APPENDIX J

AGRICULTURAL INFRASTRUCTURE

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LIST OF TABLES

TABLE J-1-1 FACILITATED IRRIGATION AREA IN BULGARIA

(UNIT : 1,000 ha)

			Total in	Operated	Water Resources			Water Supply		Irrigation Methods		
			Bulgaria	by ISC	Dam	River	G. W	Gravity	Pump	Gravity	Sprinkler	Others
Available Irrigation Area (02+03+04)		01	1,017.50	960.93	608.08	400.92	8.51	391.78	625.73	492.40	510.26	14.84
Ready to Irrigation	(class I & II)	02	692.55	673.00	437.53	248.68	6.35	263.13	429.42	318.47	364.69	9.39
Area to be rehabilitated	(Class III)	03	243.38	219.08	133.64	108.12	1.62	91.73	151.65	127.35	111.81	4.23
Area to be excluded from asset (05-09)	(Class IV)	04	81.57	68.84	36.91	44.12	0.54	36.91	44.66	46.59	33.76	1.23
due to												
- change of land use	(Class IV-2)	05	1.65	1.65	1.30	0.35	0.00	0.82	0.84	0.73	0.93	0.00
- change of water use	(Class IV-2)	06	1.29	1.09	0.09	0.91	0.29	0.72	0.57	1.14	0.16	0.00
- unsuitable soil	(Class IV-2)	07	13.84	13.78	5.96	7.88	0.00	0.86	12.98	2.88	10.92	0.03
- damage of water sources and facilities	(Class IV-1)	08	64.79	52.32	29.56	34.98	0.25	34.52	30.27	41.84	21.75	1.20
- water pollution	(Class IV-2)	09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SOURCE: Irrigation System Company (ISC)

NOTE: G.W is Ground Water

TABLE J-1-2 STUDY AREA AND FACILITATED AREA

(UNIT : ha)

Region	Name of Study Area	Study Area	Facilitated Area			Unsuitable land for Cultivation	New Area	Irrigated area		Remarks
			ready to irrigate	to be rehabilitated	total			1995	1996	
Petrich	Petrich Case I	6,584.6	2,767.7	3,816.9	6,584.6	0.0	0.0	400.0	682.6	
	Petrich Case II	11,000.0	4,081.4	6,918.6	11,000.0	0.0	0.0	--	--	
Rositza	Main Lower Right Canal Area	12,020.0	9,850.1	1,880.0	11,730.1	9.4	280.5	0. 0	136.7	
	Main Left Nikyupski Canal Area	9,384.5	7,596.1	1,555.0	9,151.1	7.0	226.4	670.6	1,532.1	
	North Main Canal Area	29,295.5	18,579.5	9,164.5	27,744.0	335.9	1,215.6	839.1	2,668.1	
	Total	50,700.0	36,025.7	12,599.5	48,625.2	352.3	1,722.5	1,509.7	4,336.9	
										50,347.7
Sredna Tundja	Nova Zagora Area	22,400.0	12,940.4	280.0	13,220.4	0.0	9,179.6	3,215.2	3,440.4	
	Mlekaevo Padarevo Area	20,000.0	0.0	0.0	0.0	0.0	20,000.0	0.0	0.0	
	Binkos Marash Area	35,000.0	26,352.3	2,317.6	28,669.9	1,825.7	4,504.4	1,137.4	1,601.6	
	Kerman Roza Area	19,600.0	6,776.8	490.5	7,267.3	241.9	12,090.8	319.6	444.8	
	Total	97,000.0	46,069.5	3,088.1	49,157.6	2,067.6	45,774.8	4,672.2	5,486.8	
										94,932.4

Study Area — Study Area under this Project

Facilitated Area — Irrigable land by the existing irrigation canal system

New Area — None facilitated area and suitable land for cultivation in category IV

Irrigated Area — Irrigated land by the existing canal and collected irrigation fee

TABLE J-1-3 MAJOR DIMENSIONS OF ALEKSANDAR STAMBOLIISKI DAM

Descriptions	Dimensions
Catment Area	1,598.00 sq.km
Total Storage Volume	220.00 mcm
Dead Storage Volume	8.30 mcm
Effective Storage Volume	211.70 mcm
High Water Level	185.50 m
Dam Height	68.00 m
Dam Length	350.00 m
Spillway Discharge	2,400.00 cu.m/sec

TABLE J-1-4 MAJOR DIMENSIONS OF JREBCHEVO DAM

Descriptions	Dimensions
Catment Area	900.00 sq.km
Total Storage Volume	400.00 mcm
Dead Storage Volume	30.00 mcm
Effective Storage Volume	370.00 mcm
High Water Level	266.00 m
Dam Height	50.50 m
Dam Length	791.00 m
Spillway Discharge	1,440.00 cu.m/sec

Table J-2-1 Water Requirement of Petrich Study Area
(Petrich, 75 % irrigation)

Efficiency : Fullow , 65% x Canal , 90 % = 58.5 %
Sprinkler , 85% x Canal , 90 % = 76.5 %

