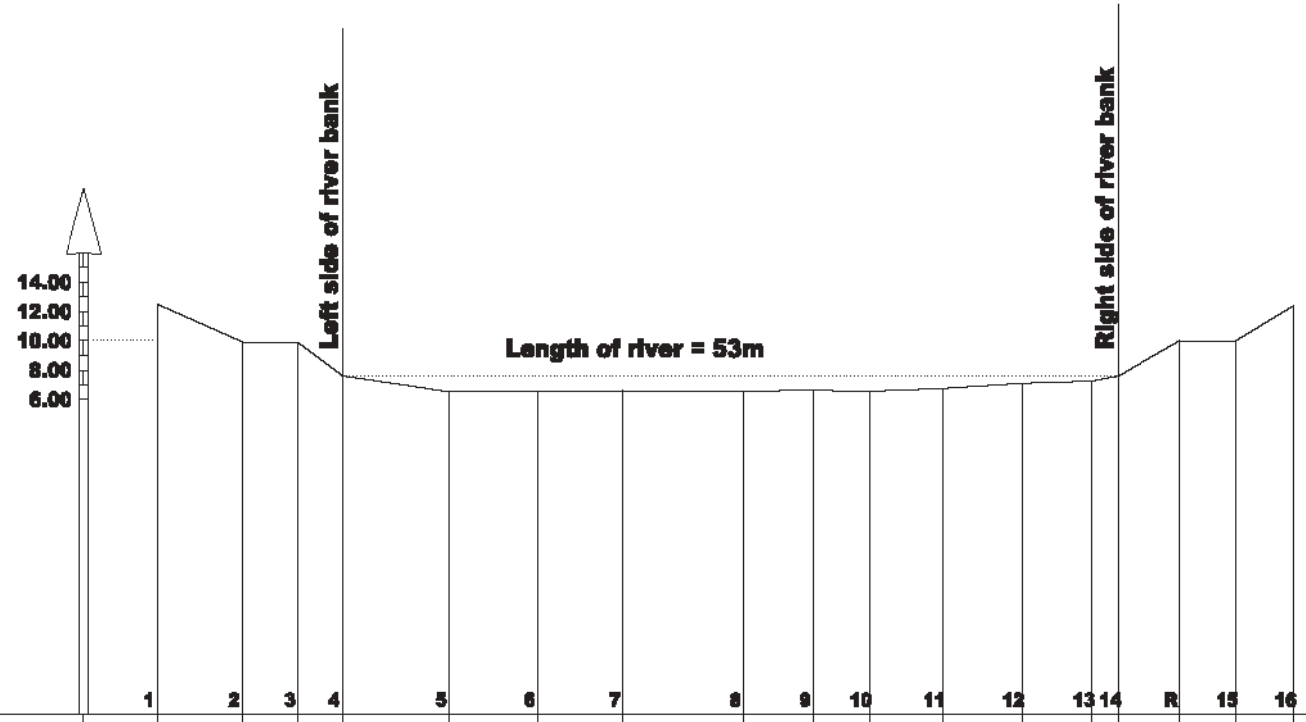
FLOW RATE AND WATER SAMPLING MEASURING POINTS

No	Cod	Description of location	Water quality	Flow rate
1	R	Stil bridge Saraj	Vardar	
2	R	Sport centar Saraj -Treska	Treska	
3	R	Lepenec	Lepenec	
4	R	Bridge Lepenec CS2(Cross section)	Lepenec	
5	R	Pedestrian crossing Bardovci CS3(Cross section)	Vardar	1 hour flow rate
6	S	Sewage pipe - Bardovci	Sewage pipe	24 hours flow rate
7	R	Bridge Unated Nations	Vardar	
8	R	CS4 (Cross section) - Center	Vardar	1 hour flow rate
9	I	Industry outlet Pivara	Industry pipe	24 hours flow rate
10	I	Industry outlet Makstil	Industry pipe	24 hours flow rate
11	R	Bridge N.Lisice	Vardar	
12	S	Sewage pipe - Aerodrom - N.Lisice	Sewage pipe	24 hours flow rate
13	R	Location between sewage pipe and Industry pipe	Vardar	
14	R	Outlet from unlegal settelment Lisice	Vardar	
15	R	Pipe under bridge (down stream?)	Vardar	
16	R	Open chanel	Vardar	
17	R	Bridge Jurulljari CS5 (Cross section)	Vardar	1 hour flow rate
18	S	Pump station Dracevo	Sewage pipe	24 hours flow rate

Attachment 2

Cross section CS1 - United Nations Bridge

Scale 1:500



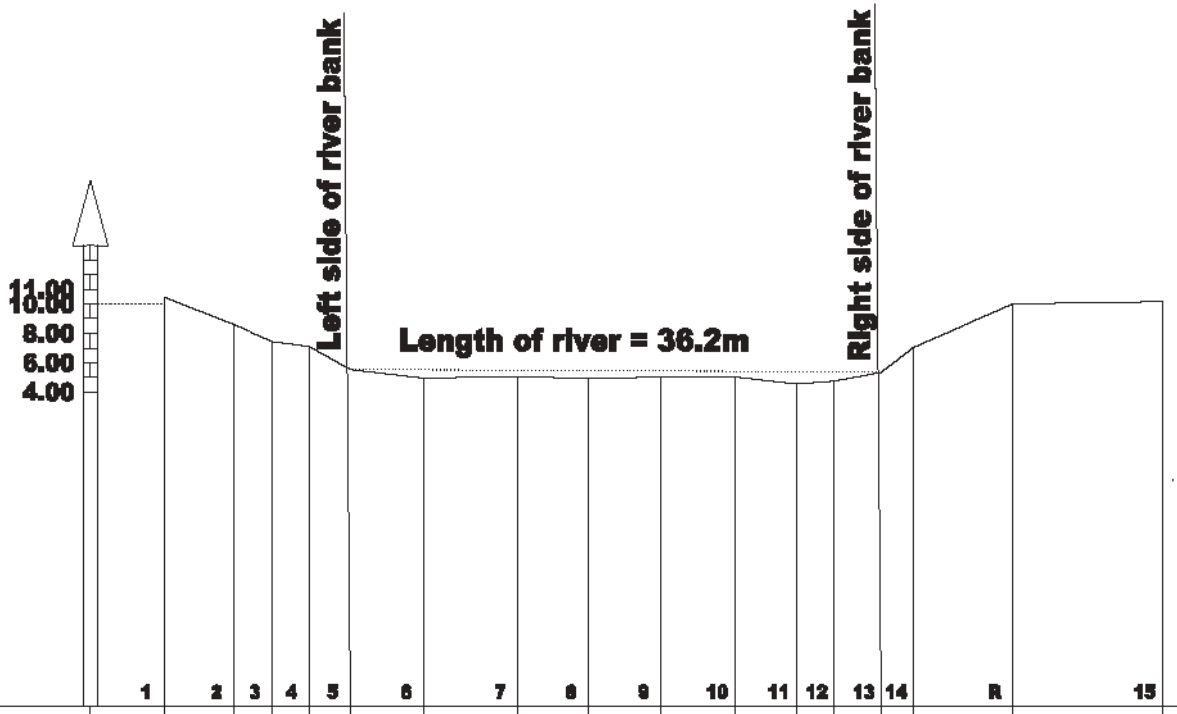
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	R	15	16
Cumulative distance	0+000.00	0+005.80	0+009.60	0+012.60	0+020.00	0+026.00	0+031.80	0+040.00	0+044.80	0+048.60	0+053.60	0+059.00	0+063.80	0+065.60	0+069.80	0+073.60	0+077.60
Terrain level	12.51	9.92	9.89	7.61	6.51	6.39	6.61	6.59	6.63	6.57	6.76	7.11	7.28	7.61	10.	9.98	12.41
Distance		5.8	3.8	3	7.4	6	5.8	8.2	4.8	3.8	5	5.4	4.8	1.8	4.2	3.8	4

Cross section Survay on 24.11.2007

Attachment 3

Cross section CS2 - Lepenec River

Scale 1:500



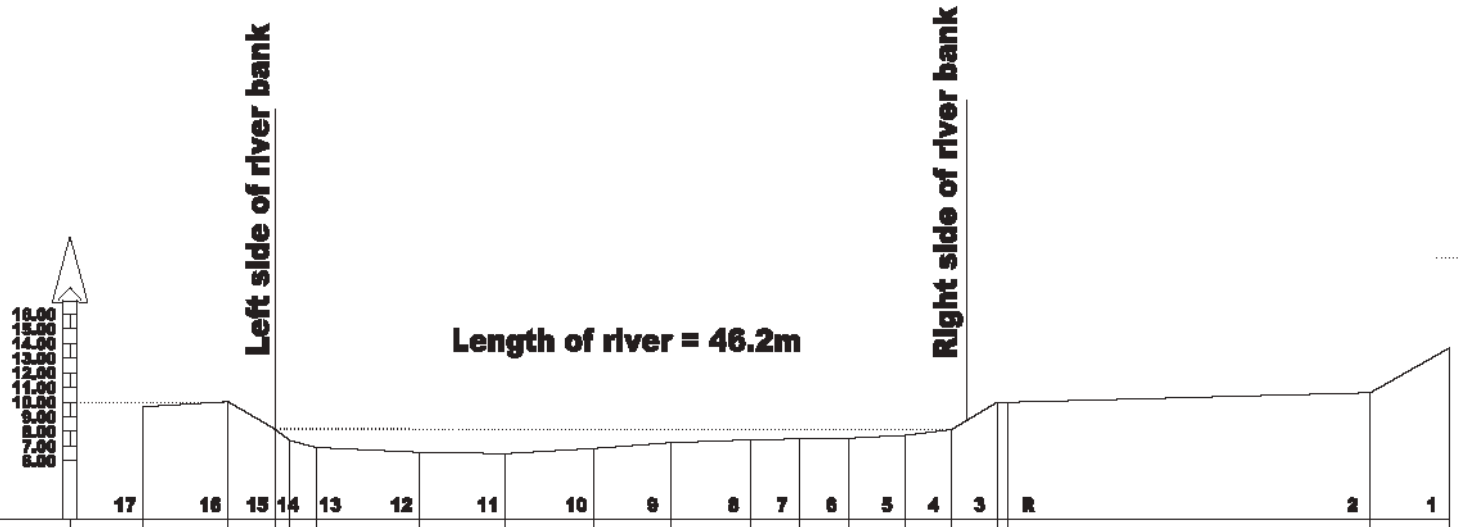
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	R	15	
Cumulative distance	0+000.00	0+004.80	0+007.50	0+010.00	0+012.80	0+017.80	0+024.20	0+029.00	0+034.00	0+039.00	0+043.20	0+045.80	0+049.00	0+051.20	0+058.00	0+068.20	
Terrain level	10.47	8.6	7.43	7.1	5.53	4.93	5.08	4.9	5.04	5.04	4.54	4.74	5.34	7.04	10.	10.17	
Distance		4.8	2.7	2.5	2.8	5	6.4	4.8	5	5	4.2	2.6	3.2	2.2	6.8	10.2	

Cross section Survay on 24.11.2007

Attachment 4

Cross section CS3 - Bardovci

Scale 1:500



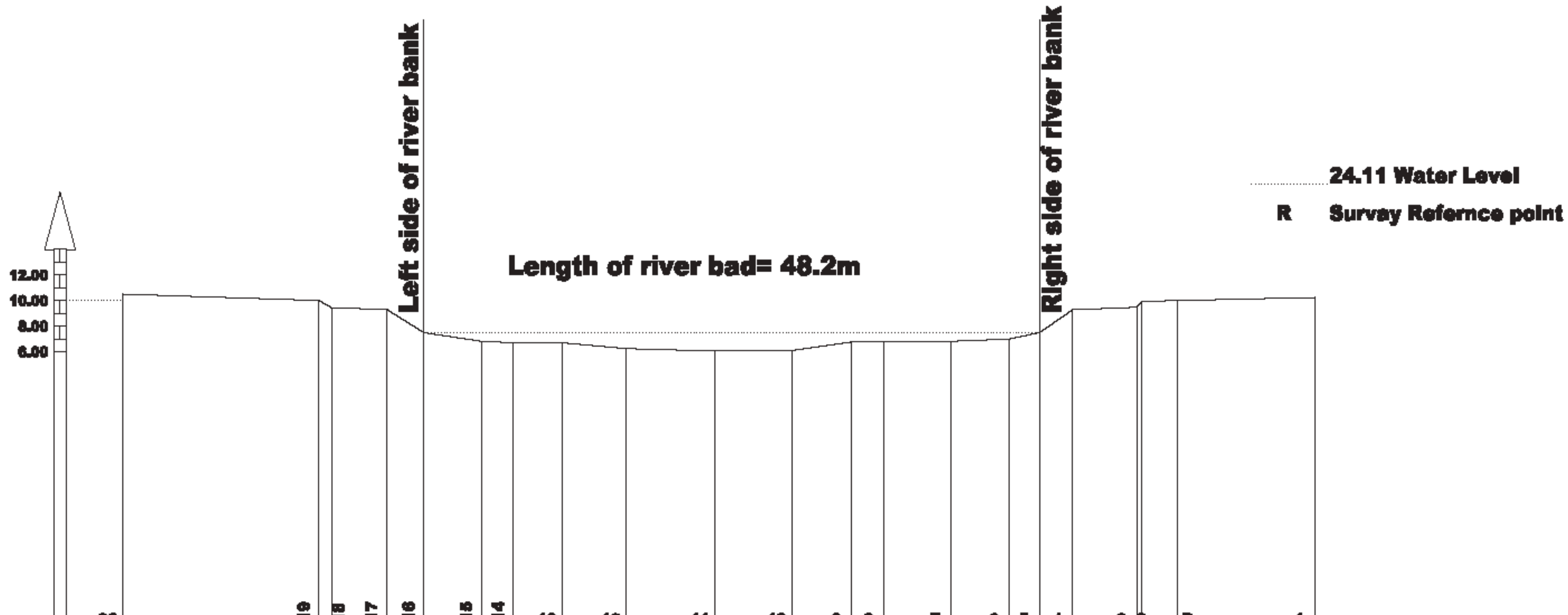
	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	R	2	1
Cumulative distance	0+000.00	0+005.80	0+009.00	0+010.00	0+011.80	0+018.80	0+024.80	0+030.80	0+036.00	0+041.50	0+044.80	0+048.20	0+052.00	0+055.20	0+058.30	0+059.00	0+083.80	0+089.20
Terrain level	9.7	10.05	8.17	7.4	6.93	6.6	6.5	6.85	7.25	7.45	7.51	7.55	7.75	8.15		10.	10.67	13.71
Distance		5.8	3.2	1	1.8	7	6	6	5.2	5.5	3.3	3.4	3.8	3.2	3.1	0.7	24.8	5.4

Cross section Survay on 24.11.2007

Attachment 5

Cross section CS4 - Center

Scale 1:500



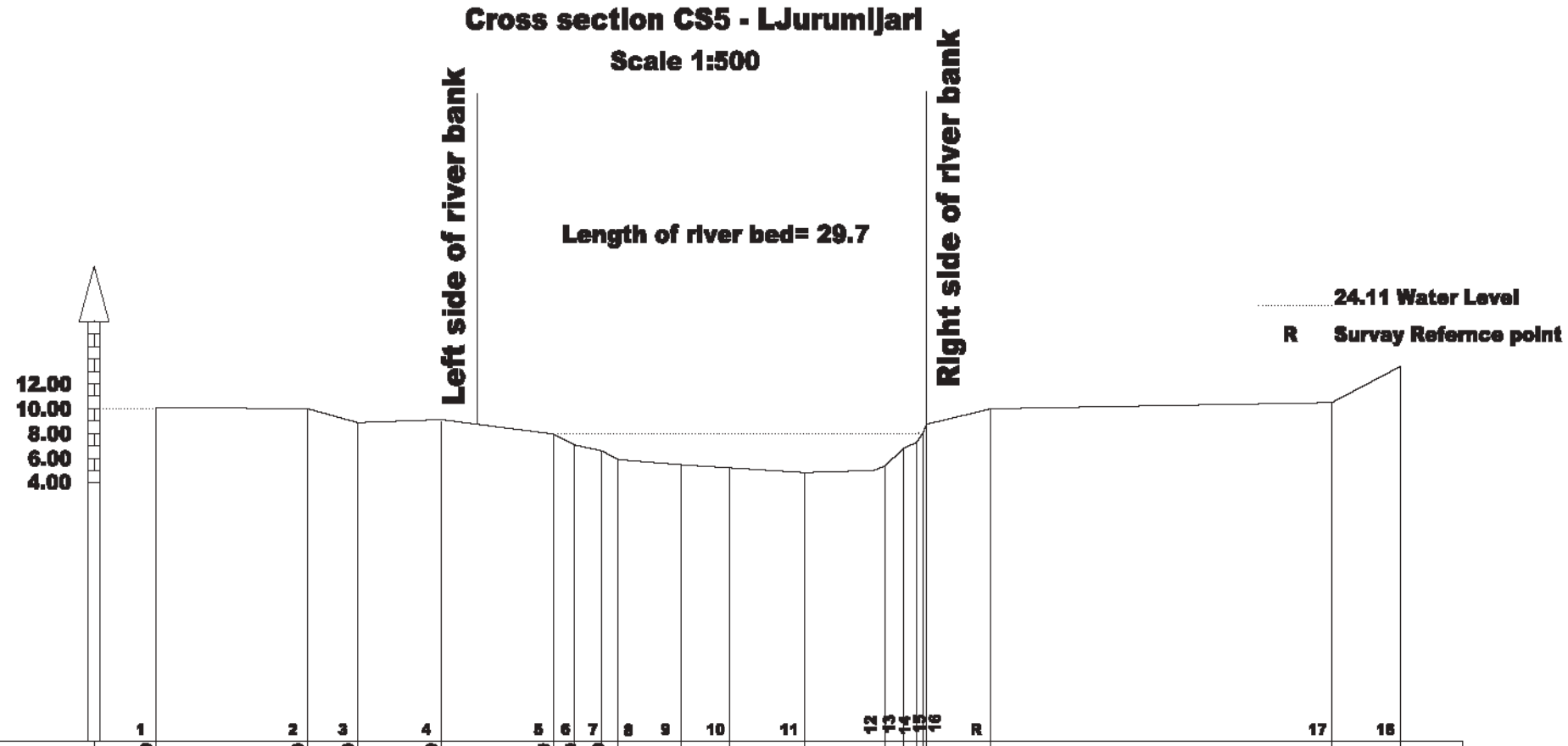
Point	Cumulative distance	Terrain level	Distance
20	0+000.00	10.51	15.3
19	0+015.30	10.01	1
18	0+016.30	9.45	4.3
17	0+020.60	9.32	2.9
16	0+023.50	7.51	4.5
15	0+028.00	6.83	2.5
14	0+030.50	6.71	3.8
13	0+034.30	6.71	5
12	0+039.30	6.25	7
11	0+046.30	6.05	6
10	0+052.30	6.1	4.7
9	0+057.00	6.79	2.5
8	0+059.50	6.79	5.2
7	0+064.70	6.83	4.6
6	0+069.30	6.98	2.4
5	0+071.70	7.51	2.6
4	0+074.30	9.29	5
3	0+079.30	9.48	0.4
2	0+079.70	9.85	2.8
R	0+082.50	10.	10.7
1	0+093.20	10.26	

