial



Item7 Future Development Plan (1/2)

No.	Name of water supply company	Name of Program	Type of structure
1	Skopje	No answer	
2	Gostivar	Filter station with capacity of 300 lit/s for First Phase Reconstruction of distribution network	FS,PD
3	Mavrovi Anovi	No answer	
4	Totovo	Main project for intake the groundwater "Studena Voda" Main project for intake the groundwater "Leshnica" Main project for intake the groundwater "Pena"	I,PM,PD
5	Kichevo	Primary project for main and secondary wear supply network for Kichevo Primary project for reconstruction and enlargement of water supply network and supply facilities of Kichevo-upper zone Primary project for reconstruction and enlargement of water supply network and facilities of Kichevo-lower zone Main project for a service reservoir	PM,PD,SR
6	Makendonski Brod	Project distribution network of upper zone Project for service reservoir construction , $V=550 \text{ m}^3$	PD,SR
7	Kumanovo	City's service reservoir in Karposh village under construction Regional supply pipeline Lipkovo-Kumanovo, $d=711 \text{ mm}$ , $L=10.5 \text{ km}$ Reservoir "Slupchanka" with capacity of 11,000,000 m <sup>3</sup> Tower service reservoir (upper zone) Service reservoir for filter station (middle zone) Service reservoir - Sokolana (lower zone)	SR,PM
8	Kratovo	Construction of new filter station Enlargement of existing filter station Construction of water supply line to uncovered villages	FS,PM
9	Kriva Palanka	Transposing pipelines $d=300 \text{ mm}$ Filter Station Distribution network for upper zone	PM,FS,PD
10	Veles	Reconstruction of water supply lines and construction of new transition lines Construction of a new service reservoir space and a pumping station Development of new water source of about 130 - 150 lit/s	I,PD,SR
11	Sveti Nikole	Replacement of the water treatment technology with contemporary technology and extension of the factory with additional apparatus and equipment Extension of water supply system for whole pumping and gravity system i.e. extension of project "Divljak" Reconstruction of zinc and iron network along the town and installation of a new network in the uninstalled area Replacement of existing AC Pipes in town with appropriate material according to international standard	PM,PD,PS,OT
12	Shtip	(Negative comments due to financial constraint)	
13	Probistip	Finalization of supply pipeline $d=500 \text{ mm}$ from system "Zletovica" Construction of a filter station and a service reservoir	PM,FS,SR
14	Kochani	Construction of water treatment facility for portable water under construction Intake and supply pipeline of water from Orizarska River Project	PM,FS
15	Vinica	No answer	
16	Delchevo	Project for gravity supply system	PM,PD
17	Berovo	No answer	
18	Demir Hisar	Thrust pipeline and service reservoir space of $1,400 \text{ m}^3$	PM,PD,SR
19	Krushevo	Intake structure from new springs and gravity supply system Reconstruction of town's water supply network Construction of water service reservoir	I,PM,PD,SR

Item7 Future Development Plan (2/2)

No.	Name of water supply company	Name of Program	Type of structure
20	Bitola	Main project for service reservoir construction V=8,000 m <sup>3</sup> in Dovlech Main Project for water supply for the settlement Bukovski Livadi Main project for water supply of rural settlement from urban water supply network	PM,PD,SR
21	Prilep	Construction of new pumping station "Kislarka" with 8 wells yielding Q=60~70 lit/s	PS
22	Kavadarci	Not yet returned	
23	Negotino	Project for water supply from Doshnica River including water supply to municipalities of Kavadarci and Rosoman	PM,PS
24	Demir Kapija	Construction of reservoir on Loshana River	SR
25	Valandovo	Automatization of water supply system	OT
26	Gevgelija	Construction of pipeline to village Mezenci L=1.5 km	PM
27	Bogdanci	Main project of water supply to Bogdanci	PM,PD
28	Star Dojran	Main project BR.10-2/97 thrust pipeline and well	PM,PD
29	Ohrid	Projects for water supply with filter station and wells Development of groundwater Projects for separated sanitary (wastewater) system 5 service reservoirs Village Studenchishia V=3,500 m <sup>3</sup> Village Samoilova Tvrдина V=500 m <sup>3</sup> Village Dolno Konjsko V=100 m <sup>3</sup> Village Peshtani V=160 m <sup>3</sup> Village Trpejca V=50 m <sup>3</sup> 7 pumping stations Metropol 2 x 250 lit/s H=95 m Dolno Konjsko 2 x 8 lit/s H=60 m Biljanini Izvori 3 x 30 lit/s H=90 m 2 x 15 lit/s H=90 m Drvara 3 x 10 lit/s H=60 m Wells 1 x 45 lit/s H=95 m 1 x 40 lit/s H=95 m Trpejca 1x 45 lit/s H=86 m	I,PM,PD,FS SR,PS
30	Struga	Regional water supply system, Gorna Belica-Struga with intake carst spring with capacity of 100 ~ 300 lit/s	I,PM,PD
31	Debar	Main project for extension and reconstruction of the town network by phases Main project for extension of service reservoir V=2,500 m <sup>3</sup>	PM,PD,SR
32	Resen	Reservoir on "Leva River" - primary project Water supply from "Prespa La" - primary project for water supply till year 2020	I,PM,PD,SR
33	Radovish	Finalization of the second phase project providing 25-30 lit/s	PM,PD
34	Strumica	Construction of service reservoir V=5,000 m <sup>3</sup> Reconstruction of water supply network L=11,890m	PM,PD,SR

Note: Abbreviation of type of structure is as follows:

- I, Intake
- PM, Pipeline (main)
- PD, Pipeline (distribution)
- PS, Pumping station
- SR, Service reservoir
- FS, Filter station
- OT, Other structure







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