Crop	Ratio (%)	Area (ha)	Unit W. R. (cu.m/dka)	Crop W.R (mcm)	Efficiency	(%)	W. Req. (mcm)
1 Wheat	3.5	385	180	0.693	F	58.5	1.185
2 Barley	7.5	825	120	0.990	F	58.5	1.692
3 Grain Maize	7.5	825	300	2.475	F	58.5	4.231
18 Fodder Maize	3.0	330	310	1.023	F	58.5	1.749
8 Tabacco	20.0	2,200	230	5.060	S	76.5	6.614
6 Sunflower	0.0	0	0	0.000	S	76.5	0.000
10 Sugar Beet	0.0	0	360	0.000	S	76.5	0.000
11 Tomato - early	5.0	550	310	1.705	S	76.5	2.229
12 Tomato - main	2.0	220	470	1.034	S	76.5	1.352
14 Peppers	5.0	550	470	2.585	S	76.5	3.379
Onion	2.5	275	400	1.100	S	76.5	1.438
Cucumber	3.0	330	400	1.320	S	76.5	1.725
15 Cabbage	3.0	330	350	1.155	S	76.5	1.510
Other Vegs-early	4.0	440	400	1.760	S	76.5	2.301
Other Vegs-main	2.5	275	400	1.100	S	76.5	1.438
Other Vegs-Late	1.5	165	400	0.660	S	76.5	0.863
25 Apples	0.5	55	420	0.231	S	76.5	0.302
(25) Plums	0.0	0	420	0.000	S	76.5	0.000
27 Peaches	3.0	330	360	1.188	S	76.5	1.553
24 Table Grapes	3.5	385	240	0.924	S	76.5	1.208
(25) Other Fruit	1.0	110	420	0.462	S	76.5	0.604
24 Grapes	4.0	440	240	1.056	S	76.5	1.380
(11) Melons	3.0	330	310	1.023	S	76.5	1.337
21 Alfalfa	4.0	440	298	1.311	F	58.5	2.241
(2) Oats	0.0	0	120	0.000	F	58.5	0.000
7 Cotton	0.0	0	0	0.000	S	76.5	0.000
(5) Peanuts	5.0	550	120	0.660	S	76.5	0.863
4 Soy	0.0	0	0	0.000	S	76.5	0.000
26 Peas	5.0	550	420	2.310	S	76.5	3.020
*5 Beans	1.5	165	120	0.198	S	76.5	0.259
8 Potato	0.0	0	230	0.000	F	58.5	0.000
23 Pasture	2.5	275	60	0.165	F	58.5	0.282
Unplanted Area	0.0	0	0	0.000			0.000
On-farm Road	0.0	0	0	0.000			0.000
Total	103.00	11,330		32.188			44.754
	11,000.00						

Table J-2-2 Water Requirement of Rositza Study Area
(Pavlikeni , 75 % Irrigation)

Efficiency : Fullow , 65% x Canal , 90 % = 58.5 %
Sprinkler , 85% x Canal , 90 % = 76.5 %

Crop	Ratio (%)	Area (ha)	Unit W. R. (cu.m/dka)	Crop W.R (mcm)	Efficiency	(%)	W. Req. (mcm)
1 Wheat	5.0	2,517	60	1.510	F	58.5	2.582
2 Barley	2.4	1,208	60	0.725	F	58.5	1.239
3 Grain Maize	7.5	3,776	240	9.063	F	58.5	15.492
18 Fodder Maize	3.0	1,510	230	3.474	F	58.5	5.938
8 Tabacco	0.0	0	0	0.000	S	76.5	0.000
6 Sunflower	5.0	2,517	120	3.021	S	76.5	3.949
10 Sugar Beet	2.5	1,259	240	3.021	S	76.5	3.949
11 Tomato - early	0.0	0	270	0.000	S	76.5	0.000
12 Tomato - main	1.0	503	350	1.762	S	76.5	2.303
14 Peppers	0.5	252	390	0.982	S	76.5	1.283
Onion	0.5	252	310	0.780	S	76.5	1.020
Cucumber	0.5	252	310	0.780	S	76.5	1.020
15 Cabbage	1.0	503	310	1.561	S	76.5	2.040
Other Vegs-early	0.0	0	310	0.000	S	76.5	0.000
Other Vegs-main	1.0	503	310	1.561	S	76.5	2.040
Other Vegs-Late	0.0	0	310	0.000	S	76.5	0.000
25 Apples	0.5	252	300	0.755	S	76.5	0.987
(25) Plums	0.5	252	300	0.755	S	76.5	0.987
27 Peaches	1.0	503	300	1.510	S	76.5	1.974
24 Table Grapes	1.0	503	180	0.906	S	76.5	1.185
(25) Other Fruit	0.5	252	300	0.755	S	76.5	0.987
24 Grapes	6.0	3,021	180	5.438	S	76.5	7.108
(11) Melons	2.0	1,007	270	2.719	S	76.5	3.554
21 Alfalfa	2.0	1,007	243	2.447	F	58.5	4.183
(2) Oats	0.0	0	60	0.000	F	58.5	0.000
7 Cotton	0.0	0	0	0.000	S	76.5	0.000
(5) Peanuts	0.0	0	60	0.000	S	76.5	0.000
4 Soy	1.0	503	180	0.906	S	76.5	1.185
26 Peas	0.0	0	300	0.000	S	76.5	0.000
5 Beans	1.0	503	60	0.302	S	76.5	0.395
*8 Potato	1.0	503	190	0.957	F	58.5	1.635
23 Pasture	3.0	1,510	60	0.906	F	58.5	1.549
Unplanted Area	0.0	0	0	0.000			0.000
On-farm Road	0.0	0	0	0.000			0.000
Total	49.40	24,872		46.597			68.586
	50,347.70						

Table J-2-3 Water Requirement of Sreduna Tundja Study Area
(Nova Zagora, 75 % irrigation)