Cross section Survay on 24.11.2007

Attachment 6

Cross section CS5 - LJurumljarl

Scale 1:500



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	R	17	18
Cumulative distance	0+000.00	0+012.20	0+016.20	0+023.00	0+032.00	0+033.70	0+035.90	0+037.20	0+042.20	0+046.20	0+052.20	0+058.70	0+060.20	0+061.20	0+061.70	0+062.00	0+067.20	0+094.70	0+100.20
Terrain level	10.11	9.89	8.89	8.92	7.96	7.09	6.61	6.41	5.4	5.2	4.8	5.41	6.85	7.26	8.01	8.76	10.	10.49	13.41
Distance		12.2	4	6.8	9	1.7	2.2	1.3	5	4	6	6.5	1.5	1	0.5	0.3	5.2	27.5	5.5

Cross section Survay on 24.11.2007

Attachment 7

Cross section CS1

Attached Autocad Drawing -CS1+CS2_geodetic_survay

Unaited Nation Bridge- River Vardar

No	Terrain Level in reference to point R	Length of segmets	Cumulutive distance	
	m	m	m	
1	12.51	5.8	0	
2	9.92	3.8	5.8	
3	9.89	3	9.6	
4	7.61	7.4	12.6	Left side of river bank
5	6.51	6	20	
6	6.59	5.8	26	
7	6.61	8.2	31.8	
8	6.59	4.8	40	Length of river = 53 m
9	6.63	3.8	44.8	
10	6.57	5	48.6	
11	6.76	5.4	53.6	
12	7.11	4.8	59	
13	7.26	1.8	63.8	
14	7.61	4.2	65.6	Right side of river bank
R	10	3.8	69.8	
15	9.98	4	73.6	
16	12.41		77.6	

Cross section CS2

Attached Autocad Drawing -CS1+CS2_geodetic_survay

River Lepenec

No	Terrain Level in reference to point R	Length of segmets	Cumulutive distance	
	m	m	m	
1	10.47	4.8	0	
2	8.6	2.7	4.8	
3	7.43	2.5	7.5	
4	7.1	2.8	10	
5	5.53	5	12.8	Left side of river bank
6	4.93	6.4	17.8	
7	5.08	4.8	24.2	
8	4.9	5	29	Length of river = 36.2 m
9	5.04	5	34	
10	5.04	4.2	39	
11	4.54	2.6	43.2	
12	4.74	3.2	45.8	
13	5.34	2.2	49	Right side of river bank
14	7.04	6.8	51.2	
R	10	10.2	58	
15	10.17		68.2	

Cross section CS3

Pedestrial bridge- River Vardar

Attachment 8

No	Terrain Level in reference to point R	Length of segmets	Cumulutive distance	
	m	m	m	
17	9.7	5.8	0	
16	10.05	3.2	5.8	
15	8.17	1	9	Left side of river bank
14	7.4	1.8	10	
13	6.93	7	11.8	
12	6.6	6	18.8	
11	6.5	6	24.8	
10	6.85	5.2	30.8	Length of river = 46.2 m
9	7.25	5.5	36	
8	7.45	3.3	41.5	
7	7.51	3.4	44.8	
6	7.55	3.8	48.2	
5	7.75	3.2	52	
4	8.15	3.1	55.2	Right side of river bank
3	10	0.7	58.3	
R	10	24.8	59	
2	10.67	5.4	83.8	
1	13.71		89.2	

Cross section CS4

Center - River Vardar

No	Terrain Level in reference to point R	Length of segmets	Cumulutive distance	
	m	m	m	
20	10.51	15.3	0	
19	10.01	1	15.3	
18	9.45	4.3	16.3	
17	9.32	2.9	20.6	
16	7.51	4.5	23.5	Left side of river bank
15	6.83	2.5	28	
14	6.71	3.8	30.5	
13	6.71	5	34.3	
12	6.25	7	39.3	
11	6.05	6	46.3	Length of river = 48.2 m
10	6.1	4.7	52.3	
9	6.79	2.5	57	
8	6.79	5.2	59.5	
7	6.83	4.6	64.7	
6	6.98	2.4	69.3	
5	7.51	2.6	71.7	Right side of river bank
4	9.29	5	74.3	
3	9.48	0.4	79.3	
2	9.95	2.8	79.7	
R	10	10.7	82.5	
1	10.26		93.2	

Cross section CS5

Ljurumljari-River Vardar

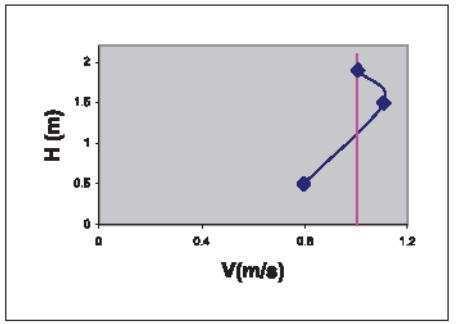
No	Terrain Level in reference to point R	Length of segmets	Cumulutive distance	
	m	m	m	
1	10.11	12.2	0	
2	9.99	4	12.2	
3	8.89	6.8	16.2	
4	9.12	9	23	
5	7.96	1.7	32	Left side of river bank
6	7.09	2.2	33.7	
7	6.61	1.3	35.9	
8	6.41	5	37.2	
9	5.4	4	42.2	Length of river = 29.7 m
10	5.2	6	46.2	
11	4.88	6.5	52.2	
12	5.41	1.5	58.7	
13	6.85	1	60.2	
14	7.26	0.5	61.2	
15	8.01	0.3	61.7	Right side of river bank
16	8.76	5.2	62	
R	10	27.5	67.2	
17	10.49	5.5	94.7	
18	13.41		100.2	

Attachment 8

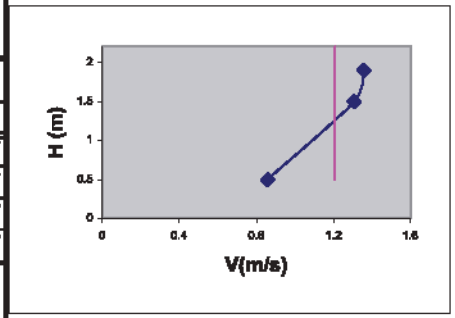
Results from flow probe measuring

Profile **CS3** **Bardovci** time 10:00 - 11:00 t-water 5
Phase 1 t-air 7

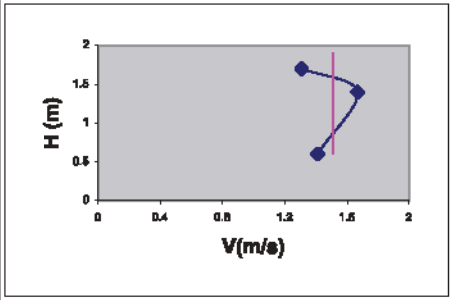
No 1	L m	n	H m	t-1I sec	N_{R1}	t1-II sec	N_{R2}	R1 rot/sec	R2 rot/sec	V1-I m/s	V1-II m/s	V1av(I+II) m/s	V1av
	8.7	1	0.5	30	95	60	172	3.1667	2.8667	0.8337	0.7551	0.794367	1.00178
		2	1.5	30	127	60	250	4.2333	4.1667	1.1131	1.0957	1.1044	1.00178
		3	1.9	30	114	60	230	3.8	3.8333	0.9996	1.0083	1.003967	1.00178
		0	2.1										1.00178



No 2	L m	n	H m	t-1I sec	R1	t1-II sec	R2	R1 rot/sec	R2 rot/sec	V2-I m/s	V2-II m/s	V2av(I+II) m/s	V2av
	8.2	1	0.5	30	98	60	195	3.2667	3.25	0.8599	0.8555	0.857683	1.20647
		2	1.5	30	150	60	296	5	4.9333	1.314	1.2965	1.305267	1.20647
		3	1.9	30	155	60	310	5.1667	5.1667	1.3577	1.3577	1.357667	1.20647
		0	2.2										1.20647

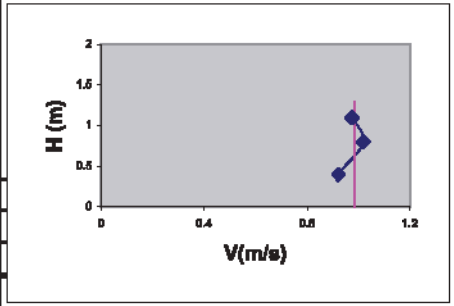


No 3	L m	n	H m	t-1I sec	R1	t1-II sec	R2	R1 rot/sec	R2 rot/sec	V3-I m/s	V3-II m/s	V3av(I+II) m/s	V3av
	6	1	0.6	30	157	60	330	5.2333	5.5	1.3751	1.445	1.410067	1.51378
		2	1.4	30	190	60	382	6.3333	6.3667	1.6633	1.6721	1.6677	1.51378
		3	1.7	30	150	60	298	5	4.9667	1.314	1.3053	1.309633	1.51378
		0	1.9										1.51378



No 4	L m	n	H m	t-1I sec	R1	t1-II sec	R2	R1 rot/sec	R2 rot/sec	V4-I m/s	V4-II m/s	V4av(I+II) m/s	V4av
	14	1	0.4	30	105	60	210	3.5	3.5	0.921	0.921	0.921	0.98213
		2	0.8	30	118	60	228	3.9333	3.8	1.0345	0.9996	1.017067	0.98213
		3	1.1	30	110	60	224	3.6667	3.7333	0.9647	0.9821	0.9734	0.98213
		0	1.3										0.98213

11.5
Ltotal= 48.4 m



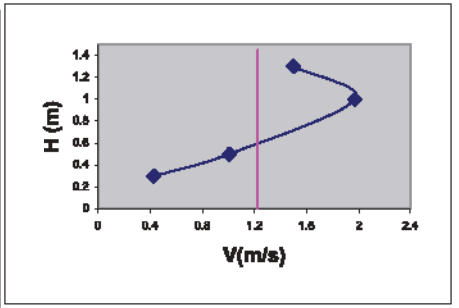
Part I: A10-90

Attachment 9

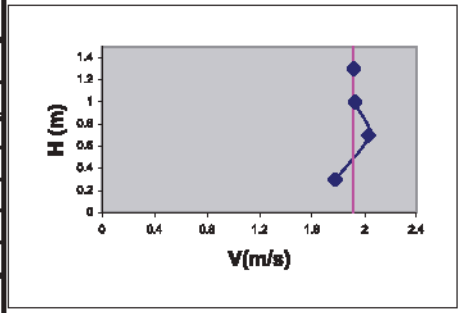
Results from flow probe measuring

Profile **CS4** mtv — time 12-13 — t-water 7
Phase 1 — t-air 7.5

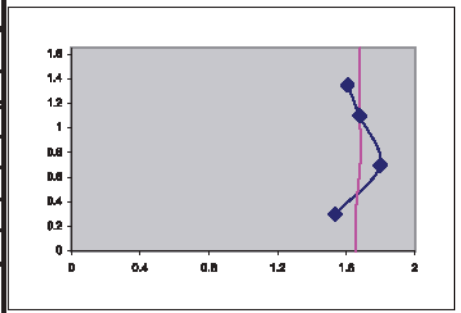
No 1	L m	n	H m	t-1I sec	R1	t1-II sec	R2	R1 rot/sec	R2 rot/sec	V1-I m/s	V1-II m/s	V1av(I+II) m/s	V1av
	7.4	1	0.3	60	38	30	78	0.6333	2.6	0.1699	0.6852	0.427567	1.22558
		2	0.5	30	60	30	170	2	5.6667	0.528	1.4887	1.008333	1.22558
		3	1	15	115	30	220	7.6667	7.3333	2.0127	1.9253	1.969	1.22558
		4	1.3	15	85	30	172	5.6667	5.7333	1.4887	1.5061	1.4974	1.22558
		0	1.45										1.22558



No 2	L m	n	H m	t-1I sec	R1	t1-II sec	R2	R1 rot/sec	R2 rot/sec	V2-I m/s	V2-II m/s	V2av(I+II) m/s	V2av
	8.8	1	0.3	15	108	30	190	7.2	6.3333	1.8904	1.6633	1.776867	1.91223
		2	0.7	15	117	30	230	7.8	7.6667	2.0476	2.0127	2.030133	1.91223
		3	1	15	110	30	220	7.3333	7.3333	1.9253	1.9253	1.925333	1.91223
		4	1.3	15	119	30	200	7.9333	6.6667	2.0825	1.7507	1.9166	1.91223
		0	1.5										1.91223

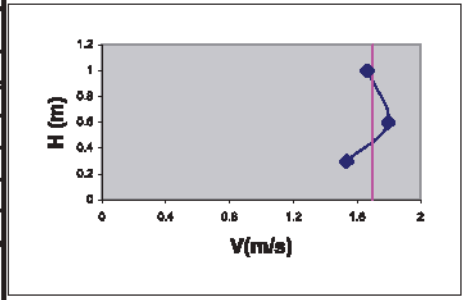


No 3	L m	n	H m	t-1I sec	R1	t1-II sec	R2	R1 rot/sec	R2 rot/sec	V3-I m/s	V3-II m/s	V3av(I+II) m/s	V3av
	10	1	0.3	15	90	30	170	6	5.6667	1.576	1.4887	1.532333	1.65242
		2	0.7	15	100	30	210	6.6667	7	1.7507	1.838	1.794333	1.67753
		3	1.1	15	94	30	195	6.2667	6.5	1.6459	1.707	1.676433	1.67753
		4	1.35	15	90	30	187	6	6.2333	1.576	1.6371	1.606567	1.67753
		0	1.65										1.67753



No 4	L m	n	H m	t-1I sec	R1	t1-II sec	R2	R1 rot/sec	R2 rot/sec	V4-I m/s	V4-II m/s	V4av(I+II) m/s	V4av
	6.2	1	0.3	15	85	30	180	5.6667	6	1.4887	1.576	1.532333	1.69608
		2	0.6	15	105	30	200	7	6.6667	1.838	1.7507	1.794333	1.69608
		3	1	15	95	30	190	6.3333	6.3333	1.6633	1.6633	1.663333	1.69608
		0	1.2										1.69608

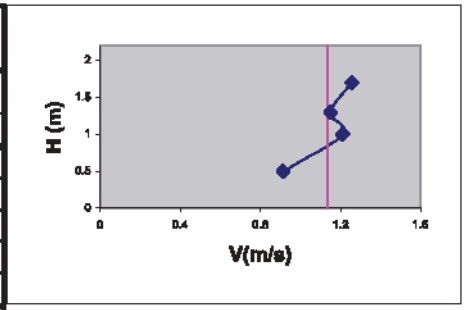
16.2
Ltotal= 48.6 m



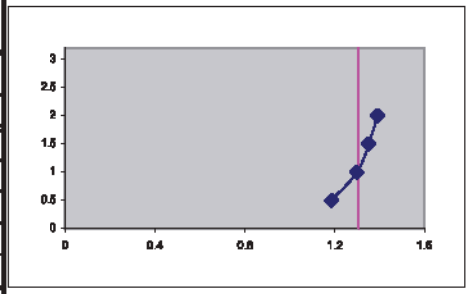
Results from flow probe measuring

Profile **CS5** **Ljurumljari** time 14-15 t-water 7.5
Phase 1 t-air 8

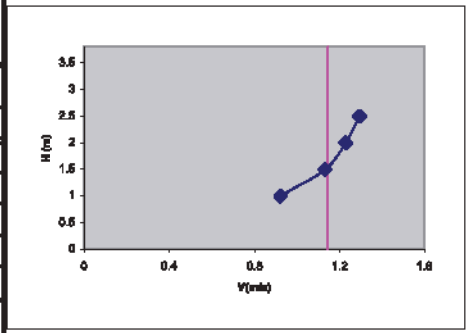
No 1	L m	n	H m	t-1I sec	R1	t1-II sec	R2	R1 rot/sec	R2 rot/sec	V1-I m/s	V1-II m/s	V1av(I+II) m/s	V1av
	10	1	0.5	15	51	30	106	3.4	3.5333	0.8948	0.9297	0.912267	1.1306
		2	1	15	70	30	136	4.6667	4.5333	1.2267	1.1917	1.2092	1.1306
		3	1.3	15	68	30	126	4.5333	4.2	1.1917	1.1044	1.148067	1.1306
		4	1.7	15	72	30	142	4.8	4.7333	1.2616	1.2441	1.252867	1.1306
		0	2.2										1.1306



No 2	L m	n	H m	t-1I sec	R1	t1-II sec	R2	R1 rot/sec	R2 rot/sec	V2-I m/s	V2-II m/s	V2av(I+II) m/s	V2av
	7	1	0.5	30	130	15	70	4.3333	4.6667	1.1393	1.2267	1.183	1.30418
		2	1	30	152	15	72	5.0667	4.8	1.3315	1.2616	1.296533	1.30418
		3	1.5	30	158	15	75	5.2667	5	1.3839	1.314	1.348933	1.30418
		4	2	30	157	15	80	5.2333	5.3333	1.3751	1.4013	1.388233	1.30418
		0	3.2										1.30418



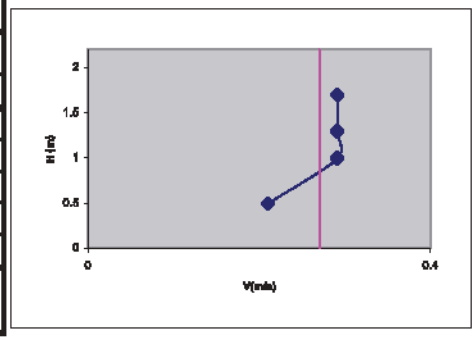
No 3	L m	n	H m	t-1I sec	R1	t1-II sec	R2	R1 rot/sec	R2 rot/sec	V3-I m/s	V3-II m/s	V3av(I+II) m/s	V3av
	12.1	1	1	15	55	30	100	3.6667	3.3333	0.9647	0.8773	0.921	1.14261
		2	1.5	15	65	30	128	4.3333	4.2667	1.1393	1.1219	1.1306	1.14261
		3	2	15	70	30	140	4.6667	4.6667	1.2267	1.2267	1.226667	1.14261
		4	2.5	15	75	30	145	5	4.8333	1.314	1.2703	1.292167	1.14261
		0	3.8										1.14261



No 4	L m	n	H m	t-1I sec	R1	t1-II sec	R2	R1 rot/sec	R2 rot/sec	V4-I m/s	V4-II m/s	V4av(I+II) m/s	V4av
	5	1	0.5	15	12	30	22	0.8	0.7333	0.2183	0.2013	0.20981	0.27016
		2	1	15	15	30	35	1	1.1667	0.2691	0.3115	0.290275	0.27016
		3	1.3	15	15	30	35	1	1.1667	0.2691	0.3115	0.290275	0.27016
		4	1.7	15	15	30	35	1	1.1667	0.2691	0.3115	0.290275	0.27016
		0	2.2										0.27016

2

Ltotal= 36.1 m

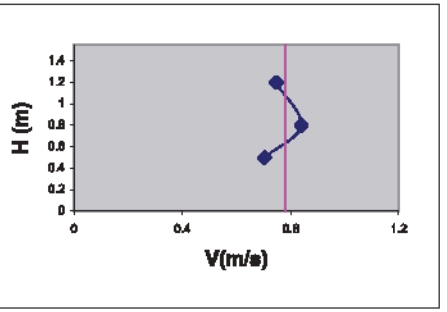


Part I: A10-92

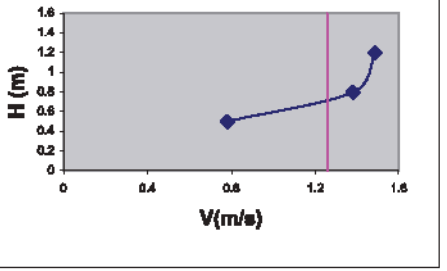
Attachment 11

Profile	Bardovci	CS3	time	10:00 - 11:00	t-water	5.2
Phase 2					t-air	7

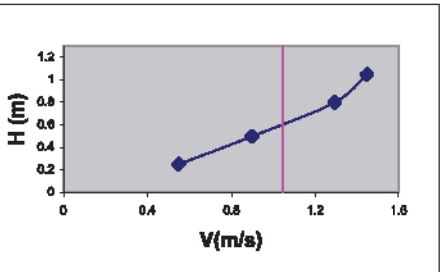
No 1	L m	n	H m	t-II sec	N_{R1}	t1-II sec	N_{R2}	R1 rot/sec	R2 rot/sec	V1-I m/s	V1-II m/s	V1av(I+II) m/s	V1av
	6.9	1	0.5	15	40	30	80	2.66667	2.66667	0.7027	0.703	0.70267	0.781
		2	0.8	15	48	30	95	3.2	3.16667	0.8424	0.834	0.83803	0.781
		3	1.2	15	42	30	86	2.8	2.86667	0.7376	0.755	0.74633	0.781
		0	1.55										0.781



No 2	L m	n	H m	t-II sec	N_{R1}	t1-II sec	N_{R2}	R1 rot/sec	R2 rot/sec	V1-I m/s	V1-II m/s	V1av(I+II) m/s	V1av
	12.3	1	0.5	15	46	30	86	3.06667	2.86667	0.8075	0.755	0.78127	1.256
		2	0.8	15	77	30	161	5.13333	5.36667	1.3489	1.41	1.3795	1.256
		3	1.2	15	82	30	175	5.46667	5.83333	1.4363	1.532	1.4843	1.256
		0	1.6										1.256



No 3	L m	n	H m	t-II sec	N_{R1}	t1-II sec	N_{R2}	R1 rot/sec	R2 rot/sec	V1-I m/s	V1-II m/s	V1av(I+II) m/s	V1av
	8.1	1	0.25	15	30	30	65	2	2.16667	0.528	0.572	0.54983	1.047
		2	0.5	15	50	30	105	3.33333	3.5	0.8773	0.921	0.89917	1.047
		3	0.8	15	73	30	149	4.86667	4.96667	1.2791	1.305	1.29217	1.047
		4	1.05	15	83	30	164	5.53333	5.46667	1.4537	1.436	1.445	1.047
		0	1.3										1.047

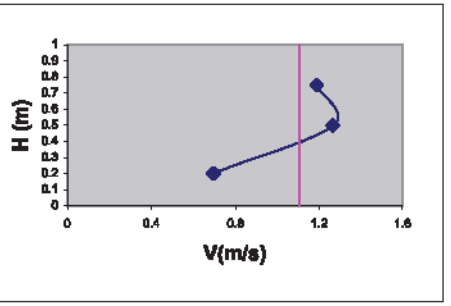


19.4

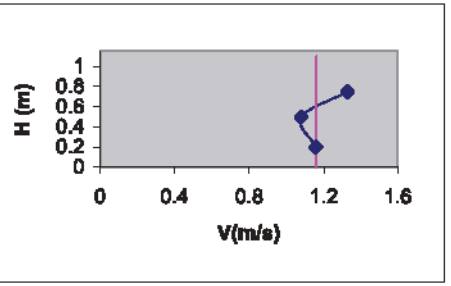
Ltotal= 46.7 m

Profile mtv CS4 time 12-13 t-water 7
Phase 2 t-air 5.5

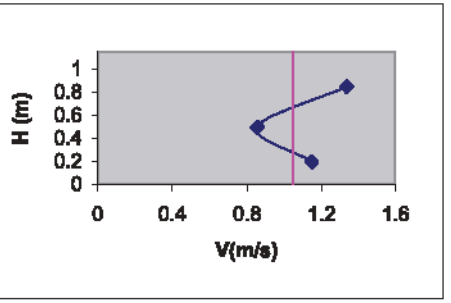
No 1	L m	n	H m	t-1I sec	R1	t1-II sec	R2	R1 rot/sec	R2 rot/sec	V1-I m/s	V1-II m/s	V1av(I+II)	V1av
	8	1	0.2	15	40	30	78	2.66667	2.6	0.7027	0.685	0.69393	1.103
		2	0.5	15	72	30	145	4.8	4.83333	1.2616	1.27	1.26597	1.103
		3	0.75	15	68	30	135	4.53333	4.5	1.1917	1.183	1.18737	1.103
		0	1										1.103



No 2	L m	n	H m	t-1I sec	R1	t1-II sec	R2	R1 rot/sec	R2 rot/sec	V1-I m/s	V1-II m/s	V1av(I+II)	V1av
	7	1	0.2	15	66	30	132	4.4	4.4	1.1568	1.157	1.1568	1.16
		2	0.5	15	62	30	122	4.13333	4.06667	1.0869	1.069	1.0782	1.16
		3	0.75	15	74	30	155	4.93333	5.16667	1.2965	1.358	1.3271	1.16
		0	1.1										1.16

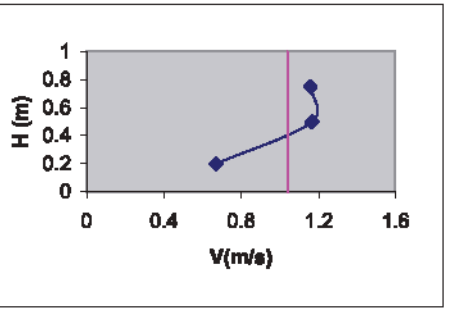


No 3	L m	n	H m	t-1I sec	R1	t1-II sec	R2	R1 rot/sec	R2 rot/sec	V1-I m/s	V1-II m/s	V1av(I+II)	V1av
	10.5	1	0.2	15	65	30	132	4.33333	4.4	1.1393	1.157	1.14807	1.049
		2	0.5	15	48	30	99	3.2	3.3	0.8424	0.869	0.8555	1.049
		3	0.85	15	75	30	155	5	5.16667	1.314	1.358	1.33583	1.049
		0	1.15										1.049



No 4	L m	n	H m	t-1I sec	R1	t1-II sec	R2	R1 rot/sec	R2 rot/sec	V1-I m/s	V1-II m/s	V1av(I+II)	V1av
	11	1	0.2	15	40	30	72	2.66667	2.4	0.7027	0.633	0.66773	1.039
		2	0.5	15	70	30	126	4.66667	4.2	1.2267	1.104	1.16553	1.039
		3	0.75	15	66	30	132	4.4	4.4	1.1568	1.157	1.1568	1.039
		0	1										1.039

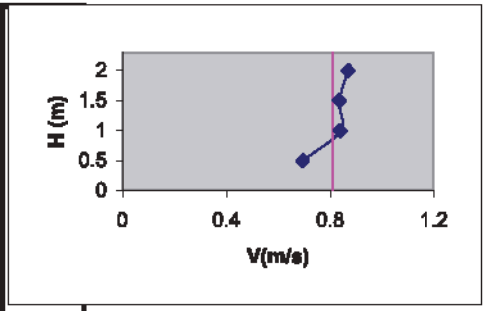
12.2
Ltotal= 48.7 m



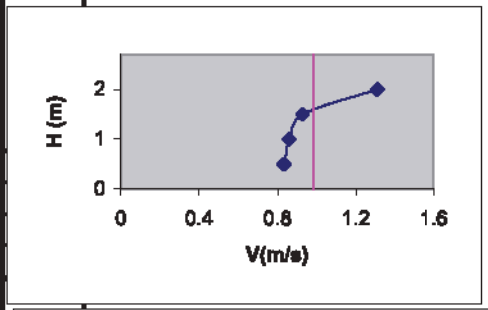
Profile **Ljurumljari CS5** 6.5

Phase 2 t-air 7.2

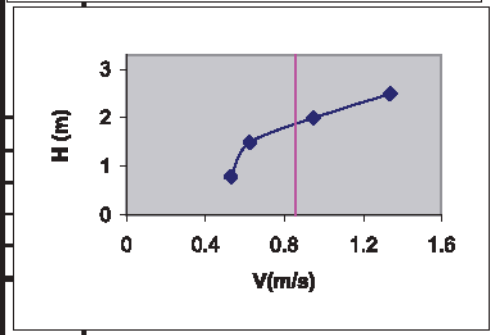
No 1	L m	n	H m	t-1I sec	R1	t1-II sec	R2	R1 rot/sec	R2 rot/sec	V1-I m/s	V1-II m/s	V1av(I+II)	V1av
1	8	1	0.5	15	40	30	78	2.66667	2.6	0.7027	0.685	0.69393	0.809
		2	1	15	48	30	95	3.2	3.16667	0.8424	0.834	0.83803	0.809
		3	1.5	15	47	30	96	3.13333	3.2	0.8249	0.842	0.83367	0.809
		4	2	15	50	30	98	3.33333	3.26667	0.8773	0.86	0.8686	0.809
		0	2.3										0.809



No 2	L m	n	H m	t-1I sec	R1	t1-II sec	R2	R1 rot/sec	R2 rot/sec	V4-I m/s	V4-II m/s	V4av(I+II)	V4av
	5	1	0.5	15	46	30	98	3.06667	3.26667	0.8075	0.86	0.83367	0.983
		2	1	15	48	30	100	3.2	3.33333	0.8424	0.877	0.85987	0.983
		3	1.5	15	52	30	108	3.46667	3.6	0.9123	0.947	0.92973	0.983
		4	2	15	76	30	147	5.06667	4.9	1.3315	1.288	1.30963	0.983
		0	2.7										0.983



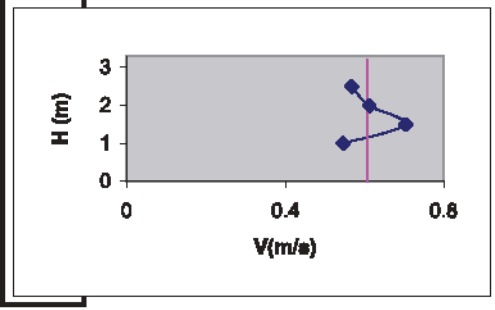
No 3	L m	n	H m	t-1I sec	R1	t1-II sec	R2	R1 rot/sec	R2 rot/sec	V4-I m/s	V4-II m/s	V4av(I+II)	V4av
	6.5	1	0.8	15	30	30	60	2	2	0.528	0.528	0.528	0.859
		2	1.5	15	35	30	72	2.33333	2.4	0.6153	0.633	0.62407	0.859
		3	2	15	55	30	106	3.66667	3.53333	0.9647	0.93	0.9472	0.859
		4	2.5	15	75	30	155	5	5.16667	1.314	1.358	1.33583	0.859
		0	3.3										0.859



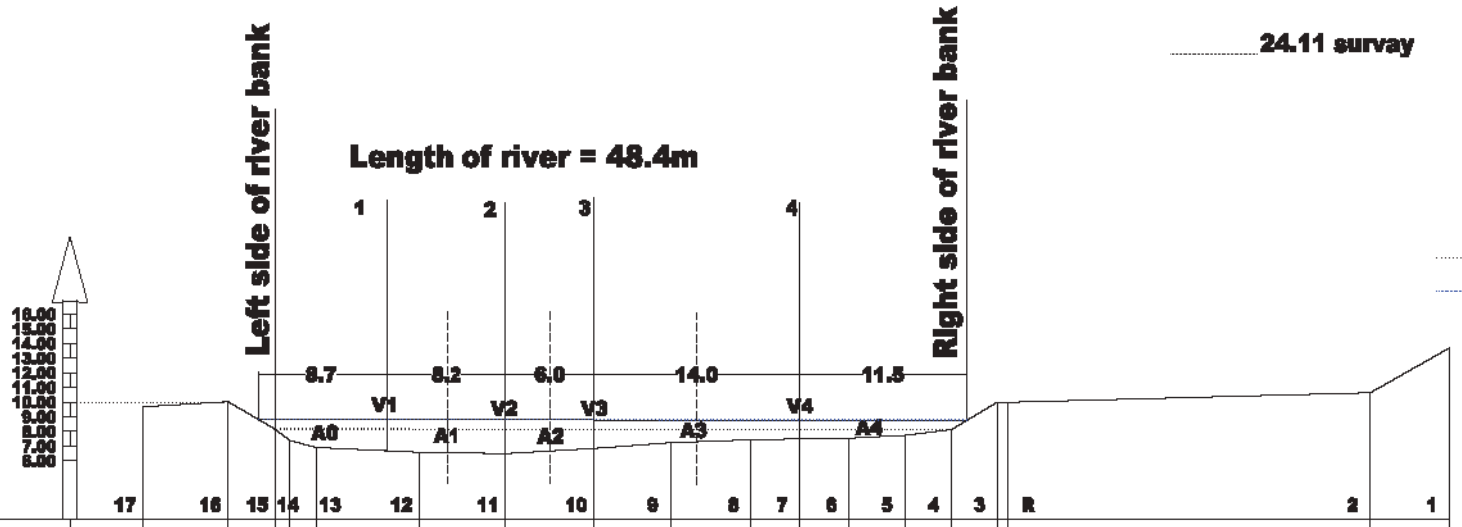
No 4	L m	n	H m	t-1I sec	R1	t1-II sec	R2	R1 rot/sec	R2 rot/sec	V1-I m/s	V1-II m/s	V1av(I+II)	V1av
1	9	1	1	15	31	30	62	2.06667	2.06667	0.5455	0.545	0.54547	0.607
		2	1.5	15	40	30	80	2.66667	2.66667	0.7027	0.703	0.70267	0.607
		3	2	15	35	30	69	2.33333	2.3	0.6153	0.607	0.61097	0.607
		4	2.5	15	29	30	71	1.93333	2.36667	0.5105	0.624	0.5673	0.607
		0	3.2										0.607

4

Ltotal= 32.5 m



Flow rate measuring 27.11
Cross section CS3 - Bardovci
Scale 1:500



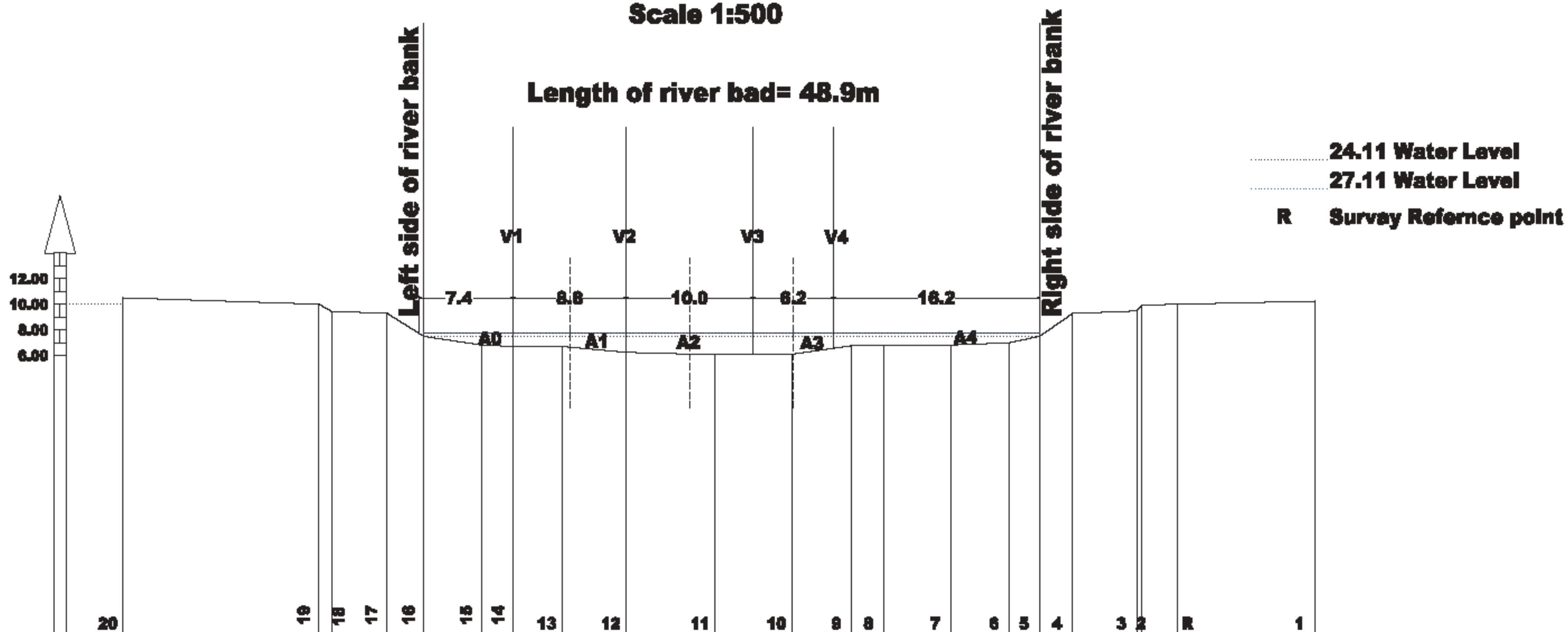
	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	R	2	1
Cumulative distance	0+000.00	0+005.30	0+009.00	0+010.00	0+011.50	0+018.50	0+024.50	0+030.50	0+036.00	0+041.50	0+044.50	0+048.20	0+052.00	0+055.20	0+058.30	0+059.00	0+083.80	0+089.20
Terrain level	9.7	10.05	8.17	7.4	6.93	6.6	6.5	6.85	7.25	7.45	7.51	7.55	7.75	8.15		10.	10.67	13.71
Distance		5.3	3.2	1	1.5	7	6	6	5.2	5.5	3.3	3.4	3.8	3.2	3.1	0.7	24.8	5.4

Cross section Survay on 24.11.2007

Attachment 15

Cross section CS4 - Center
Flow rate measuring 27.11
Scale 1:500

Length of river bad= 48.9m



Point	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	R	1
Cumulative distance	0+000.00	0+015.30	0+016.30	0+020.60	0+023.50	0+028.00	0+030.50	0+034.30	0+039.30	0+046.30	0+052.30	0+057.00	0+059.50	0+064.70	0+069.30	0+071.70	0+074.30	0+079.30	0+079.70	0+082.50	0+093.20
Terrain level	10.51	10.01	9.45	9.32	7.51	6.83	6.71	6.71	6.25	6.05	6.1	6.79	6.79	6.83	6.98	7.51	9.29	9.48	9.85	10.	10.26

Distance (between successive points): 15.3 | 1 | 4.3 | 2.9 | 4.5 | 2.5 | 3.8 | 5 | 7 | 6 | 4.7 | 2.5 | 5.2 | 4.6 | 2.4 | 2.6 | 5 | 0.4 | 2.8 | 10.7