Efficiency : Furlow , 65% x Canal , 90 % = 58.5 %
Sprinkler , 85% x Canal , 90 % = 76.5 %

Crop	Ratio (%)	Area (ha)	Unit W. R. (cu.m/dka)	Crop W.R (mcm)	Efficiency	(%)	W. Req. (mcm)
1 Wheat	0.0	0	120	0.000	F	58.5	0.000
2 Barley	0.0	0	60	0.000	F	58.5	0.000
3 Grain Maize	7.5	7,120	240	17.088	F	58.5	29.210
18 Fodder Maize	1.0	949	270	2.563	F	58.5	4.381
8 Tabacco	0.0	0	190	0.000	S	76.5	0.000
6 Sunflower	0.0	0	120	0.000	S	76.5	0.000
10 Sugar Beet	0.0	0	300	0.000	S	76.5	0.000
11 Tomato - early	0.5	475	310	1.471	S	76.5	1.923
12 Tomato - main	1.0	949	430	4.082	S	76.5	5.336
14 Peppers	0.5	475	430	2.041	S	76.5	2.668
Onion	0.5	475	330	1.566	S	76.5	2.048
Cucumber	0.5	475	330	1.566	S	76.5	2.048
15 Cabbage	0.0	0	310	0.000	S	76.5	0.000
Other Vegs-early	0.0	0	330	0.000	S	76.5	0.000
Other Vegs-main	1.0	949	330	3.133	S	76.5	4.095
Other Vegs-Late	0.5	475	330	1.566	S	76.5	2.048
25 Apples	0.5	475	360	1.709	S	76.5	2.234
(25) Plums	1.0	949	360	3.418	S	76.5	4.467
27 Peaches	3.0	2,848	360	10.253	S	76.5	13.402
24 Table Grapes	1.0	949	180	1.709	S	76.5	2.234
(25) Other Fruit	1.0	949	360	3.418	S	76.5	4.467
24 Grapes	6.0	5,696	180	10.253	S	76.5	13.402
(11) Melons	1.0	949	310	2.943	S	76.5	3.847
21 Alfalfa	2.0	1,899	243	4.614	F	58.5	7.887
(2) Oats	0.0	0	60	0.000	F	58.5	0.000
7 Cotton	1.0	949	180	1.709	S	76.5	2.234
(5) Peanuts	0.0	0	60	0.000	S	76.5	0.000
4 Soy	0.0	0	240	0.000	S	76.5	0.000
26 Peas	0.5	475	360	1.709	S	76.5	2.234
5 Beans	0.5	475	60	0.285	S	76.5	0.372
16 Potato	0.5	475	120	0.570	F	58.5	0.974
23 Pasture	3.0	2,848	60	1.709	F	58.5	2.921
Unplanted Area	0.0	0	0	0.000			0.000
On-farm Road	0.0	0	0	0.000			0.000
Total	34.00	32,277		79.373			114.431
	94,932.00						

Table J-2-4 Water Requirement of Sreduna Tundja Study Area (Alternative)
(Nova Zagora, 75 % irrigation)

Efficiency : Fullow , 65% x Canal , 90 % = 58.5 %
Sprinkler , 85% x Canal , 90 % = 76.5 %

Crop	Ratio (%)	Area (ha)	Unit W. R. (cu.m/dka)	Crop W.R (mcm)	Efficiency	(%)	W. Req. (mcm)
1 Wheat	5.0	3,149	120	3.778	F	58.5	6.459
2 Barley	2.4	1,511	60	0.907	F	58.5	1.550
3 Grain Maize	7.5	4,723	240	11.335	F	58.5	19.376
18 Fodder Maize	3.0	1,889	270	5.101	F	58.5	8.719
8 Tabacco	0.0	0	190	0.000	S	76.5	0.000
6 Sunflower	2.5	1,574	120	1.889	S	76.5	2.470
10 Sugar Beet	1.0	630	300	1.889	S	76.5	2.470
11 Tomato - early	0.5	315	310	0.976	S	76.5	1.276
12 Tomato - main	1.5	945	430	4.062	S	76.5	5.309
14 Peppers	1.0	630	430	2.708	S	76.5	3.540
Onion	1.0	630	330	2.078	S	76.5	2.716
Cucumber	1.0	630	330	2.078	S	76.5	2.716
15 Cabbage	0.5	315	310	0.976	S	76.5	1.276
Other Vegs-early	0.0	0	330	0.000	S	76.5	0.000
Other Vegs-main	1.5	945	330	3.117	S	76.5	4.075
Other Vegs-Late	1.0	630	330	2.078	S	76.5	2.716
25 Apples	0.5	315	360	1.134	S	76.5	1.482
(25) Plums	1.0	630	360	2.267	S	76.5	2.963
27 Peaches	4.0	2,519	360	9.068	S	76.5	11.854
24 Table Grapes	1.5	945	180	1.700	S	76.5	2.223
(25) Other Fruit	1.0	630	360	2.267	S	76.5	2.963
24 Grapes	7.5	4,723	180	8.501	S	76.5	11.113
(11) Melons	1.5	945	310	2.928	S	76.5	3.828
21 Alfalfa	2.0	1,259	243	3.060	F	58.5	5.232
(2) Oats	0.0	0	60	0.000	F	58.5	0.000
7 Cotton	1.0	630	180	1.134	S	76.5	1.482
(5) Peanuts	0.0	0	60	0.000	S	76.5	0.000
4 Soy	0.0	0	240	0.000	S	76.5	0.000
26 Peas	1.0	630	360	2.267	S	76.5	2.963
5 Beans	1.0	630	60	0.378	S	76.5	0.494
16 Potato	1.0	630	120	0.756	F	58.5	1.292
23 Pasture	3.0	1,889	60	1.134	F	58.5	1.938
Unplanted Area	0.0	0	0	0.000			0.000
On-farm Road	0.0	0	0	0.000			0.000
Total	55.40	34,887		79.566			114.494
	62,973.00						