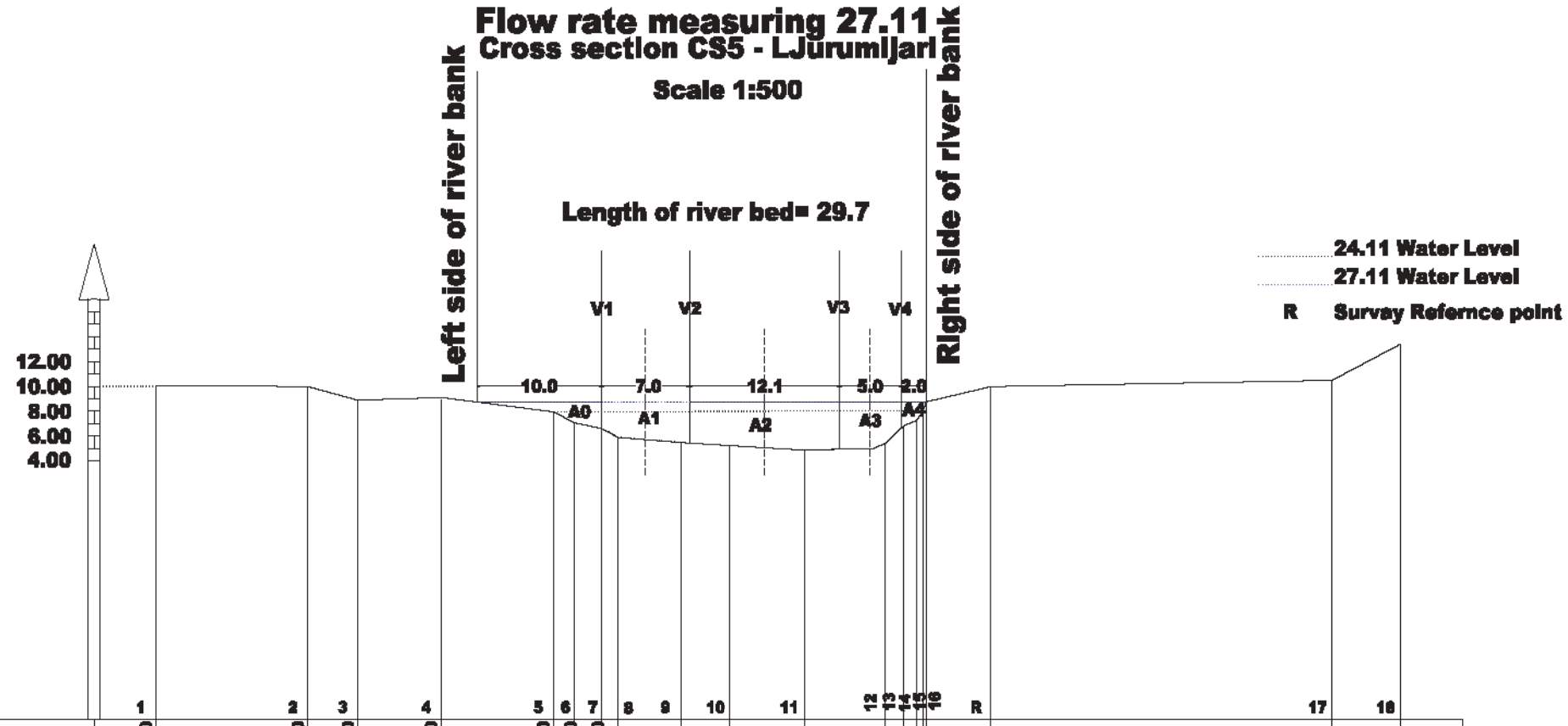
Cross section Survay on 24.11.2007

Attachment 16

Flow rate measuring 27.11

Cross section CS5 - LJurumljarl

Scale 1:500



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	R	17	18
Cumulative distance	0+000.00	0+012.20	0+016.20	0+023.00	0+032.00	0+033.70	0+035.90	0+037.20	0+042.20	0+046.20	0+052.20	0+058.70	0+060.20	0+061.20	0+061.70	0+062.00	0+067.20	0+094.70	0+160.20
Terrain level	10.11	9.99	8.89	5.92	7.96	7.09	5.61	6.41	5.4	5.2	4.8	5.41	6.85	7.36	8.01	8.76	10.	10.49	13.41
Distance		12.2	4	6.8	9	1.7	2.2	1.3	5	4	6	6.5	1.5	1	0.5	0.3	5.2	27.5	5.5

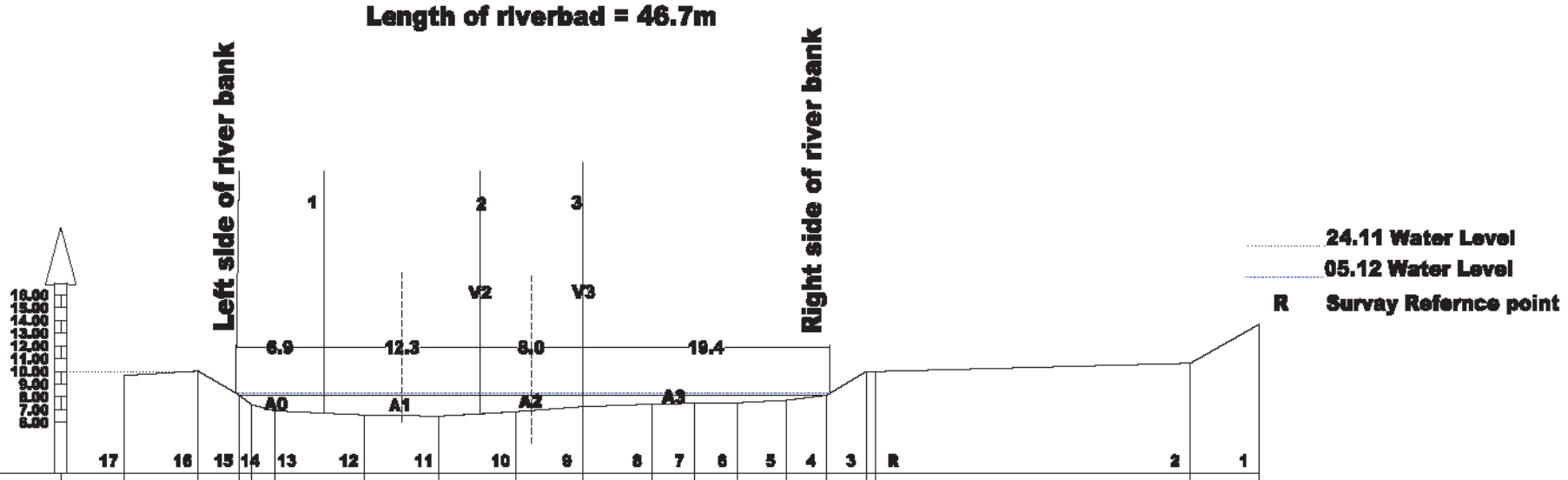
Cross section Survay on 24.11.2007

Attachment 17

Flow rate measuring 05.12

Cross section CS3 - Bardovcl

Scale 1:500



	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	R	2	1
Cumulative distance	0+000.00	0+005.80	0+009.00	0+010.00	0+011.80	0+018.80	0+024.80	0+030.80	0+036.00	0+041.50	0+044.80	0+048.20	0+052.00	0+055.20	0+058.30	0+059.00	0+083.80	0+089.20
Terrain level	9.7	10.05	8.17	7.4	6.93	6.6	6.5	6.85	7.25	7.45	7.51	7.55	7.75	8.15		10.	10.67	13.71
Distance		5.8	3.2	1	1.8	7	6	6	5.2	5.5	3.3	3.4	3.8	3.2	3.1	0.7	24.8	5.4

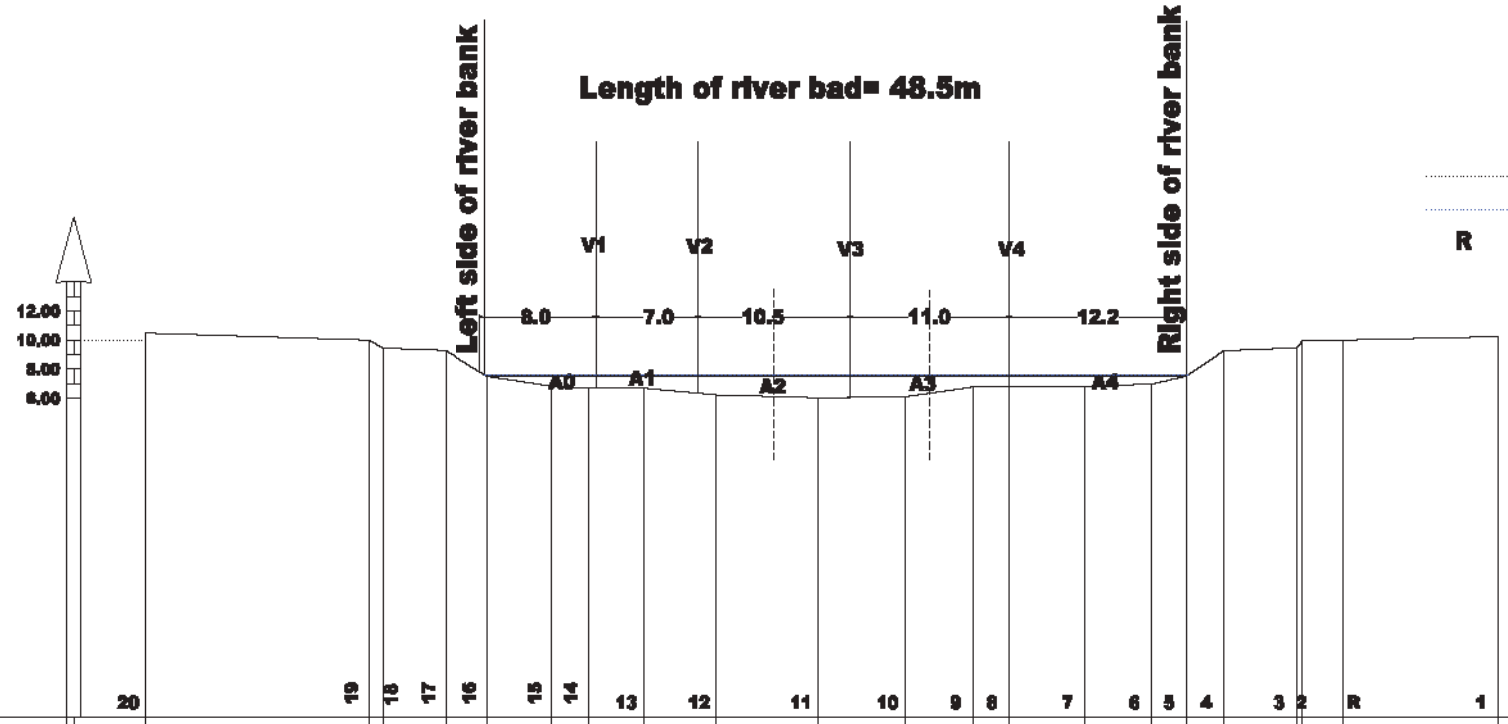
Cross section Survay on 24.11.2007

Attachment 18

Flow rate measuring 05.12

Cross section CS4 - Center

Scale 1:500



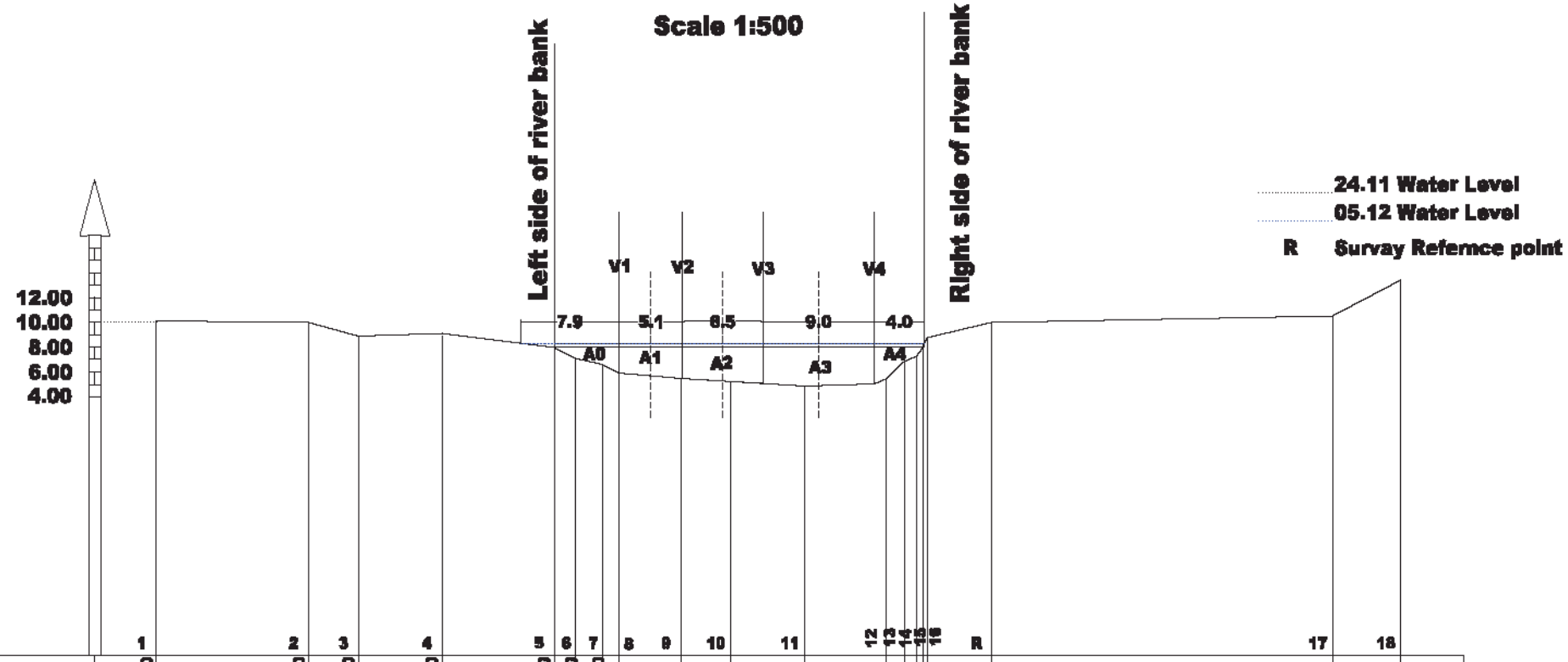
Cumulative distance	0+000.00			0+015.30	0+016.30	0+020.60	0+023.50	0+028.00	0+030.50	0+034.30	0+039.30	0+046.30	0+052.30	0+057.00	0+059.50	0+064.70	0+069.30	0+071.70	0+074.30	0+079.30	0+079.70	0+082.50	0+093.20					
Terrain level	10.51			10.01	9.45	9.32	7.51	6.83	6.71	6.71	6.25	6.05	6.1	6.79	6.79	6.83	6.95	7.51	9.29	9.48	9.95	10.	10.26					
Distance		15.3			1	4.3	2.9	4.5	2.5	3.8	5	7	6	4.7	2.5	5.2	4.6	2.4	2.6	5	0.4	2.8	10.7					

Cross section Survay on 24.11.2007

Part I: A10-100

Attachment 19

Flow rate measuring 05.12
Cross section CS5 - LJurumljarl



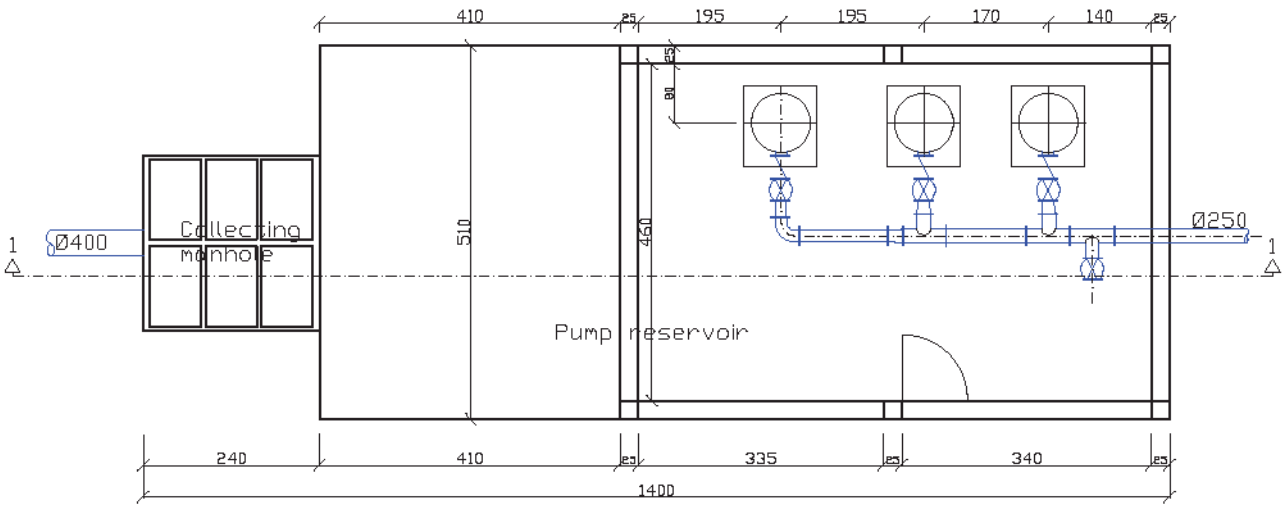
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	R	17	18
Cumulative distance	0+000.00	0+012.20	0+016.20	0+023.00	0+032.00	0+033.70	0+035.90	0+037.20	0+042.20	0+046.20	0+052.20	0+058.70	0+060.20	0+061.20	0+061.70	0+062.00	0+067.20	0+094.70	0+100.20
Terrain level	10.11	9.99	8.59	8.92	7.96	7.09	6.51	6.41	5.4	5.2	4.8	5.41	6.83	7.26	6.01	8.76	10.	10.49	13.41
Distance		12.2	4	6.8	9	1.7	2.2	1.3	5	4	6	6.5	1.5	1	0.5	0.3	5.2	27.5	5.5

Cross section Survay on 24.11.2007

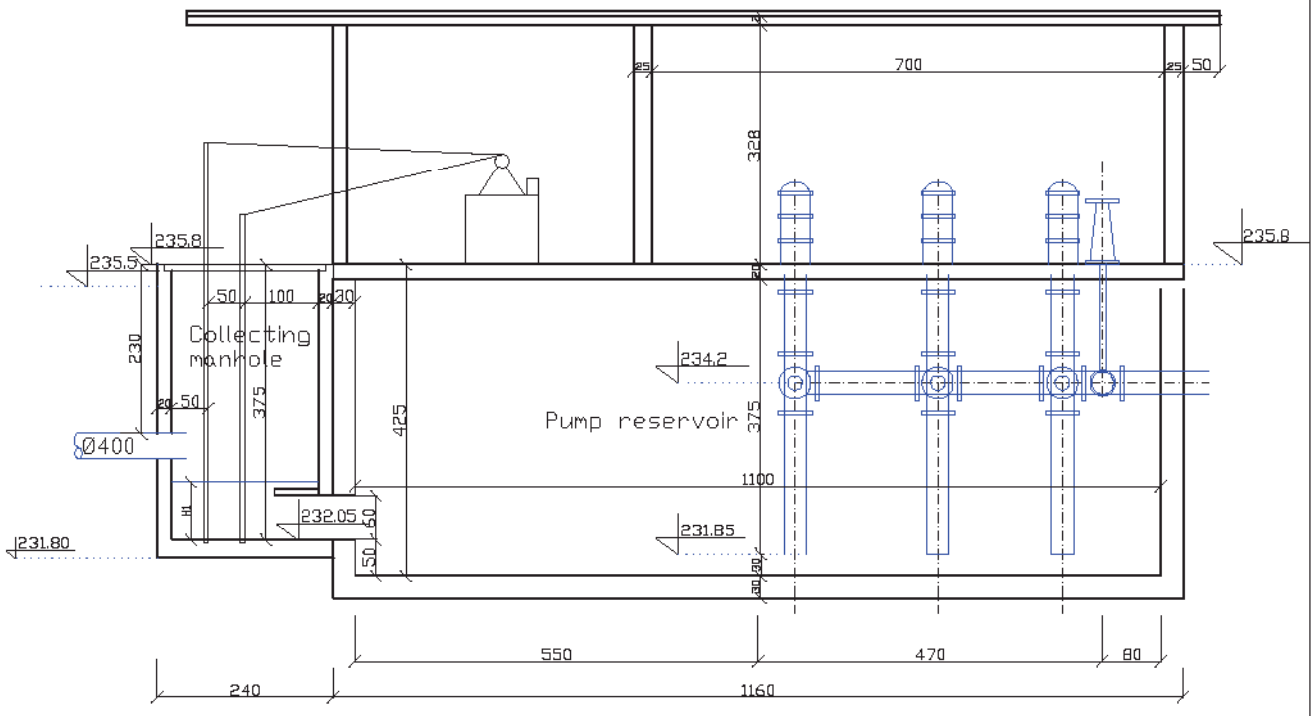
Attachment 20

Pump reservoir at
Pump Station
DRacevo
Scale 1:100

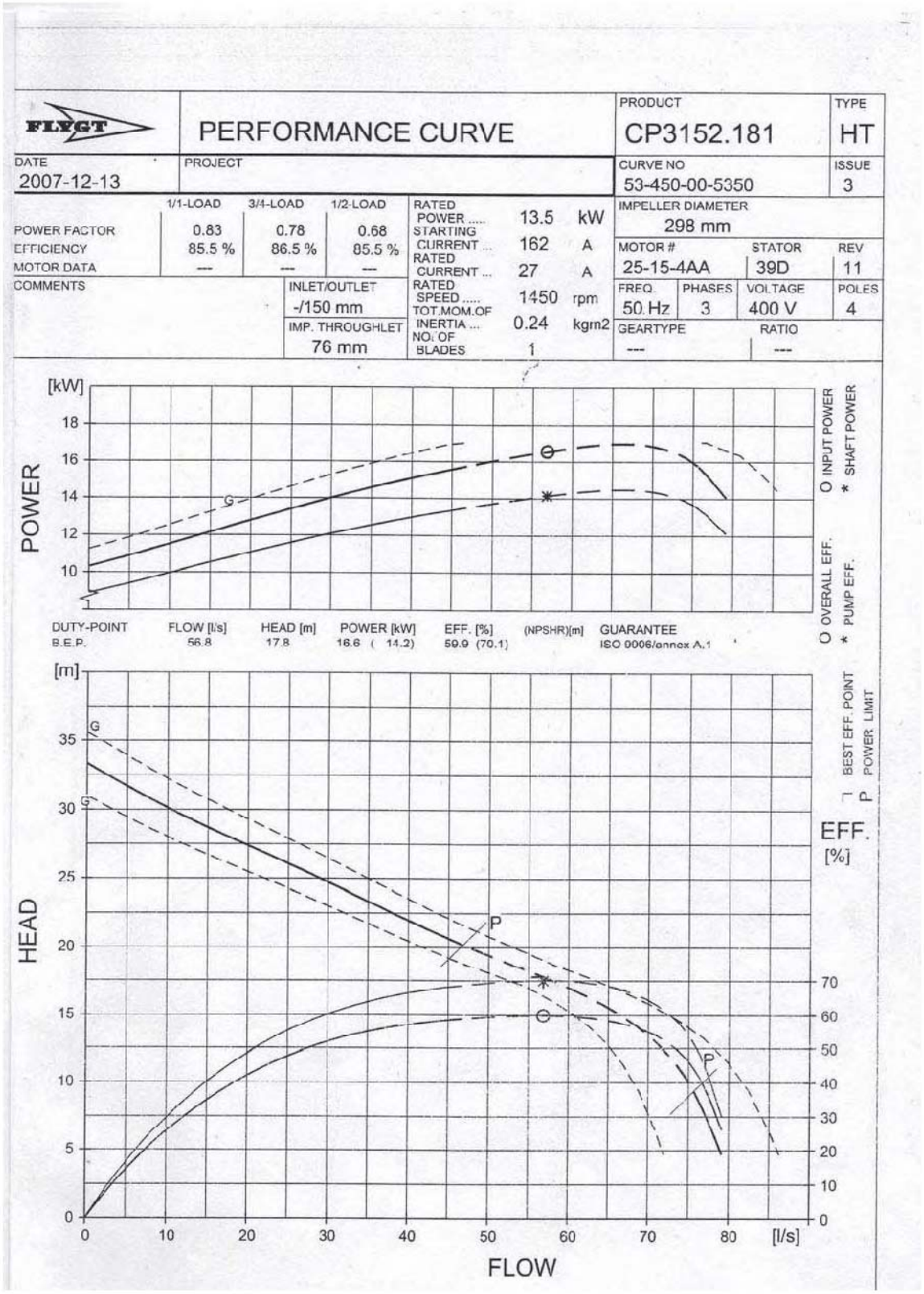
BASE



SECTION 1-1



Attachment 21



Attachment 22

27.11.2007	Outlet	Bardovci	MP6		Dpipe		500	mm

	No	h/D	h	r	φ	φ	B	S	Q_{crit}	Q_{crit}	V
		(%)	m	m	(rad)	(°)	m	m^2	m^3/s	l/s	m/s
8:00	1	13.0%	0.065	0.25	1.48	84.6	0.34	0.015	0.01	9.9	0.661
09:00	2	13.0%	0.065	0.25	1.48	84.6	0.34	0.015	0.01	9.9	0.661
10:00	3	17.0%	0.085	0.25	1.70	97.4	0.38	0.022	0.02	16.8	0.760
11:00	4	14.0%	0.070	0.25	1.53	87.9	0.35	0.017	0.01	11.5	0.687
12:00	5	14.0%	0.070	0.25	1.53	87.9	0.35	0.017	0.01	11.5	0.687
13:00	6	16.0%	0.080	0.25	1.65	94.4	0.37	0.020	0.01	14.9	0.737
14:00	7	16.0%	0.080	0.25	1.65	94.4	0.37	0.020	0.01	14.9	0.737
15:00	8	18.0%	0.090	0.25	1.75	100.5	0.38	0.024	0.02	18.8	0.783
16:00	9	16.0%	0.080	0.25	1.65	94.4	0.37	0.020	0.01	14.9	0.737
17:00	10	16.0%	0.080	0.25	1.65	94.4	0.37	0.020	0.01	14.9	0.737
18:00	11	20.0%	0.100	0.25	1.85	106.3	0.40	0.028	0.02	23.1	0.828
19:00	12	24.0%	0.120	0.25	2.05	117.4	0.43	0.036	0.03	33.1	0.912
20:00	13	18.0%	0.090	0.25	1.75	100.5	0.38	0.024	0.02	18.8	0.783
21:00	14	17.0%	0.085	0.25	1.70	97.4	0.38	0.022	0.02	16.8	0.760
22:00	15	24.0%	0.120	0.25	2.05	117.4	0.43	0.036	0.03	33.1	0.912
23:00	16	20.0%	0.100	0.25	1.85	106.3	0.40	0.028	0.02	23.1	0.828
00:00	17	19.0%	0.095	0.25	1.80	103.4	0.39	0.026	0.02	20.9	0.806
01:00	18	14.0%	0.070	0.25	1.53	87.9	0.35	0.017	0.01	11.5	0.687
02:00	19	10.0%	0.050	0.25	1.29	73.8	0.30	0.010	0.01	5.9	0.578
03:00	20	9.0%	0.045	0.25	1.22	69.9	0.29	0.009	0.00	4.8	0.548
04:00	21	9.0%	0.045	0.25	1.22	69.9	0.29	0.009	0.00	4.8	0.548
05:00	22	10.0%	0.050	0.25	1.29	73.8	0.30	0.010	0.01	5.9	0.578
06:00	23	10.0%	0.050	0.25	1.29	73.8	0.30	0.010	0.01	5.9	0.578
07:00	24	10.0%	0.050	0.25	1.29	73.8	0.30	0.010	0.01	5.9	0.578

05.12.2007	Outlet	Bardovci	MP6		Dpipe		500	mm

	No	h/D	h	r	φ	φ	B	A	Q_{crit}	Q_{crit}	V
		(%)	m	m	(rad)	(°)	m	m^2	m^3/s	l/s	m/s
8:00	1	16.0%	0.080	0.25	1.65	94.4	0.37	0.020	0.01	14.9	0.737
09:00	2	18.0%	0.090	0.25	1.75	100.5	0.38	0.024	0.02	18.8	0.783
10:00	3	20.0%	0.100	0.25	1.85	106.3	0.40	0.028	0.02	23.1	0.828
11:00	4	20.0%	0.100	0.25	1.85	106.3	0.40	0.028	0.02	23.1	0.828
12:00	5	20.0%	0.100	0.25	1.85	106.3	0.40	0.028	0.02	23.1	0.828
13:00	6	18.0%	0.090	0.25	1.75	100.5	0.38	0.024	0.02	18.8	0.783
14:00	7	18.0%	0.090	0.25	1.75	100.5	0.38	0.024	0.02	18.8	0.783
15:00	8	20.0%	0.100	0.25	1.85	106.3	0.40	0.028	0.02	23.1	0.828
16:00	9	22.0%	0.110	0.25	1.95	111.9	0.41	0.032	0.03	27.9	0.871
17:00	10	20.0%	0.100	0.25	1.85	106.3	0.40	0.028	0.02	23.1	0.828
18:00	11	21.0%	0.105	0.25	1.90	109.2	0.41	0.030	0.03	25.5	0.850
19:00	12	22.0%	0.110	0.25	1.95	111.9	0.41	0.032	0.03	27.9	0.871
20:00	13	22.0%	0.110	0.25	1.95	111.9	0.41	0.032	0.03	27.9	0.871
21:00	14	21.0%	0.105	0.25	1.90	109.2	0.41	0.030	0.03	25.5	0.850
22:00	15	21.0%	0.105	0.25	1.90	109.2	0.41	0.030	0.03	25.5	0.850
23:00	16	19.0%	0.095	0.25	1.80	103.4	0.39	0.026	0.02	20.9	0.806
00:00	17	18.0%	0.090	0.25	1.75	100.5	0.38	0.024	0.02	18.8	0.783
01:00	18	16.0%	0.080	0.25	1.65	94.4	0.37	0.020	0.01	14.9	0.737
02:00	19	13.0%	0.065	0.25	1.48	84.6	0.34	0.015	0.01	9.9	0.661
03:00	20	9.0%	0.045	0.25	1.22	69.9	0.29	0.009	0.00	4.8	0.548
04:00	21	8.0%	0.040	0.25	1.15	65.8	0.27	0.007	0.00	3.8	0.516
05:00	22	10.0%	0.050	0.25	1.29	73.8	0.30	0.010	0.01	5.9	0.578
06:00	23	12.0%	0.060	0.25	1.41	81.1	0.32	0.013	0.01	8.5	0.635
07:00	24	13.0%	0.065	0.25	1.48	84.6	0.34	0.015	0.01	9.9	0.661

Attachment 23

27.11.2007	Outlet Pivara MP9						Dpipe		1,000 mm		
	No	h/D	h	R	φ	φ	B	A	Q_{crit}	Q_{crit}	V
		(%)	m	m	(rad)	(°)	m	m^2	m^3/s	l/s	m/s
8:00	1	18.0%	0.18	0.50	1.75	100.5	0.77	0.096	0.11	107	1.108
09:00	2	20.0%	0.20	0.50	1.85	106.3	0.80	0.112	0.13	131	1.171
10:00	3	22.0%	0.22	0.50	1.95	111.9	0.83	0.128	0.16	158	1.232
11:00	4	24.0%	0.24	0.50	2.05	117.4	0.85	0.145	0.19	187	1.290
12:00	5	25.0%	0.25	0.50	2.09	120.1	0.87	0.154	0.20	203	1.319
13:00	6	27.0%	0.27	0.50	2.19	125.3	0.89	0.171	0.24	235	1.375
14:00	7	25.0%	0.25	0.50	2.09	120.1	0.87	0.154	0.20	203	1.319
15:00	8	22.0%	0.22	0.50	1.95	111.9	0.83	0.128	0.16	158	1.232
16:00	9	20.0%	0.20	0.50	1.85	106.3	0.80	0.112	0.13	131	1.171
17:00	10	20.0%	0.20	0.50	1.85	106.3	0.80	0.112	0.13	131	1.171
18:00	11	20.0%	0.20	0.50	1.85	106.3	0.80	0.112	0.13	131	1.171
19:00	12	20.0%	0.20	0.50	1.85	106.3	0.80	0.112	0.13	131	1.171
20:00	13	20.0%	0.20	0.50	1.85	106.3	0.80	0.112	0.13	131	1.171
21:00	14	40.0%	0.40	0.50	2.74	157.0	0.98	0.293	0.50	503	1.714
22:00	15	35.0%	0.35	0.50	2.53	145.2	0.95	0.245	0.39	389	1.587
23:00	16	45.0%	0.45	0.50	2.94	168.6	0.99	0.343	0.63	630	1.838
00:00	17	45.0%	0.45	0.50	2.94	168.6	0.99	0.343	0.63	630	1.838
01:00	18	45.0%	0.45	0.50	2.94	168.6	0.99	0.343	0.63	630	1.838
02:00	19	45.0%	0.45	0.50	2.94	168.6	0.99	0.343	0.63	630	1.838
03:00	20	35.0%	0.35	0.50	2.53	145.2	0.95	0.245	0.39	389	1.587
04:00	21	30.0%	0.30	0.50	2.32	132.9	0.92	0.198	0.29	289	1.456
05:00	22	25.0%	0.25	0.50	2.09	120.1	0.87	0.154	0.20	203	1.319
06:00	23	15.0%	0.15	0.50	1.59	91.2	0.71	0.074	0.07	74	1.007
07:00	24	15.0%	0.15	0.50	1.59	91.2	0.71	0.074	0.07	74	1.007

05.12.2007	Outlet Pivara MP9						Dpipe		1,000 mm		
	No	h/D	h	r	φ	φ	B	A	Q_{crit}	Q_{crit}	V
		(%)	m	m	(rad)	(°)	m	m^2	m^3/s	l/s	m/s
8:00	1	17.0%	0.17	0.50	1.70	97.4	0.75	0.089	0.10	95	1.075
09:00	2	19.0%	0.19	0.50	1.80	103.4	0.78	0.104	0.12	118	1.140
10:00	3	22.0%	0.22	0.50	1.95	111.9	0.83	0.128	0.16	158	1.232
11:00	4	24.0%	0.24	0.50	2.05	117.4	0.85	0.145	0.19	187	1.290
12:00	5	24.0%	0.24	0.50	2.05	117.4	0.85	0.145	0.19	187	1.290
13:00	6	26.0%	0.26	0.50	2.14	122.7	0.88	0.162	0.22	219	1.347
14:00	7	27.0%	0.27	0.50	2.19	125.3	0.89	0.171	0.24	235	1.375
15:00	8	30.0%	0.30	0.50	2.32	132.9	0.92	0.198	0.29	289	1.456
16:00	9	25.0%	0.25	0.50	2.09	120.1	0.87	0.154	0.20	203	1.319
17:00	10	22.0%	0.22	0.50	1.95	111.9	0.83	0.128	0.16	158	1.232
18:00	11	22.0%	0.22	0.50	1.95	111.9	0.83	0.128	0.16	158	1.232
19:00	12	22.0%	0.22	0.50	1.95	111.9	0.83	0.128	0.16	158	1.232
20:00	13	25.0%	0.25	0.50	2.09	120.1	0.87	0.154	0.20	203	1.319
21:00	14	25.0%	0.25	0.50	2.09	120.1	0.87	0.154	0.20	203	1.319
22:00	15	19.0%	0.19	0.50	1.80	103.4	0.78	0.104	0.12	118	1.140
23:00	16	20.0%	0.20	0.50	1.85	106.3	0.80	0.112	0.13	131	1.171
00:00	17	15.0%	0.15	0.50	1.59	91.2	0.71	0.074	0.07	74	1.007
01:00	18	15.0%	0.15	0.50	1.59	91.2	0.71	0.074	0.07	74	1.007
02:00	19	20.0%	0.20	0.50	1.85	106.3	0.80	0.112	0.13	131	1.171
03:00	20	15.0%	0.15	0.50	1.59	91.2	0.71	0.074	0.07	74	1.007
04:00	21	14.0%	0.14	0.50	1.53	87.9	0.69	0.067	0.06	65	0.972
05:00	22	12.0%	0.12	0.50	1.41	81.1	0.65	0.053	0.05	48	0.898
06:00	23	12.0%	0.12	0.50	1.41	81.1	0.65	0.053	0.05	48	0.898
07:00	24	12.0%	0.12	0.50	1.41	81.1	0.65	0.053	0.05	48	0.898

Control measurement with curent meter (propeler)												Qmeasured /Qcalculated
15:00		30.0%	0.30	0.50	2.32		0.92	0.198	0.33	327	1.652	113%

Attachment 24

27.11.2007	Outlet Zelezara (Makstil) MP10								Dpipe	2,000 mm

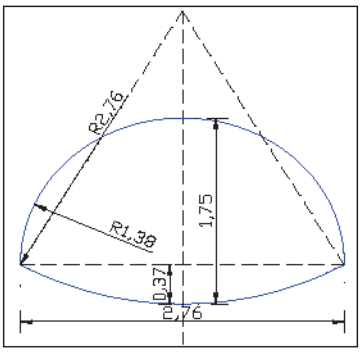
	No	h/D	h	r	φ	φ	B	A	Q_{crit}	Q_{crit}	V
		(%)	m	m	(rad)	(°)	m	m^2	m^3/s	l/s	m/s
8:00	1	22.5%	0.45	1.00	1.98	113.3	1.67	0.529	0.93	933	1.763
09:00	2	21.0%	0.42	1.00	1.90	109.2	1.63	0.480	0.81	815	1.699
10:00	3	22.5%	0.45	1.00	1.98	113.3	1.67	0.529	0.93	933	1.763
11:00	4	23.5%	0.47	1.00	2.02	116.0	1.70	0.563	1.02	1,015	1.804
12:00	5	24.5%	0.49	1.00	2.07	118.7	1.72	0.597	1.10	1,101	1.845
13:00	6	25.0%	0.50	1.00	2.09	120.1	1.73	0.614	1.15	1,146	1.865
14:00	7	24.0%	0.48	1.00	2.05	117.4	1.71	0.580	1.06	1,058	1.825
15:00	8	22.5%	0.45	1.00	1.98	113.3	1.67	0.529	0.93	933	1.763
16:00	9	21.0%	0.42	1.00	1.90	109.2	1.63	0.480	0.81	815	1.699
17:00	10	17.5%	0.35	1.00	1.73	99.0	1.52	0.369	0.57	570	1.544
18:00	11	20.0%	0.40	1.00	1.85	106.3	1.60	0.447	0.74	741	1.656
19:00	12	20.0%	0.40	1.00	1.85	106.3	1.60	0.447	0.74	741	1.656
20:00	13	21.0%	0.42	1.00	1.90	109.2	1.63	0.480	0.81	815	1.699
21:00	14	20.0%	0.40	1.00	1.85	106.3	1.60	0.447	0.74	741	1.656
22:00	15	20.0%	0.40	1.00	1.85	106.3	1.60	0.447	0.74	741	1.656
23:00	16	21.0%	0.42	1.00	1.90	109.2	1.63	0.480	0.81	815	1.699
00:00	17	20.0%	0.40	1.00	1.85	106.3	1.60	0.447	0.74	741	1.656
01:00	18	21.5%	0.43	1.00	1.93	110.6	1.64	0.496	0.85	853	1.721
02:00	19	22.5%	0.45	1.00	1.98	113.3	1.67	0.529	0.93	933	1.763
03:00	20	22.5%	0.45	1.00	1.98	113.3	1.67	0.529	0.93	933	1.763
04:00	21	20.0%	0.40	1.00	1.85	106.3	1.60	0.447	0.74	741	1.656
05:00	22	20.0%	0.40	1.00	1.85	106.3	1.60	0.447	0.74	741	1.656
06:00	23	20.0%	0.40	1.00	1.85	106.3	1.60	0.447	0.74	741	1.656
07:00	24	20.0%	0.40	1.00	1.85	106.3	1.60	0.447	0.74	741	1.656