Table J-2-5 Facilitated Agricultural Land of Nova Zagora Block

No	Name of Main Pipe	Name of Irri. Block	Name of Village	Facilitated Area (dca)	
1	M-3 Main Canal (direct offtake)		Korten	9,817	
			Asenovets	7,174	
			Bryastovo	4,558	
			Karanovo	5,127	
		Sub-Total		26,676	
2	Nova Zagora Syphon		Korten	6,358	
			Nova Zagora	4,671	
		Sub-Total		11,029	
3	No. 1 Main Pipe (81-Main Pipe Line-1)	Korten-Karanovo	Korten	7,455	
			Korten	206	
		Sub-Total		7,661	
4	No. 2 Main Pipe (89-Main Pipe Line-1)	Korten-Karanovo	Asenovets	5,040	
		Sub-Total		5,040	
5	No. 3 Main Pipe (GST-2)	Zagortzi-Karanovo	Bryastovo	3,904	
			Karanovo	3,059	
			Sub-Total	6,963	
		Stoil-Voivoda	Nova Zagora	2,399	
			Stoil Voivoda	26,157	
			Zagortzi	2,722	
			Karanovo	451	
			Sub-Total	31,729	
		Zagortzi-Bogdanovo	Zagortzi	6,994	
			Bogdanovo	839	
			Sub-Total	7,833	
		Sub-Total		46,525	
6	No.4 Main Canal (GST-1)	Zagortzi-Karanovo	Karanovo	5,035	
			Sub-Total	5,035	
		Zagortzi-Sabrano	Karanovo	1,514	
			Sabrano	6,389	
			Zagortzi	8,524	
			Sub-Total	16,427	
		Zagortzi-Lyubenetz	Lyubenetz	4,984	
			Zagortzi	8,623	
			Sub-Total	13,607	
		Sub-Total		35,069	
	TOTAL			132,000	

Source : ISC Sliven

Table J-2-6 Water Requirement of Nova Zagora Project Area
(Nova Zagora, 75 % Irrigation)

Efficiency : Fullow , 65% x Canal , 90 % = 58.5 %
Sprinkler , 85% x Canal , 90 % = 76.5 %

Crop		Ratio (%)	Area (ha)	Unit W. R. (cu.m/dca)		Efficiency (%)	W. R. (cu.m/dca)	W. Req. (mcm)
1 Wheat (irrigated)		0.0	0.0					
Wheat (non-irrigated)		35.0	4,620.0					
Wheat (Total)		35.0	4,620.0					
2 Barley (irrigated)		0.0	0.0					
Barley (non-irrigated)		17.0	2,244.0					
Barley (Total)		17.0	2,244.0					
3 Grain Maize (irrigated)	75	13.0	1,716.0	240	F	58.5	410	7.040
Grain Maize (non-irrigated)		0.0	0.0					
Grain Maize (total)		13.0	1,716.0					
6 Sunflower (irrigated)	75	2.0	264.0	120	S	76.5	157	0.414
Sunflower (non-irrigated)		10.0	1,320.0					
Sunflower (total)		12.0	1,584.0					
* Millet		3.0	396.0					
12 Vegetable (Tomato)	90	2.5	330.0	310	S	76.5	405	1.337
12 Vegetable (Cabbage)	90	2.5	330.0	310	S	76.5	405	1.337
12 Melons	75	0.5	66.0	430	S	76.5	562	0.371
4 Other Crops	75	3.0	396.0	240	S	76.5	314	1.242
25 Fruit (irrigated)	75	1.3	172.0	360	S	76.5	471	0.809
Fruit (non-irrigated)		0.0	0.0					
Fruit (total)		1.3	172.0					
24 Grapes (irrigated)	75	4.7	620.0	180	S	76.5	235	1.459
Grapes (non-irrigated)		0.0	0.0					
Grapes (total)		4.7	620.0					
21 Alfalfa (irrigated)	75	4.0	528.0	300	F	58.5	513	2.708
Alfalfa (non-irrigated)		0.0	0.0					
Alfalfa (total)		4.0	528.0					
23 Pasture		1.0	132.0					
Unplanted Area		1.0	132.0					
On-farm Road		2.0	264.0					
Total		102.5	13,530.0					
Total (irrigated)		33.5	4,422.0					16.718
		13,200.0	33.5 %					

Table J-2-7(1) Water Requirement of Small Size Farmer (Nova Zagora, 75 % irrigation)

Efficiency : Fullow , 65% x Canal , 90 % = 58.5 %
Sprinkler , 85% x Canal , 90 % = 76.5 %