05.12.2007	Outlet Zelezara (Makstil)								Dpipe	2,000 mm

	No	h/D	h	r	φ	φ	B	A	Q_{crit}	Q_{crit}	V
		(%)	m	m	(rad)	(°)	m	m^2	m^3/s	l/s	m/s
8:00	1	22.5%	0.45	1.00	1.98	113.3	1.67	0.529	0.93	933	1.763
09:00	2	23.5%	0.47	1.00	2.02	116.0	1.70	0.563	1.02	1,015	1.804
10:00	3	25.0%	0.50	1.00	2.09	120.1	1.73	0.614	1.15	1,146	1.865
11:00	4	26.0%	0.52	1.00	2.14	122.7	1.75	0.649	1.24	1,236	1.905
12:00	5	26.0%	0.52	1.00	2.14	122.7	1.75	0.649	1.24	1,236	1.905
13:00	6	25.0%	0.50	1.00	2.09	120.1	1.73	0.614	1.15	1,146	1.865
14:00	7	26.5%	0.53	1.00	2.16	124.0	1.77	0.667	1.28	1,283	1.925
15:00	8	25.0%	0.50	1.00	2.09	120.1	1.73	0.614	1.15	1,146	1.865
16:00	9	25.0%	0.50	1.00	2.09	120.1	1.73	0.614	1.15	1,146	1.865
17:00	10	24.0%	0.48	1.00	2.05	117.4	1.71	0.580	1.06	1,058	1.825
18:00	11	24.0%	0.48	1.00	2.05	117.4	1.71	0.580	1.06	1,058	1.825
19:00	12	24.0%	0.48	1.00	2.05	117.4	1.71	0.580	1.06	1,058	1.825
20:00	13	23.0%	0.46	1.00	2.00	114.7	1.68	0.546	0.97	974	1.784
21:00	14	23.0%	0.46	1.00	2.00	114.7	1.68	0.546	0.97	974	1.784
22:00	15	25.0%	0.50	1.00	2.09	120.1	1.73	0.614	1.15	1,146	1.865
23:00	16	25.0%	0.50	1.00	2.09	120.1	1.73	0.614	1.15	1,146	1.865
00:00	17	23.5%	0.47	1.00	2.02	116.0	1.70	0.563	1.02	1,015	1.804
01:00	18	22.5%	0.45	1.00	1.98	113.3	1.67	0.529	0.93	933	1.763
02:00	19	24.0%	0.48	1.00	2.05	117.4	1.71	0.580	1.06	1,058	1.825
03:00	20	22.5%	0.45	1.00	1.98	113.3	1.67	0.529	0.93	933	1.763
04:00	21	19.0%	0.38	1.00	1.80	103.4	1.57	0.416	0.67	670	1.612
05:00	22	18.5%	0.37	1.00	1.78	102.0	1.55	0.400	0.64	636	1.589
06:00	23	20.0%	0.40	1.00	1.85	106.3	1.60	0.447	0.74	741	1.656
07:00	24	20.0%	0.40	1.00	1.85	106.3	1.60	0.447	0.74	741	1.656

Attachment 25

27.11.2007	Outlet	N.Lisice			MP12						
			Dpipe	5,530	mm						
	No	h/D	h	r	φ	φ	B	A	Q_{crit}	Q_{crit}	V
		(%)	m	m	(rad)	(°)	m	m^2	m^3/s	l/s	m/s
8:00	1	3.1%	0.17	2.77	0.70	40.4	1.91	0.218	0.23	230	1.058
09:00	2	3.6%	0.20	2.77	0.77	43.9	2.06	0.277	0.32	318	1.148
10:00	3	4.0%	0.22	2.77	0.80	46.0	2.16	0.320	0.39	385	1.204
11:00	4	4.3%	0.24	2.77	0.84	48.1	2.25	0.364	0.46	458	1.258
12:00	5	4.3%	0.24	2.77	0.84	48.1	2.25	0.364	0.46	458	1.258
13:00	6	4.7%	0.26	2.77	0.87	50.1	2.34	0.410	0.54	537	1.310
14:00	7	4.3%	0.24	2.77	0.84	48.1	2.25	0.364	0.46	458	1.258
15:00	8	4.0%	0.22	2.77	0.80	46.0	2.16	0.320	0.39	385	1.204
16:00	9	3.6%	0.20	2.77	0.77	43.9	2.06	0.277	0.32	318	1.148
17:00	10	4.0%	0.22	2.77	0.80	46.0	2.16	0.320	0.39	385	1.204
18:00	11	4.0%	0.22	2.77	0.80	46.0	2.16	0.320	0.39	385	1.204
19:00	12	3.1%	0.17	2.77	0.70	40.4	1.91	0.218	0.23	230	1.058
20:00	13	4.3%	0.24	2.77	0.84	48.1	2.25	0.364	0.46	458	1.258
21:00	14	4.0%	0.22	2.77	0.80	46.0	2.16	0.320	0.39	385	1.204
22:00	15	4.9%	0.27	2.77	0.89	51.1	2.38	0.433	0.58	579	1.336
23:00	16	4.0%	0.22	2.77	0.80	46.0	2.16	0.320	0.39	385	1.204
00:00	17	4.0%	0.22	2.77	0.80	46.0	2.16	0.320	0.39	385	1.204
01:00	18	4.3%	0.24	2.77	0.84	48.1	2.25	0.364	0.46	458	1.258
02:00	19	4.0%	0.22	2.77	0.80	46.0	2.16	0.320	0.39	385	1.204
03:00	20	4.0%	0.22	2.77	0.80	46.0	2.16	0.320	0.39	385	1.204
04:00	21	3.1%	0.17	2.77	0.70	40.4	1.91	0.218	0.23	230	1.058
05:00	22	2.2%	0.12	2.77	0.59	33.9	1.61	0.129	0.11	115	0.888
06:00	23	2.5%	0.14	2.77	0.64	36.6	1.74	0.163	0.16	156	0.959
07:00	24	3.1%	0.17	2.77	0.70	40.4	1.91	0.218	0.23	230	1.058



B= 2.8 m
H= 1.8 m

05.12.2007	Outlet	N.Lisice			MP12						
			Dpipe	5,530	mm						
	No	h/D	h	r	φ	φ	B	A	Q_{crit}	Q_{crit}	V
		(%)	m	m	(rad)	(°)	m	m^2	m^3/s	l/s	m/s
8:00	1	3.1%	0.17	2.77	0.70	40.4	1.91	0.218	0.23	230	1.058
09:00	2	3.6%	0.20	2.77	0.77	43.9	2.06	0.277	0.32	318	1.148
10:00	3	4.0%	0.22	2.77	0.80	46.0	2.16	0.320	0.39	385	1.204
11:00	4	4.3%	0.24	2.77	0.84	48.1	2.25	0.364	0.46	458	1.258
12:00	5	4.7%	0.26	2.77	0.87	50.1	2.34	0.410	0.54	537	1.310
13:00	6	5.1%	0.28	2.77	0.91	52.0	2.42	0.457	0.62	622	1.360
14:00	7	4.7%	0.26	2.77	0.87	50.1	2.34	0.410	0.54	537	1.310
15:00	8	4.3%	0.24	2.77	0.84	48.1	2.25	0.364	0.46	458	1.258
16:00	9	4.3%	0.24	2.77	0.84	48.1	2.25	0.364	0.46	458	1.258
17:00	10	4.0%	0.22	2.77	0.80	46.0	2.16	0.320	0.39	385	1.204
18:00	11	3.6%	0.20	2.77	0.77	43.9	2.06	0.277	0.32	318	1.148
19:00	12	4.0%	0.22	2.77	0.80	46.0	2.16	0.320	0.39	385	1.204
20:00	13	4.0%	0.22	2.77	0.80	46.0	2.16	0.320	0.39	385	1.204
21:00	14	3.6%	0.20	2.77	0.77	43.9	2.06	0.277	0.32	318	1.148
22:00	15	4.0%	0.22	2.77	0.80	46.0	2.16	0.320	0.39	385	1.204
23:00	16	4.0%	0.22	2.77	0.80	46.0	2.16	0.320	0.39	385	1.204
00:00	17	3.6%	0.20	2.77	0.77	43.9	2.06	0.277	0.32	318	1.148
01:00	18	3.3%	0.18	2.77	0.73	41.6	1.96	0.237	0.26	258	1.089
02:00	19	4.0%	0.22	2.77	0.80	46.0	2.16	0.320	0.39	385	1.204
03:00	20	3.4%	0.19	2.77	0.75	42.7	2.01	0.257	0.29	287	1.119
04:00	21	3.6%	0.20	2.77	0.77	43.9	2.06	0.277	0.32	318	1.148
05:00	22	3.3%	0.18	2.77	0.73	41.6	1.96	0.237	0.26	258	1.089
06:00	23	3.1%	0.17	2.77	0.70	40.4	1.91	0.218	0.23	230	1.058
07:00	24	2.5%	0.14	2.77	0.64	36.6	1.74	0.163	0.16	156	0.959

Control measurement with curent meter (propeler)												Qmeasured /Qcalculated
13:00		5.1%	0.28	2.77	0.91		2.50	0.500	0.64	635	1.270	102%

Attachment 26

Flow rate as a result of pipe water level

27.11.2007 | Pump Station Dracevo | MP18 | Dpipe | 400 mm

	No	h/D	h	r	φ	φ	B	A	Q_{crit}	Q_{crit}	V
		(%)	m	m	(rad)	(°)	m	m^2	m^3/s	l/s	m/s
8:00	1	25.0%	0.100	0.20	2.09	120.1	0.35	0.025	0.02	20.5	0.834
09:00	2	30.0%	0.120	0.20	2.32	132.9	0.37	0.032	0.03	29.2	0.921
10:00	3	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
11:00	4	30.0%	0.120	0.20	2.32	132.9	0.37	0.032	0.03	29.2	0.921
12:00	5	25.0%	0.100	0.20	2.09	120.1	0.35	0.025	0.02	20.5	0.834
13:00	6	25.0%	0.100	0.20	2.09	120.1	0.35	0.025	0.02	20.5	0.834
14:00	7	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
15:00	8	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
16:00	9	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
17:00	10	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
18:00	11	25.0%	0.100	0.20	2.09	120.1	0.35	0.025	0.02	20.5	0.834
19:00	12	30.0%	0.120	0.20	2.32	132.9	0.37	0.032	0.03	29.2	0.921
20:00	13	25.0%	0.100	0.20	2.09	120.1	0.35	0.025	0.02	20.5	0.834
21:00	14	25.0%	0.100	0.20	2.09	120.1	0.35	0.025	0.02	20.5	0.834
22:00	15	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
23:00	16	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
00:00	17	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
01:00	18	20.0%	0.080	0.20	1.85	106.3	0.32	0.018	0.01	13.3	0.741
02:00	19	20.0%	0.080	0.20	1.85	106.3	0.32	0.018	0.01	13.3	0.741
03:00	20	20.0%	0.080	0.20	1.85	106.3	0.32	0.018	0.01	13.3	0.741
04:00	21	20.0%	0.080	0.20	1.85	106.3	0.32	0.018	0.01	13.3	0.741
05:00	22	20.0%	0.080	0.20	1.85	106.3	0.32	0.018	0.01	13.3	0.741
06:00	23	17.5%	0.070	0.20	1.73	99.0	0.30	0.015	0.01	10.2	0.690
07:00	24	20.0%	0.080	0.20	1.85	106.3	0.32	0.018	0.01	13.3	0.741

05.12.2007 | Pump Station Dracevo | MP18 | Dpipe | 400 mm

	No	h/D	h	r	φ	φ	B	A	Q_{crit}	Q_{crit}	V
		(%)	m	m	(rad)	(°)	m	m^2	m^3/s	l/s	m/s
8:00	1	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
09:00	2	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
10:00	3	30.0%	0.120	0.20	2.32	132.9	0.37	0.032	0.03	29.2	0.921
11:00	4	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
12:00	5	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
13:00	6	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
14:00	7	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
15:00	8	30.0%	0.120	0.20	2.32	132.9	0.37	0.032	0.03	29.2	0.921
16:00	9	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
17:00	10	30.0%	0.120	0.20	2.32	132.9	0.37	0.032	0.03	29.2	0.921
18:00	11	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
19:00	12	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
20:00	13	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
21:00	14	30.0%	0.120	0.20	2.32	132.9	0.37	0.032	0.03	29.2	0.921
22:00	15	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
23:00	16	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
00:00	17	27.5%	0.110	0.20	2.21	126.6	0.36	0.028	0.02	24.7	0.878
01:00	18	22.5%	0.090	0.20	1.98	113.3	0.33	0.021	0.02	16.7	0.788
02:00	19	22.5%	0.090	0.20	1.98	113.3	0.33	0.021	0.02	16.7	0.788
03:00	20	22.5%	0.090	0.20	1.98	113.3	0.33	0.021	0.02	16.7	0.788
04:00	21	20.0%	0.080	0.20	1.85	106.3	0.32	0.018	0.01	13.3	0.741
05:00	22	20.0%	0.080	0.20	1.85	106.3	0.32	0.018	0.01	13.3	0.741
06:00	23	22.5%	0.090	0.20	1.98	113.3	0.33	0.021	0.02	16.7	0.788
07:00	24	25.0%	0.100	0.20	2.09	120.1	0.35	0.025	0.02	20.5	0.834

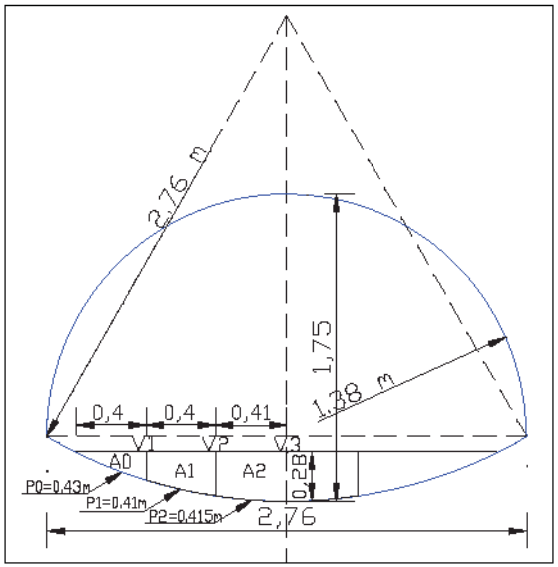
Flow rate as a result of pums work and reservoir water level

27.11.2007	Pump Station Dracevo					MP18					
	No	T pumps /hour	T pump /hour	Water Level in Collect. Manhole H1	Water Level in Pump Rezer H2	Q pumps	Wpum	Volume of Reservoirs Wrez	dW	Volume of inflow into Reserv. Winf	Q inflow
		(hour)	(sec)	(cm)	(cm)	(l/s)	(m3)	(m3)	(m3)	(m3)	(l/s)
8:00	1	976.58	792	65	115	15.4	55	61.44		55	15.4
09:00	2	976.8	1404	70	120	27.3	98	64.22	2.78	101	28.1
10:00	3	977.19	1260	75	120	24.5	88	64.47	0.25	88	24.6
11:00	4	977.54	1476	70	125	28.7	103	66.75	2.28	106	29.3
12:00	5	977.95	1296	75	115	25.2	91	61.94	-4.81	86	23.9
13:00	6	978.31	1188	75	115	23.1	83	61.94	0	83	23.1
14:00	7	978.64	1296	75	120	25.2	91	64.47	2.53	93	25.9
15:00	8	979	1296	80	125	25.2	91	67.25	2.78	94	26.0
16:00	9	979.36	1476	75	120	28.7	103	64.47	-2.78	101	27.9
17:00	10	979.77	1296	80	120	25.2	91	64.72	0.25	91	25.3
18:00	11	980.13	1224	70	115	23.8	86	61.69	-3.03	83	23.0
19:00	12	980.47	1584	75	120	30.8	111	64.47	2.78	114	31.6
20:00	13	980.91	1044	65	115	20.3	73	61.44	-3.03	70	19.5
21:00	14	981.2	1116	65	110	21.7	78	58.91	-2.53	76	21.0
22:00	15	981.51	1368	70	115	26.6	96	61.69	2.78	99	27.4
23:00	16	981.89	1260	70	115	24.5	88	61.69	0	88	24.5
00:00	17	982.24	1188	65	115	23.1	83	61.44	-0.25	83	23.0
01:00	18	982.57	756	65	115	14.7	53	61.44	0	53	14.7
02:00	19	982.78	756	65	110	14.7	53	58.91	-2.53	50	14.0
03:00	20	982.99	648	65	110	12.6	45	58.91	0	45	12.6
04:00	21	983.17	576	70	120	11.2	40	64.22	5.31	46	12.7
05:00	22	983.33	684	65	115	13.3	48	61.44	-2.78	45	12.5
06:00	23	983.52	540	65	110	10.5	38	58.91	-2.53	35	9.8
07:00	24	983.67	648	65	110	12.6	45	58.91	0	45	12.6
		983.85								Qavg inf=	21.2

05.12.2007	Pump Station Dracevo					MP18					
	No	T pumps /hour	T pump /hour	Water Level in Collect. Manhole H1	Water Level in Pump Rezer H2	Q pumps	Wpum	Volume of Reservoirs Wrez	dW	Volume of inflow into Reserv. Wdot	Q inflow
		(hour)	(sec)	(cm)	(cm)	(l/s)	(m^3)	(m^3)	(m^3)	(m3)	(l/s)
8:00	1	45.91	1224	75	110	23.8	86	55.66		86	23.8
9:00	2	46.25	1224	80	115	23.8	86	58.19	2.53	88	24.5
10:00	3	46.59	1404	75	120	27.3	98	60.72	2.53	101	28.0
11:00	4	46.98	1296	80	105	25.2	91	53.13	-7.59	83	23.1
12:00	5	47.34	1368	75	110	26.6	96	55.66	2.53	98	27.3
13:00	6	47.72	1260	75	115	24.5	88	58.19	2.53	91	25.2
14:00	7	48.07	1260	80	120	24.5	88	60.72	2.53	91	25.2
15:00	8	48.42	1260	80	110	24.5	88	55.66	-5.06	83	23.1
16:00	9	48.77	1332	75	125	25.9	93	63.25	7.59	101	28.0
17:00	10	49.14	1296	70	120	25.2	91	60.72	-2.53	88	24.5
18:00	11	49.5	1512	75	110	29.4	106	55.66	-5.06	101	28.0
19:00	12	49.92	1224	60	120	23.8	86	60.72	5.06	91	25.2
20:00	13	50.26	1332	70	110	25.9	93	55.66	-5.06	88	24.5
21:00	14	50.63	1476	75	120	28.7	103	60.72	5.06	108	30.1
22:00	15	51.04	1152	70	115	22.4	81	58.19	-2.53	78	21.7
23:00	16	51.36	1476	57	108	28.7	103	54.648	-3.542	100	27.7
0:00	17	51.77	1044	70	115	20.3	73	58.19	3.542	77	21.3
1:00	18	52.06	828	75	120	16.1	58	60.72	2.53	60	16.8
2:00	19	52.29	1008	65	115	19.6	71	58.19	-2.53	68	18.9
3:00	20	52.57	936	70	110	18.2	66	55.66	-2.53	63	17.5
4:00	21	52.83	576	75	115	11.2	40	58.19	2.53	43	11.9
5:00	22	52.99	612	75	120	11.9	43	60.72	2.53	45	12.6
6:00	23	53.16	864	60	110	16.8	60	55.66	-5.06	55	15.4
07:00	24	53.4	900	75	120	17.5	63	60.72	5.06	68	18.9
		53.65								Qavg inf=	22.6