Crop	Ratio (%)	Area (ha)	Unit W. R. (cu.m/dca)		Efficiency (%)	W. R. (cu.m/dca)	W. Req. (cm)
1 Wheat (irrigated)		0.0					
Wheat (non-irrigated)		5.3					
Wheat (Total)		5.3					
2 Barley (irrigated)		0.0					
Barley (non-irrigated)		2.6					
Barley (Total)		2.6					
3 Grain Maize (irrigated)	75	1.7	240	F	58.5	410	697.4
Grain Maize (non-irrigated)		0.0					
Grain Maize (total)		1.7					
6 Sunflower (irrigated)	75	0.0	120	S	76.5	157	0.0
Sunflower (non-irrigated)		1.2					
Sunflower (total)		1.2					
* Millet		0.2					
12 Vegetable (Tomato)	90	0.9	310	S	76.5	405	364.7
12 Vegetable (Cabbage)	90	0.9	310	S	76.5	405	364.7
12 Melons	75	0.2	430	S	76.5	562	112.4
4 Other Crops	75	0.9	240	S	76.5	314	282.4
25 Fruit (irrigated)	75	0.0	360	S	76.5	471	0.0
Fruit (non-irrigated)		0.0					
Fruit (total)		0.0					
24 Vineyard (irrigated)	75	1.2	180	S	76.5	235	282.4
Vineyard (non-irrigated)		0.0					
Vineyard (total)		1.2					
21 Alfalfa (irrigated)	75	0.3	300	F	58.5	513	153.8
Alfalfa (non-irrigated)		0.0					
Alfalfa (total)		0.3					
23 Pasture		0.3					
Unplanted Area		0.1					
On-farm Road		0.5					
Total		16.3					
Total (irrigated)		6.1					2,257.8
		37.9 %					

Table J-2-7(2) Water Requirement of Medium Size Farmer (Nova Zagora, 75 % irrigation)

Efficiency : Fullow , 65% x Canal , 90 % = 58.5 %
Sprinkler , 85% x Canal , 90 % = 76.5 %

Crop	Ratio (%)	Area (ha)	Unit W. R. (cu.m/dca)	Efficiency	(%)	W. R. (cu.m/dca)	W. Req. (cm)
1 Wheat (irrigated)		0.0					
Wheat (non-irrigated)		13.5					
Wheat (Total)		13.5					
2 Barley (irrigated)		0.0					
Barley (non-irrigated)		6.8					
Barley (Total)		6.8					
3 Grain Maize (irrigated)	75	5.8	240	F	58.5	410	2,379.5
Grain Maize (non-irrigated)		0.0					
Grain Maize (total)		5.8					
6 Sunflower (irrigated)	75	1.0	120	S	76.5	157	156.9
Sunflower (non-irrigated)		3.8					
Sunflower (total)		4.8					
* Millet		1.1					
12 Vegetable (Tomato)	90	1.7	310	S	76.5	405	688.9
12 Vegetable (Cabbage)	90	1.7	310	S	76.5	405	688.9
12 Melons	75	0.2	430	S	76.5	562	112.4
4 Other Crops	75	1.2	240	S	76.5	314	376.5
25 Fruit (irrigated)	75	0.5	360	S	76.5	471	235.3
Fruit (non-irrigated)		0.0					
Fruit (total)		0.5					
24 Vineyard (irrigated)	75	1.5	180	S	76.5	235	352.9
Vineyard (non-irrigated)		0.0					
Vineyard (total)		1.5					
21 Alfalfa (irrigated)	75	1.7	300	F	58.5	513	871.8
Alfalfa (non-irrigated)		0.0					
Alfalfa (total)		1.7					
23 Pasture		0.3					
Unplanted Area		0.4					
On-farm Road		1.1					
Total		42.3					
Total (irrigated)		15.3					5,863.0
		36.3 %					

Table J-2-7(3) Water Requirement of Pertnership Farmer (Nova Zagora, 75 % irrigation)

Efficiency : Fullow , 65% x Canal , 90 % = 58.5 %
Sprinkler , 85% x Canal , 90 % = 76.5 %

Crop	Ratio (%)	Area (ha)	Unit W. R. (cu.m/dca)		Efficiency (%)	W. R. (cu.m/dca)	W. Req. (cm)
1 Wheat (irrigated)		0.0					
Wheat (non-irrigated)		22.8					
Wheat (Total)		22.8					
2 Barley (irrigated)		0.0					
Barley (non-irrigated)		10.9					
Barley (Total)		10.9					
3 Grain Maize (irrigated)	75	12.1	240	F	58.5	410	4,964.1
Grain Maize (non-irrigated)		0.0					
Grain Maize (total)		12.1					
6 Sunflower (irrigated)	75	0.0	120	S	76.5	157	0.0
Sunflower (non-irrigated)		7.0					
Sunflower (total)		7.0					
* Millet		1.5					
12 Vegetable (Tomato)	90	1.0	310	S	76.5	405	405.2
12 Vegetable (Cabbage)	90	1.0	310	S	76.5	405	405.2
12 Melons	75	0.5	430	S	76.5	562	281.0
4 Other Crops	75	2.3	240	S	76.5	314	721.6
25 Fruit (irrigated)	75	0.4	360	S	76.5	471	188.2
Fruit (non-irrigated)		0.0					
Fruit (total)		0.4					
24 Vineyard (irrigated)	75	1.3	180	S	76.5	235	305.9
Vineyard (non-irrigated)		0.0					
Vineyard (total)		1.3					
21 Alfalfa (irrigated)	75	1.8	300	F	58.5	513	923.1
Alfalfa (non-irrigated)		0.0					
Alfalfa (total)		1.8					
23 Pasture		0.2					
Unplanted Area		0.7					
On-farm Road		1.3					
Total		64.8					
Total (irrigated)		20.4					8,194.4
		31.7 %					