Attachment 28

Outlet N.Lisice		MP12		Control measurement with curent meter (propeler)							
No	n	H	t-II	N_{R1}	t1-II	N_{R2}	R1	R2	V3-I	V3-II	V3av(I+II)	V3av
1		m	sec		sec		rot/sec	rot/sec	m/s	m/s	m/s	
	1	0.15	15	111	30	232	7.40	7.73	1.943	2.030	1.986	**1.958**
	2	0.1	15	110	30	221	7.33	7.37	1.925	1.934	1.930	**1.958**
	3	0.28										



Hydraulic radius R=A/P

y=2.5*sqrt(n)-0.13-0.75*sqrt(R)*(sqrt(n)-0.1)

Schezy coeficient $C=R^{y}*1/n$

Velocity characteristic coeficient kv=C*sqrt(R)

Velocity V=kv*sqrt(i)

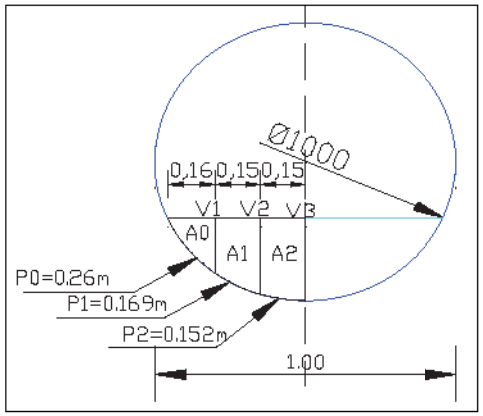
Coeficient dependent of type of ground $a=V/V_{max}$ a=0.5-0.9 a= 0.7

Manning coeficient n= 0.012

$Q_{1/2}=a*V1av*A0+0.5*(V1av+V2av)*A1+0.5*(V2av+V3av)*A2$

Segmet's Area		Wet Perometer P	Hydraulic radius R	y	C	kv	Average Valocity		Calculated Flow rate	
(m^2)		(m)	(m)		($m^{0.5}/s$)		(m/sec)		(m^3/sec)	
A0=	0.034	0.43	0.079	0.142	58.144	16.35	V1av=	0.899	Q_1=	0.021
A1=	0.08	0.41	0.195	0.141	66.216	29.25	V2av=	1.608	Q_2=	0.100
A2=	0.11	0.415	0.265	0.14	69.181	35.62	V3av=	1.958	Q_3=	0.196
									Q1/2=	0.318
									Q=	**0.636**

Outlet Pivara			MP9	Control measurement with curent meter (propeler)								
No	n	H	t-1I	N_{R1}	t1-II	N_{R2}	R1	R2	V1-I	V1-II	V1av(I+II)	V1av
2		m	sec		sec		rot/sec	rot/sec	m/s	m/s	m/s	
	1	0.1	5	32	15	148	6.4	9.87	1.681	2.589	2.135	**2.401**
	2	0.2	5	49	15	158	9.8	10.53	2.572	2.764	2.668	**2.401**
	3	0.3										



Hydraulic radius $R=A/P$

$y=2.5*sqrt(n)-0.13-0.75*sqrt(R)*(sqrt(n)-0.1)$

Schezy coeficient $C=R^{y}*1/n$

Velocity characteristic coeficient $kv=C*sqrt(R)$

Velocity $V=kv*sqrt(I)$

Coeficient dependent of type of ground $a=V/V_{max}$ a=0.5-0.9 a= 0.7

Manning coeficient n= 0.012

$Q_{1/2}=a*V1av*A0+0.5*(V1av+V2av)*A1+0.5*(V2av+V3av)*A2$

Segmet's Area		Wet Perom eter P	Hydra ulic radius R	y	C	kv	Average Velocity		Calculated Flow rate	
(m^2)		(m)	(m)		($m^{0.5}/s$)		(m/sec)		(m^3/sec)	
A0=	0.0186	0.258	0.072	0.142	57.376	15.41	V1av=	0.984	Q_1=	0.013
A1=	0.0366	0.169	0.216	0.141	67.19	31.23	V2av=	1.995	Q_2=	0.055
A2=	0.0439	0.152	0.288	0.14	70.013	37.59	V3av=	2.401	Q_3=	0.097
									Q1/2=	0.164
									Q=	**0.328**

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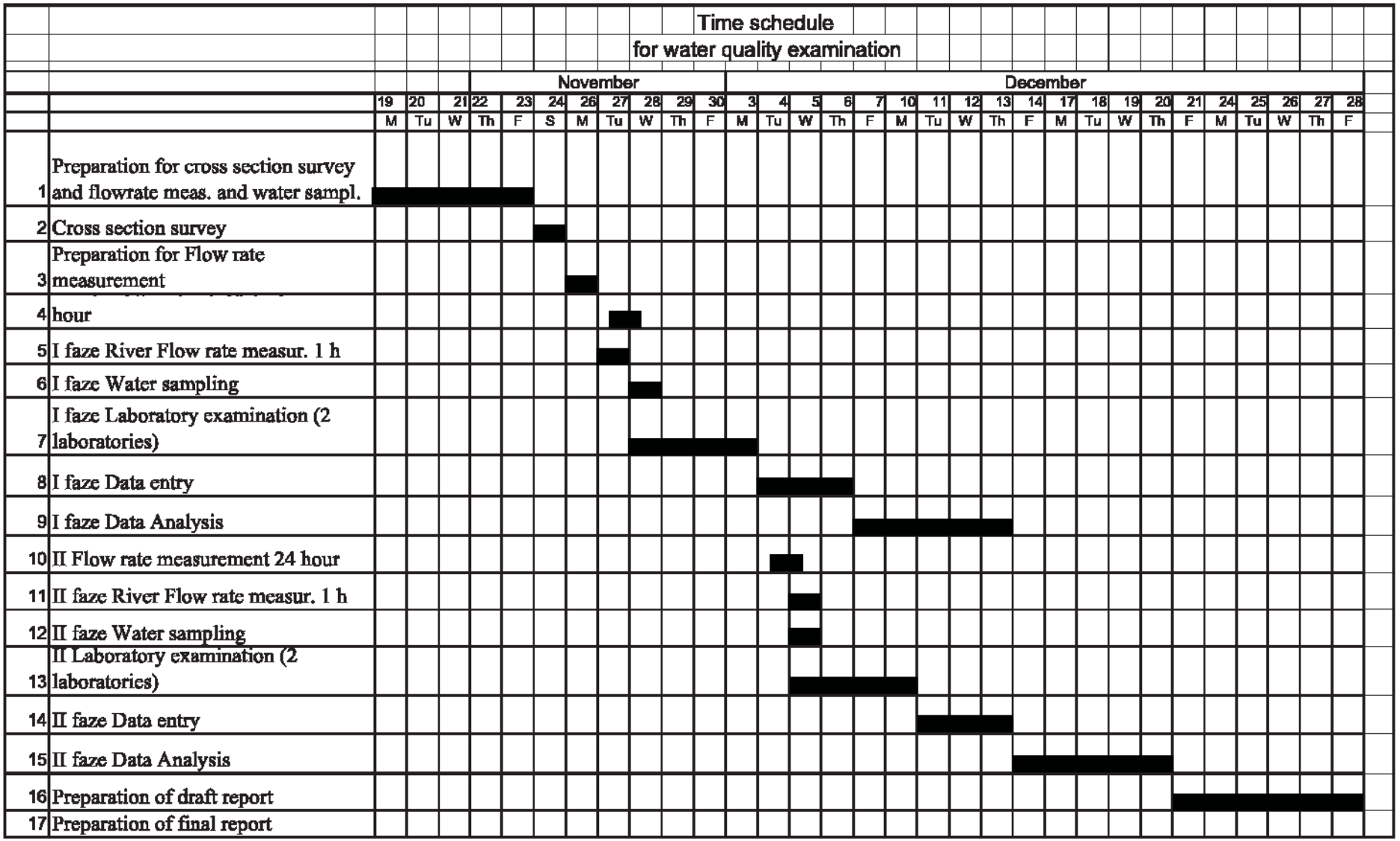
Time schedule
for water quality examination
November
December
19 20 21 22 23 24 26 27 28 29 30 3 4 5 6 7 10 11 12 13 14 17 18 19 20 21 24 25 26 27 28
M Tu W Th F S M Tu W Th F M Tu W Th F M Tu W Th F M Tu W Th F S M Tu W Th F
1 Preparation for cross section survey and flowrate meas. and water sampl.
2 Cross section survey
3 Preparation for Flow rate measurement
4 hour
5 I faze River Flow rate measur. 1 h
6 I faze Water sampling
7 I faze Laboratory examination (2 laboratories)
8 I faze Data entry
9 I faze Data Analysis
10 II Flow rate measurement 24 hour
11 II faze River Flow rate measur. 1 h
12 II faze Water sampling
13 II Laboratory examination (2 laboratories)
14 II faze Data entry
15 II faze Data Analysis
16 Preparation of draft report
17 Preparation of final report

28.11.2007 **Results of Central Laboratory analisys**

No	Hour of sampling	Sample Label		Description of location	*COD* $_{Cr2O7}$	*Phenol*	*Normal - hexan Extracts*	SiO_2	*TN*
					mg/L O_2	mg/L	mg/L	mg/L	mg/L
					Metods of analisys				
					M54 ISO 6060	M54 ISO 6439	M54 1303	M54 ISO 11885	M54 ISO 11905
1	06:30	1	R	Stil bridge Saraj	9,80	0,006	1,2	7,49	2,53
2	07:00	2	R	Sport centar Saraj -Treska	6,86	< 0,002	0,4	4,49	1,36
3	07:30	3	R	Lepenec	4,90	< 0,002	0,4	8,77	1,78
4	07:45	4	R	Bridge Lepenec CS2	9,80	0,003	0,8	8,79	1,92
5	07:15	5	R	Pedestrian crossing Bardovci CS3	6,86	0,010	0,9	8,56	1,78
6	08:30	6	S	Sewage pipe - Bardovci	49,00	0,021	2,6	11,80	11,91
7	06:00	7	R	Bridge Unated Nations	0,98	0,006	0,6	5,78	2,03
8	08:45	8	R	CS4 - Center	6,86	0,002	< 0,1	7,06	2,50
9	09:45	**9**	**I**	**Industry outlet Pivara**	**11,80**	**0,211**	**7,9**	**12,00**	21,11
10	10:00	10	I	Industry outlet Makstil	196,00	0,009	1,1	7,08	2,57
11	09:15	11	R	Bridge N.Lisice	4,90	0,009	0,3	6,42	1,91
12	09:30	**12**	**S**	**Sewage pipe - Aerodrom - N.Lisice**	**90,20**	**0,220**	**4,3**	**12,20**	20,80
13	10:15	13	R	Location between sewage pipe and Industry pipe	8,82	0,027	0,3	6,84	2,37
14	10:30	14	R	Outlet from unlegal settelment Lisice	9,80	0,014	0,5	6,21	2,50
15	10:45	15	R	Pipe under bridge	5,88	0,012	0,5	6,42	2,96
16	11:00	16	R	Open chanel	5,88	0,012	0,7	6,40	3,08
17	11:30	17	R	Bridge Jurulljari CS5	9,80	0,009	0,2	6,37	3,01
18	12:00	18	S	Pump station Dracevo	215,70	0,450	10,0	11,80	33,61

Attachement 32

06.12.2007 **Results of Central Laboratory analisys**

No	Hour of sampling	Laboratory Label	Sample Label		Description of location	$COD_{K2Cr2O7}$	Phenol	Normal - hexan Extracts	SiO_2	TN
						mg/L O_2	mg/L	mg/L	mg/L	mg/L
						Metods of analisys				
						M54 ISO 6060	M54 ISO 6439	M54 1303	M54 ISO 11885	M54 ISO 11905
1	06:30	10988	1	R	Stil bridge Saraj	5,88	< 0,002	0,1	8,15	5,29
2	07:00	10989	2	R	Sport centar Saraj -Treska	0,98	< 0,002	< 0,1	4,19	2,23
3	07:30	10990	3	R	Lepenec	7,84	< 0,002	0,5	8,56	2,69
4	07:45	10991	4	R	Bridge Lepenec CS2	5,88	< 0,002	0,4	8,69	2,74
5	07:15	10992	5	R	Pedestrian crossing Bardovci CS3	4,90	0,011	< 0,1	8,73	3,08
6	08:30	10993	6	S	Sewage pipe - Bardovci	33,30	0,008	< 0,1	11,60	11,68
7	06:00	10994	7	R	Bridge Unated Nations	3,90	0,005	0,1	6,61	1,04
8	08:45	10995	8	R	CS4 - Center	4,90	< 0,002	0,2	7,81	0,85
9	09:45	10996	9	I	Industry outlet Pivara	9,80	0,005	4,7	11,40	15,78
10	10:00	10997	10	I	Industry outlet Makstil	156,90	0,005	< 0,1	11,50	1,38
11	09:15	10998	11	R	Bridge N.Lisice	14,70	0,007	0,2	7,36	1,49
12	09:30	10999	12	S	Sewage pipe - Aerodrom - N.Lisice	114,00	0,021	1,6	11,00	19,89
13	10:15	11000	13	R	Location between sewage pipe and Industry pipe	7,84	0,009	< 0,1	7,34	2,63
14	10:30	11001	14	R	Outlet from unlegal settelment Lisice	3,92	0,014	0,1	7,57	1,58
15	10:45	11002	15	R	Pipe under bridge	8,82	0,007	0,1	7,49	1,82
16	11:00	11003	16	R	Open chanel	6,86	0,010	< 0,1	7,51	2,43
17	11:30	11004	17	R	Bridge Jurulljari CS5	3,92	0,009	0,1	7,55	2,55
18	12:00	11005	18	S	Pump station Dracevo	196,00	0,327	7,1	11,60	30,78

Attachement 33

Series 1 :28.11.2007				Bio - chemical		Phisic - chemical parameters							
No	Hour of sampling	Laboratory Label	Description of location	DO	BOD_5	NO_2 as N	NO_3 as N	NH_4 as N	pH	K	SO_4	SS	Cl
				mg/l	mg/l	mg/l	mg/l	mg/l		µs/cm	mg/l	mg/l	mg/l
1	06:30	14224	Stil bridge Saraj	12,0	2,0	0,19	23,0	0,18	8,7	268	15,0	271,0	10
2	07:00	14225	Sport centar Saraj -Treska	12,0	1,5	0,05	13,0	0,21	8,1	358	12,0	262,0	12
3	07:30	14226	Lepenec	13,0	1,0	0,24	17,5	0,31	7,7	276	22,6	267,0	13
4	07:45	14255	CS2 Bridge Lepenec	13,0	3,0	0,25	20,5	0,36	7,8	266	22,0	293,0	10
5	07:15	14256	CS3 Pedestrian crossing Bardovci	12,0	2,0	0,23	21,0	0,34	7,6	276	21,0	281,0	11
6	08:30	14258	Sewage pipe - Bardovci	8,0	11,0	0,25	15,0	0,50	7,8	633	15,0	418,0	21
7	06:00	14259	Bridge Unated Nations	11,0	4,0	0,11	7,8	0,20	6,6	334	11,5	226,0	10
8	08:45	14260	CS4 - Center	11,0	3,5	0,20	8,0	0,37	7,3	324	16,0	313,0	11
9	09:45	14261	Industry outlet Pivara	2,0	80,0	0	2,0	16,0	7,3	864	36,5	643,0	51
10	10:00	14264	Industry outlet Makstil	0	14,0	0,06	5,0	2,0	6,5	772	8,0	594,0	15
11	09:15	14265	Bridge N.Lisice	12,0	2,0	0,18	7,4	0,24	7,7	318	15,0	294,0	12
12	09:30	14267	Sewage pipe - Aerodrom - N.Lisice	0,6	50,0	1,0	2,0	24,0	7,7	938	35,0	653,0	53
13	10:15	14268	Location between sewage pipe and Industry pipe	11,0	2,5	0,22	13,5	0,47	7,8	336	16,0	254,0	12
14	10:30	14269	Outlet from unlegal settelment Lisice	10,0	2,0	0,21	9,5	0,54	7,3	340	13,0	328,0	28
15	10:45	14270	Pipe under bridge	11,0	3,0	0,25	11,0	0,87	7,4	325	13,3	224,0	18
16	11:00	14271	Open chanel	11,0	4,0	0,24	13,0	0,70	7,7	314	15,3	295,0	14
17	11:30	14272	CS5 Bridge Jurulljari	11,0	3,0	0,24	14,5	0,76	7,6	325	12,0	331,0	20
18	12:00	14273	Pump station Dracevo	0,4	22,0	0	2,0	32,0	8,0	986	60,0	548,0	53

Series 1 :28.11.2007				Phisic - chemical parameters						
No	Hour of sampling	Laboratory Label	Description of location	CN	PO_4	T-P	F	Color	Odor	Transparency
				mg/l	mg/l	mg/l	mg/l	Pt	poen	(NTU)
1	06:30	14224	Stil bridge Saraj	0	2.4	0.8	0.043	0	1	16
2	07:00	14225	Sport centar Saraj -Treska	0	0.7	0.23	0.06	0	1	9
3	07:30	14226	Lepenec	0	3.19	1	0.22	0	1	7
4	07:45	14255	CS2 Bridge Lepenec	0	3.66	1.2	0.17	0	1	4
5	07:15	14256	CS3 Pedestrian crossing Bardovci	0	3.53	1.18	0.13	0	1	0
6	08:30	14258	Sewage pipe - Bardovci	0	26.6	8.7	0.15	0	1	0
7	06:00	14259	Bridge Unated Nations	0	3.61	1.17	0.1	0	1	6
8	08:45	14260	CS4 - Center	0	2.81	0.92	0.14	0	1	12
9	09:45	14261	Industry outlet Pivara	0	48	15.6	0.23	0	1	21
10	10:00	14264	Industry outlet Makstil	0	1.16	0.38	0.1	0	1	3
11	09:15	14265	Bridge N.Lisice	0	2.95	0.98	0.26	0	1	6
12	09:30	14267	Sewage pipe - Aerodrom - N.Lisice	0	48.25	15.75	0.05	0	1	3
13	10:15	14268	Location between sewage pipe and Industry pipe	0	8.2	2.7	0	0	1	1
14	10:30	14269	Outlet from unlegal settelment Lisice	0	11.16	3.63	0.16	0	1	16
15	10:45	14270	Pipe under bridge	0	7.7	2.51	0.11	0	1	17
16	11:00	14271	Open chanel	0	7.35	2.4	0.11	0	1	8
17	11:30	14272	CS5 Bridge Jurulljari	0	3.67	1.2	0.13	0	1	7
18	12:00	14273	Pump station Dracevo	0	57.4	18.7	0.14	0	1	33