Table J-2-7(4) Water Requirement of Large Scale Farmer
(Nova Zagora, 75 % irrigation)

Efficiency : Fullow , 65% x Canal , 90 % = 58.5 %
Sprinkler , 85% x Canal , 90 % = 76.5 %

	Crop	Ratio (%)	Area (ha)	Unit W. R. (cu.m/dca)		Efficiency (%)	W. R. (cu.m/dca)	W. Req. (cm)
1	Wheat (irrigated)		0.0					
	Wheat (non-irrigated)		100.7					
	Wheat (Total)		100.7					
2	Barley (irrigated)		0.0					
	Barley (non-irrigated)		44.0					
	Barley (Total)		44.0					
3	Grain Maize (irrigated)	75	42.3	240	F	58.5	410	17,353.8
	Grain Maize (non-irrigated)		0.0					
	Grain Maize (total)		42.3					
6	Sunflower (irrigated)	75	6.0	120	S	76.5	157	941.2
	Sunflower (non-irrigated)		28.3					
	Sunflower (total)		34.3					
*	Millet		11.7					
12	Vegetable (Tomato)	90	3.4	310	S	76.5	405	1,357.5
12	Vegetable (Cabbage)	90	3.4	310	S	76.5	405	1,357.5
12	Melons	75	2.0	430	S	76.5	562	1,124.2
4	Other Crops	75	11.0	240	S	76.5	314	3,451.0
25	Fruit (irrigated)	75	8.0	360	S	76.5	471	3,764.7
	Fruit (non-irrigated)		0.0					
	Fruit (total)		8.0					
24	Vineyard (irrigated)	75	15.0	180	S	76.5	235	3,529.4
	Vineyard (non-irrigated)		0.0					
	Vineyard (total)		15.0					
21	Alfalfa (irrigated)	75	10.3	300	F	58.5	513	5,282.1
	Alfalfa (non-irrigated)		0.0					
	Alfalfa (total)		10.3					
23	Pasture		4.0					
	Unplanted Area		4.3					
	On-farm Road		6.7					
	Total		301.0					
	Total (irrigated)		101.3					38,161.4
			33.9 %					

Table J-2-7(5) Water Requirement of Cooperative (Nova Zagora, 75 % irrigation)

Efficiency : Fullow , 65% x Canal , 90 % = 58.5 %
Sprinkler , 85% x Canal , 90 % = 76.5 %

Crop	Ratio (%)	Area (ha)	Unit W. R. (cu.m/dca)		Efficiency (%)	W. R. (cu.m/dca)	W. Req. (cm)
1 Wheat (irrigated)		0.0					
Wheat (non-irrigated)		362.6					
Wheat (Total)		362.6					
2 Barley (irrigated)		0.0					
Barley (non-irrigated)		174.2					
Barley (Total)		174.2					
3 Grain Maize (irrigated)	75	109.6	240	F	58.5	410	44,964.1
Grain Maize (non-irrigated)		0.0					
Grain Maize (total)		109.6					
6 Sunflower (irrigated)	75	29.2	120	S	76.5	157	4,580.4
Sunflower (non-irrigated)		111.0					
Sunflower (total)		140.2					
* Millet		39.0					
12 Vegetable (Tomato)	90	2.5	310	S	76.5	405	1,013.1
12 Vegetable (Cabbage)	90	2.5	310	S	76.5	405	1,013.1
12 Melons	75	1.2	430	S	76.5	562	674.5
4 Other Crops	75	16.0	240	S	76.5	314	5,019.6
25 Fruit (irrigated)	75	19.4	360	S	76.5	471	9,129.4
Fruit (non-irrigated)		0.0					
Fruit (total)		19.4					
24 Vineyard (irrigated)	75	47.2	180	S	76.5	235	11,105.9
Vineyard (non-irrigated)		0.0					
Vineyard (total)		47.2					
21 Alfalfa (irrigated)	75	51.6	300	F	58.5	513	26,461.5
Alfalfa (non-irrigated)		0.0					
Alfalfa (total)		51.6					
23 Pasture		8.6					
Unplanted Area		12.2					
On-farm Road		9.6					
Total		996.4					
Total (irrigated)		279.2					103,961.6
		28.1 %					

APPENDIX K

DESIGN & COST ESTIMATION

CONTENTS

LIST OF TABLES, EXHIBITS, DRAWINGS AND FIGURE

TABLE K-1-1 INVENTORY SURVEY OF PETRICH STUDY AREA(CANAL)

Name of Canal	Area (ha)	Q (m3/S)	Total Length (m)	Open Canal					Pipe			Turn out		Remarks
				Length		Size						Size		
				Lining (m)	Earth (m)	Bottom (m)	Height (m)	1:m	Length (m)	φ (mm)	Mate-rial	B*H (m)	φ (mm)	
MIC. Kojuh	152	1.50	9285	9000	285	0.9	1.0	1.0						*
MIC. Men-Kav	206	0.70	9174	9174		0.6	0.9	1.0			Mendov-Kavzakirovo			*
IC. 4-C-2	80	0.30	1177	1177		0.6	0.4	1.0						
IC. 5-5-1	40	0.30	280	280		0.5	0.4	1.0						
IC. 6-5-1	30	0.30	885	885		0.5	0.4	1.0						
IC. 9-5-1	40	0.60	480	480		0.5	0.4	1.0						*
IC. 9-5-3	30	0.30	180	180		0.5	0.3	1.0						*
IC. 11-C-1	50	0.20	562	562		0.4	0.3	1.0						*
MIC. Pripechene	371	0.40	5000	5000		0.6	0.8	1.0						
MIC. Hars-Pripe	667	0.80	8000	5000	3000	1.2	0.8	1.0			Harsovo-Pripechene			
MIC. Hars-Mari	689	0.40	11000	11000		0.6	0.8	1.0			Harsovo-Marikostinovo			
MIC. Vra-kulata	368	0.40	3115	3115		0.6	0.4	1.0			Vranva-kulata			
IC. Kronindovo	50	0.10	2000	2000		0.3	0.3	1.0						
MIC. Petrichiki	899	2.00	13297	13297		1.2	1.0	1.0						*
MIC. P4	630	0.60	8823	8823		0.7	1.0	1.0						*
MIC. MI	380	2.00	2817	2817		0.9	1.0	1.0						*
MIC. 1-C-7	350	0.20	3591	3591		0.5	0.6	1.0						
MIC. Lyastnitza	41	0.15	1279	1279		0.3	0.2	1.0						
MIC. Varosh	40	0.12	1683	1683		0.4	0.3	1.0						
MIC. Dalboshitza	20	0.40	2516	1259	1257	0.5	0.5	1.0						
IC. Svetipetka	20	0.40	1259	1259		0.5	0.4	1.0						
IC. Buto	30	0.10	789	789		0.5	0.5	1.0						
IC. Byala Cher	60	0.08	1279	1279		0.6	0.4	1.0			ByalaCherkova			
IC. Potka	30	0.08	1400	1400		0.3	0.2	1.0						
IC. Svoboda5	20	0.10	1200		1200	0.6	0.4	1.0						
Ic. TumbiteP2	60	0.10	3100	217	2883	0.6	0.4	1.0						
IC. ByalaMara	80	0.10	929	929		0.4	0.3	1.0						
MIC. Drangouski	30	0.10	2169	1133	1036	0.6	0.4	1.0						
MIC. Seztbent	116	0.15	3253	1795	1458	0.6	0.4	1.0						
MIC. Djmrapo	80	0.10	2860	2440	420	0.6	0.4	1.5						
MIC. Ivannik	169	0.20	3950	3073	877	0.6	0.4	1.0						
Total			107332	94916	12416									

MIC:main irrigation canal IC:irrigation canal

*:rehabilitation required for canal lining

TABLE K-1-2 INVENTORY SURVEY OF PETRICH STUDY AREA(PUMP)

Name of Pump	Area (ha)	Q (m3/s)	q (m3/s)	φ in (mm)	φ out (mm)	Number	Power (Kw)	H (m)	Name of Type	Source	Remarks Y	Remarks N
Pripechene	410	0.70	0.35	350		2	132	36	350 д 90	R. Struma	Y	
Kojuh	1512	1.40	0.35	300		4	200	44	350 д 90	〃	Y	
Valtata	350	0.14	0.07	200		2	110	96	70M32*3	Valtata	Y	
		0.40	0.20	200		2	132	55	220 д 55			
Svoboda-1	1010	2.00	1.00	500		2	500	44	22M д SB		Y	
Svoboda-2	474	1.05	0.35	300		3	160	58	350 д 90			
		0.20	0.10	200		2	75	70	50E80		Y	
		0.20	0.10	200		2	22	30	50E50			
Svoboda-3	350	0.30	0.10	200		3	75	50	100E50		Y	
Svoboda-6	120	0.10	0.05	200		2	75	80	50E80		Y	
Svoboda-7	535	0.15	0.05	200		3	75	80	50E80		Y	
Svoboda-8	300										N	
Starchevo-1	357										N	
Svoboda-5	-										N	

Y:work N:does' nt work

TABLE K-1-3 INVENTORY SURVEY OF ROSITZA STUDY AREA(CANAL) (1/2)