Series 2 :06.12.2007				Bio - chemical		Phisic - chemical parameters							
No	Hour of sampling	Laboratory Label	Description of location	DO	BOD_5	NO_2 as N	NO_3 as N	NH_4 as N	pH	N	SO_4	SS	Cl
				mg/l	mg/l	mg/l	mg/l	mg/l		µs/cm	mg/l	mg/l	mg/l
1	06:30	14575	Stil bridge Saraj	11,0	1,5	0,082	1,0	0.101	8,2	324	6,0	247,0	10
2	07:00	14576	Sport centar Saraj -Treska	11,0	2,0	0,0456	0,912	0.272	8,2	403	4,6	201,0	10
3	07:30	14577	Lepenec	12,0	3,0	0,0729	0.706	0.248	8,1	275	8,3	236,0	9
4	07:45	14578	CS2 Bridge Lepenec	12,0	1,0	0,0668	0.843	0.241	8,0	273	8,6	211,0	9
5	07:15	14579	CS3 Pedestrian crossing Bardovci	12,4	1,0	0,0668	1.094	0.178	7,8	284	9,0	219,0	9
6	08:30	14580	Sewage pipe - Bardovci	9,4	4,0	0,076	1.368	4.668	7,8	666	20,0	431,0	23
7	06:00	14581	Bridge Unated Nations	12,0	0,5	0,0699	0.957	0.202	8,1	365	6,0	216,0	11
8	08:45	14582	CS4 - Center	11,5	2,0	0,0912	0.638	0.420	7,7	362	7,4	225,0	11
9	09:45	14583	Industry outlet Pivara	5,7	1,0	0	0	9.336	7,7	851	37,0	541,0	54
10	10:00	14584	Industry outlet Makstil	11,0	10,0	0,0729	0.912	0.778	8,0	589	9,6	265,0	24
11	09:15	14585	Bridge N.Lisice	13,0	2,0	0,097	0.615	0.280	8,2	342	7,3	232,0	10
12	09:30	14586	Sewage pipe - Aerodrom - N.Lisice	3,4	5,6	0	0	15.56	8,0	884	31,3	601,0	55
13	10:15	14587	Location between sewage pipe and Industry pipe	12,5	1,3	0,066	0.478	0.622	8,1	365	40,0	253,0	14
14	10:30	14588	Outlet from unlegal settelment Lisice	12,0	20,0	0,103	1.00	0.614	8,0	355	8,8	231,0	11
15	10:45	14589	Pipe under bridge	12,5	3,0	0,097	0.661	0.731	7,5	354	8,0	242,0	11
16	11:00	14590	Open chanel	12,3	4,0	0,10	1.162	0.855	7,9	352	7,7	275,0	10
17	11:30	14591	CS5 Bridge Jurulljari	13,0	2,0	0,0972	1.66	0.676	8,0	350	8,0	263,0	10
18	12:00	14592	Pump station Dracevo	4,0	2,5	0	0	31.12	8,0	998	62,0	586,0	56

Series 2 :06.12.2007				Phisic - chemical parameters						
No	Hour of sampling	Laboratory Label	Description of location	CN	PO_4	T-P	F	Color	Odor	Transparency
				mg/l	mg/l	mg/l	mg/l	Pt	poen	(NTU)
1	06:30	14575	Stil bridge Saraj	0	1.5	0.5	0.26	0	1	18
2	07:00	14576	Sport centar Saraj -Treska	0	1.67	0.54	0.17	0	1	16
3	07:30	14577	Lepenec	0	5.74	18.7	0.23	0	1	31
4	07:45	14578	CS2 Bridge Lepenec	0	3.29	1	0.21	0	1	3
5	07:15	14579	CS3 Pedestrian crossing Bardovci	0	2.94	0.95	0.25	0	1	1
6	08:30	14580	Sewage pipe - Bardovci	0	29.94	9.8	0.34	0	1	0
7	06:00	14581	Bridge Unated Nations	0	33.73	11.1	0.27	0	1	5
8	08:45	14582	CS4 - Center	0	5.54	1.8	0.34	0	1	10
9	09:45	14583	Industry outlet Pivara	0	33.5	11	0.4	0	1	18
10	10:00	14584	Industry outlet Makstil	0	0	0	0.91	0	1	2
11	09:15	14585	Bridge N.Lisice	0	1.38	0.45	0.27	0	1	6
12	09:30	14586	Sewage pipe - Aerodrom - N.Lisice	0	8.92	2.9	0.33	0	1	4
13	10:15	14587	Location between sewage pipe and Industry pipe	0	3.18	1	0.2	0	1	0
14	10:30	14588	Outlet from unlegal settelment Lisice	0	3.96	1.3	0.12	0	1	14
15	10:45	14589	Pipe under bridge	0	4.9	1.6	0.28	0	1	14
16	11:00	14590	Open chanel	0	4.9	1.6	0.3	0	1	10
17	11:30	14591	CS5 Bridge Jurulljari	0	5.17	1.7	0.22	0	1	5
18	12:00	14592	Pump station Dracevo	0	55.46	18.1	0.34	0	3	35

Series 1 :28.11.2007				Heavy metals									
No	Hour of sampling	Laboratory Label	Description of location	As (µg/L)	Pb (mg/L)	Cd (mg/L)	Zn (mg/L)	Fe (mg/L)	Mn (mg/L)	Cr (mg/L)	Ni (mg/L)	Hg (µg/L)	Na (mg/L)
1	06:30	14224	Stil bridge Saraj	< 0.003	0.004	0.0004	0.025	1.525	0.003	0.019	0.0	0.214	4.8
2	07:00	14225	Sport centar Saraj -Treska	< 0.003	< 0.0013	< 0.0001	0.075	1.45	0.002	0.016	0.0	0.229	5.3
3	07:30	14226	Lepenec	< 0.003	< 0.0013	< 0.0001	0.05	1.68	0.013	0.009	0.0	1.409	8.6
4	07:45	14255	CS2 Bridge Lepenec	< 0.003	< 0.0013	< 0.0001	0.025	1.88	0.058	0.010	0.0	1.641	3.85
5	07:15	14256	CS3 Pedestrian crossing Bardovci	1.0	< 0.0013	< 0.0001	0.05	4.48	0.004	0.001	0.001	0.52	4
6	08:30	14258	Sewage pipe - Bardovci	< 0.003	< 0.0013	< 0.0001	0.0751	1.1	0.021	0.001	0.002	0.352	5.5
7	06:00	14259	Bridge Unated Nations	1.0	< 0.0013	< 0.0001	0.025	2.25	0.004	0.003	0.0	0.85	6
8	08:45	14260	CS4 - Center	< 0.003	0.001	0.0002	0.005	1.25	0.002	0.003	0.001	1.25	4.5
9	09:45	14261	Industry outlet Pivara	1.0	0.005	0.0004	0.05	1.38	0.002	0.003	0.0	0.4	5.2
10	10:00	14264	Industry outlet Makstil	6.0	0.049	0.001	0.075	0.78	0.008	0.004	0.0	0.382	7
11	09:15	14265	Bridge N.Lisice	< 0.003	< 0.0013	0.0003	0.025	1.6	0.002	0.004	0.0	0.65	3
12	09:30	14267	Sewage pipe - Aerodrom - N.Lisice	2.0	0.010	0.001	< 0.05	7.9	0.016	< 0.0005	0.001	< 0.04	5.2
13	10:15	14268	Location between sewage pipe and Industry pipe	< 0.003	< 0.0013	< 0.0001	0.025	1.53	0.011	0.019	0.0	0.09	5.1
14	10:30	14269	Outlet from unlegal settelment Lisice	1.0	< 0.0013	< 0.0001	0.05	2.53	0.030	0.015	0.0	3.13	5.5
15	10:45	14270	Pipe under bridge	31	0.047	0.002	0.35	64	0.150	0.487	0.075	0.8	4.5
16	11:00	14271	Open chanel	< 0.003	< 0.0013	< 0.0001	0.025	3.42	0.037	0.037	0.003	0.23	6.2
17	11:30	14272	CS5 Bridge Jurulljari	< 0.003	< 0.0013	< 0.0001	0.03	0.83	0.005	0.009	0.0	0.503	5
18	12:00	14273	Pump station Dracevo	< 0.003	< 0.0013	0.001	0.06	0.61	0.018	0.011	0.0	0.717	5.5

				Heavy metals									
Series 2 :06.12.2007													
No	*Hour of samplin*	*Laborat ory*	*Description of location*	As (µg/L)	Pb (mg/L)	Cd (mg/L)	Zn (mg/L)	Fe (mg/L)	Mn (mg/L)	Cr (mg/L)	Ni (mg/L)	Hg (µg/L)	Na (mg/L)
1	06:30	14575	Stil bridge Saraj	< 0.003	< 0.0013	< 0.0001	0.02	0.66	0.008	0.025	0.0	< 0.04	5.2
2	07:00	14576	Sport centar Saraj -Treska	3.0	< 0.0013	< 0.0001	0.03	0.89	0.006	0.007	0.0	1.24	4.4
3	07:30	14577	Lepenec	< 0.003	< 0.0013	< 0.0001	0.02	0.91	0.007	0.010	0.001	0.455	3.8
4	07:45	14578	CS2 Bridge Lepenec	< 0.003	< 0.0013	< 0.0001	0.03	0.88	0.007	0.012	0.001	0.210	5.3
5	07:15	14579	CS3 Pedestrian crossing Bardovci	< 0.003	< 0.0013	< 0.0001	0.03	0.88	0.008	0.010	0.0	0.603	4.7
6	08:30	14580	Sewage pipe - Bardovci	< 0.003	< 0.0013	< 0.0001	0.04	0.55	0.004	0.011	0.0	0.656	15.2
7	06:00	14581	Bridge Unated Nations	< 0.003	0.003	< 0.0001	0.02	0.01	0.003	0.019	0.0	0.214	4.5
8	08:45	14582	CS4 - Center	< 0.003	0.004	< 0.0001	0.03	0.01	0.002	0.016	0.0	0.229	6.3
9	09:45	14583	Industry outlet Pivara	< 0.003	0.006	0.001	0.04	0.08	0.013	0.009	0.0	1.409	31.3
10	10:00	14584	Industry outlet Makstil	< 0.003	0.004	0.003	0.02	0.01	0.058	0.010	0.0	1.641	16.0
11	09:15	14585	Bridge N.Lisice	< 0.003	0.002	< 0.0001	0.01	0.04	0.004	0.001	0.001	0.520	5.2
12	09:30	14586	Sewage pipe - Aerodrom - N.Lisice	< 0.003	0.005	< 0.0001	0.03	0.02	0.021	0.001	0.002	0.352	28.3
13	10:15	14587	Location between sewage pipe and Industry pipe	< 0.003	0.002	< 0.0001	0.01	0.02	0.004	0.003	0.0	0.850	6.5
14	10:30	14588	Outlet from unlegal settelment Lisice	< 0.003	0.002	< 0.0001	0.01	0.02	0.002	0.003	0.001	1.26	6.1
15	10:45	14589	Pipe under bridge	< 0.003	< 0.0013	< 0.0001	0.02	0.01	0.002	0.003	0.0	0.4	6.1
16	11:00	14590	Open chanel	< 0.003	0.011	< 0.0001	0.01	0.1	0.008	0.004	0.0	0.382	6.1
17	11:30	14591	CS5 Bridge Jurulljari	< 0.003	0.002	< 0.0001	0.01	0.01	0.002	0.004	0.0	0.65	7
18	12:00	14592	Pump station Dracevo	< 0.003	< 0.0013	< 0.0001	0.05	< 0.3	0.016	< 0.0005	0.001	< 0.04	55.0

Series 1 :28.11.2007				Microbiological parameters		
No	*Hour of sampling*	*Laboratory Label*	*Description of location*	*Total number of bacteria*	*Number of coliform bacteria*	*Isolated type of bacteria*
1	06:30	14224	Stil bridge Saraj	20 000	MPN (500) III class	E.coli, Enterobacteriacae spp. Enterococcus,
2	07:00	14225	Sport centar Saraj -Treska	20 000	MPN (500) III class	E.coli Enterococcus
3	07:30	14226	Lepenec	20 000	MPN (500) III class	E.coli, Enterobacteriacae spp., Enterococcus,
4	07:45	14255	CS2 Bridge Lepenec	20 000	MPN (500) III class	E.coli, Enterobacteriacae spp., Enterococcus,
5	07:15	14256	CS3 Pedestrian crossing Bardovci	20 000	MPN (500) III class	E.coli, Enterobacteriacae spp., Enterococcus,
6	08:30	14258	Sewage pipe - Bardovci	240 000	MPN (24000) V class	E.coli, Enterobacteriacae spp., Enterococcus,
7	06:00	14259	Bridge Unated Nations	20 000	MPN (500) III class	E.coli, Enterococcus Citrobacter spp.
8	08:45	14260	CS4 - Center	20 000	MPN (500) III class	E.coli, Enterobacter spp. Enterococcus Proteus spp.
9	09:45	14261	Industry outlet Pivara	240 000	MPN (24000) V class	E.coli, Enterobacteriacae spp., Enterococcus,
10	10:00	14264	Industry outlet Makstil	24 000	MPN (2400) IV class	E.coli, Enterobacteriacae spp., Enterococcus,

11	09:15	14265	Bridge N.Lisice	20 000	MPN (500) III class	E.coli, Enterobacteriacae spp., Enterococcus,
12	09:30	14267	Sewage pipe - Aerodrom - N.Lisice	240 000	MPN (24000) V class	E.coli, Enterobacteriacae spp., Enterococcus,
13	10:15	14268	Location between sewage pipe and Industry pipe	200 000	MPN (500) III class	E.coli, Aeromonas Enterobacter spp. Enterococcus
14	10:30	14269	Outlet from unlegal settelment Lisice	20 000	MPN (500) III class	E.coli, Enterobacter spp. Enterococcus, Citrobacter spp.
15	10:45	14270	Pipe under bridge	20 000	MPN (500) III class	E.coli, Enterobacteriacae spp., Enterococcus,
16	11:00	14271	Open chanel	20 000	MPN (500) III class	E.coli, Enterobacteriacae spp., Enterococcus,
17	11:30	14272	CS5 Bridge Jurulljari	20 000	MPN (500) III class	E.coli, Enterobacteriacae spp., Enterococcus, Proteus spp.
18	12:00	14273	Pump station Dracevo	240 000	MPN (24000) V class	E.coli, Enterobacteriacae spp., Enterococcus,

MPN was calculated by Schwarop's tables according to Table IV (modified) and Table V (modified) expressed into 100 ml of water sample

Table IV – Method with 5 tubes with 0.1ml water sample, 1 tube with 0,01ml and one tube with 0,001ml

Table V – Method with 5 tubes with 0.01ml water sample, 1 tube with 0,001ml and one tube with 0,0001ml

According to regulation in Republic of Macedonia there are 5 classes of water

Series 2 :06.12.2007				Microbiological parameters		
No	*Hour of sampling*	*Laboratory Lab*	*Description of location*	*Total number of bacteria*	*Number of coliform bacteria*	*Isolated type of bacteria*
1	06:30	14575	Stil bridge Saraj	20 000	MPN (500) III class	E.coli Enterococcus, Proteus spp. Citrobacter spp.
2	07:00	14576	Sport centar Saraj -Treska	20 000	MPN (500) III class	E.coli Enterococcus, Citrobacter spp.
3	07:30	14577	Lepenec	20 000	MPN (500) III class	E.coli Serratia, Enterococcus
4	07:45	14578	CS2 Bridge Lepenec	20 000	MPN (500) III class	E.coli, Enterobacter spp. Enterococcus Citrobacter spp.
5	07:15	14579	CS3 Pedestrian crossing Bardovci	20 000	MPN (500) III class	E.coli, Enterobacter spp. Enterococcus Citrobacter spp.
6	08:30	14580	Sewage pipe - Bardovci	240 000	MPN (24000) V class	E.coli Serratia, Enterococcus
7	06:00	14581	Bridge Unated Nations	20 000	MPN (500) III class	E.coli, Enterococcus Citrobacter spp.
8	08:45	14582	CS4 - Center	20 000	MPN (500) III class	E.coli, Enterobacter spp. Enterococcus Citrobacter spp.
9	09:45	14583	Industry outlet Pivara	240 000	MPN (24000) V class	E.coli, Proteus spp. Enterococcus Citrobacter spp.
10	10:00	14584	Industry outlet Makstil	24 000	MPN (2400) IV class	E.coli, Enterobacter spp.

						Enterococcus
11	09:15	14585	Bridge N.Lisice	20 000	MPN (500) III class	E.coli, Enterobacter spp. Enterococcus Proteus spp.
12	09:30	14586	Sewage pipe - Aerodrom - N.Lisice	240 000	MPN (24000) V class	Proteus spp. Pseudomonas spp. Enterobacter spp. Enterococcus
13	10:15	14587	Industry pipe	20 000	MPN (500) III class	E.coli, Aeromonas , Enterobacter spp. Enterococcus
14	10:30	14588	Outlet from unlegal settelment Lisice	20 000	MPN (500) III class	E.coli, Enterobacter spp. Enterococcus Citrobacter spp.
15	10:45	14589	Pipe under bridge	20 000	MPN (500) III class	E.coli, Enterobacteriacae spp., Enterococcus,
16	11:00	14590	Open chanel	20 000	MPN (500) III class	E.coli, Enterobacteriacae spp., Enterococcus,
17	11:30	14591	CS5 Bridge Jurulljari	20 000	MPN (500) III class	E.coli, Enterobacteriacae spp., Enterococcus,
18	12:00	14592	Pump station Dracevo	240 000	MPN (24000) V class	E.coli Enterococcus Citrobacter spp. Proteus spp.

MPN was calculated by Schwarop's tables according to Table IV (modified) and Table V (modified) expressed into 100 ml of water sample

Table IV – Method with 5 tubes with 0.1ml water sample, 1 tube with 0,01ml and one tube with 0,001ml

Table V – Method with 5 tubes with 0.01ml water sample, 1 tube with 0,001ml and one tube with 0,0001ml

According to regulation in Republic of Macedonia there are 5 classes of water

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Бр. 07 - 341/2
23. 11. 2007

ДО: ЗАВОД ЗА ВОДОСТОПАНСТВО НА РМ-СКОПЈЕ

ПРЕДМЕТ : Одговор на Ваше барање со број 03-233

Почитувани,

За тестирање на отпадни води во Република Македонија, Републички завод за здравствена заштита има акредитирано една метода за тестирање на отпадни води и тоа „Квалитет на вода-Определување на растворени Li^+, Na^+, NH_4^+, K^+, Mn^{2+}, Ca^{2+}, Mg^{2+}, Sr^{2+} и Ba^{2+} со јонска хроматографија".

Друга лабораторија за тестирање на отпадни води засега не е акредитирана.

Со почит,

Др. Трпе Ристоски
Директор

28.11.2007			
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