Name of Canal	Area (ha)	Q (m3/S)	Total Length (m)	Open Canal Length Lining (m)	Open Canal Length Earth (m)	Open Canal Size Bottom (m)	Open Canal Size Height (m)	Open Canal Size I:m	Pipe Length (m)	Pipe φ (mm)	Pipe Material	Turn out Size B*H (mm)	Turn out Size φ (mm)	Remarks	
North Main Canal															
P5	2671	4.50	32198	28975	3218	0.80～1.60	1.20～2.10	1.25	43 Siphon	1200		400*400～1400*1400	250～600	from PS. Rositza1	*
P6	1900	2.00	24500	18726	5691	0.80～1.60	1.00～1.45	1.25～1.50	Siphon	1400		320*320～1400*1400	200～250	from PS. Rositza2	
Main Left Distribution Canal	26800	17.60	17584	2285	15299	2.55～5.00	1.90～3.90	1.25～1.50	2793 Siphon	2100	con-crete	Butovski tunnel L=1102m 2*2200			*
P7	198	2.90	5627	1165	4462	1.10	1.10	1.25					250～300	from M.L.D Canal	
P8	56	2.70	2097	2097		1.00	1.15	1.25					250	from PS. Patreshl	
3-C-2	435	0.33	7013	6845	168	0.60	0.60	1.25				600～800	250		
Main Right Butovski Canal	706	4.00	11610	7087	4523	1.00～4.00	1.20～2.60	1.25				2000*2000	250	from M.L.D Canal	*
Main Left Butovski Canal	1152	2.50	11683	3450	8233	1.10～1.30	1.10～1.20	1.25				200*150			
P10	150	0.87	2583	2583		0.50	0.70	1.25					300		
P2-1	216	0.35	8654	2662	5992	0.70	0.68	1.25	30 Siphon	1100		1900*1900 400*1000	250		
P9		0.50～1.20	7500	7500										from PS. Patresh2	
Canal Compensator Kutzina			1830	1130	700	10.00	3.10					2000*1000 2600*2600		Spillway L=60m	
M4		1.20	6640	6640		0.50	1.35	1.25	400	1000		Siphon	φ1000 φ1000	L=1390m L=750m	
P4-1		0.82	2376	2376		0.50	1.03	1.25							
Canal Dam P41-M4 Distribution			216	216		8.00	1.50	1.25						V=2540m3	
Canal Dam of PS.ObedinenieD1			420	420		3.00	1.93	1.25						V=6918m3	
Canal Dam of PS.ObedinenieD2			166	166		16.00	3.50	1.25						V=5200m3	
Canal Dam of PS.Lipnitza			166	166		16.00	3.50	1.25						V=5200m3	
Main Pipe for Ir.ObedinenieD1		0.22	1083						1083	300～475	As				
Pressure Pipe PS.Obed to Canal		0.45	1300						1300	510	St				
Main Pipe SET3		0.20	1500						1500	300～510	As, St				
Pressure Pipe PS.Obe to field		0.12	1050						1050	350	As				
Pressure Pipe PS.Obe to N1		0.28	1460						1460	510	St				
Main Pipe 7ET1		0.48	500						500	355	PVC				
M2	3179	1.90	14834	14834		0.80	1.60	1.25	1480 Siphon						
Small Dam Vazulitza2						80*80								V=12800m3	
Main Pipe SET7		0.53	2934						2934	125～475	As, St Pve				
Main Pipe SET8		0.26	1296						1296	125～350	As Pve				
Main Pipe ET2	320	0.25	1724						1724	546～600	St As				
Pressure Pipe Varzulitza	970	0.41	881						881	600	St				
Main Right Butovski Canal		3.00	6040						150 Siphon						
Main Left Butashki Canal		1.60～2.50	11700						926 Siphon	1500	1st tunnel φ1300 2st tunnel φ1400				
Main Right Butashki Canal			15562	8902	6660										
M3		1.50				0.80		1.25						Canal-Dam V=3000m3	
P9		0.80	4300	4300											
P10		0.50	7180	7180											
M5		1.00	9501	9501										from PS. Lipnitza	
P-11		0.50	1000	1000										from PS. Patresh3	
P-12		0.50	2000	2000											
Total			228691	142209	51949										

PS:pumping station M.L.D:main left distrubution canal *:rehabilitation required for canal lining
Material:(As:asbestos pipe St:steel pipe PVC:polyvinyl chloride pipe)

TABLE K-1-3 INVENTORY SURVEY OF ROSITZA STUDY AREA(CANAL)

Name of Canal	Area (ha)	Q (m3/S)	Total Length (m)	Open Canal					Pipe			Turn out		Remarks	
				Length		Size						Size			
				Lining (m)	Earth (m)	Bottom (m)	Height (m)	1:m	Length (m)	φ (mm)	Mate-rial	B*H (mm)	φ (mm)		
Main Left Nikyupsky Canal															
Main Left Nikyupsky Canal	9600	6.00	45000	4977	40023	3.00～4.00	2.00～3.20	1.25	20 Siphon	1000		2000*1500 4000*1500			
P1		1.20	2342	2342		1.20	1.20	1.25							
Main Left Nikyupsky Canal		2.20	2252	2252		0.80～1.00	1.20～2.00	1.25				400*800 2000*2500	250		
Total			49594	9571	40023										
Main Lower Right Canal															
Main Lower Right Canal	2500	12.00	14637	4479	10158	1.40～5.00	2.10～2.20	1.25				3600*2200 4000*1600			*
Main Upper Right Canal	1176	1.00	21000	21000		0.70～1.00	0.70～0.90	1.25	12 Siphon	1000		400*400 900*1300	250		
P4		0.30	2435	2435		0.50	0.50	1.25	18	500					*
M1	610	3.00	6000	6000		1.50	1.40	1.25				550*2000 1050*2000	250	from PS. Hotnitza3	*
P2		0.60	1001	104	852	1.00	0.90	1.25	45 Siphon	600					
P4	1324	1.50	4320	2589	1727	1.00	1.20	1.25				1000*2000	250	from M1	*
P5	1059	1.50	5788	3303	2485	1.00	1.20	1.25	18 Siphon					from M1	*
Upper Left Canal		2.00	10555	10555		0.60～1.50	0.80～1.30	1.25	1400 Siphon	1000					
Total			65736	50465	15222										

PS:pumping station

*:rehabilitation required for canal lining

TABLE K-1-4 INVENTORY SURVEY OF ROSITZA STUDY AREA(PUMP)

Name of Pump	Area (ha)	Q (m3/s)	q (m3/s)	φ in (mm)	φ out (mm)	Number	Power (Kw)	H (m)	Name of Type	Source	Remarks L	Remarks Mat	Remarks Y N
North Main Canal													
Rositza-1	5550	3.75		5*700	1200	5	2048	40	20Нд С		71	St	Y
Rositza-2	2690	2.25		3*700	1400	3	1499	40	20Нд С	P5	312	St	Y
P5D2	340	0.47				5	556	70	140д70	P5	10	Pvc	N
P5D3	460	0.68			300	5	560	70	140д70	P5			N
Byala	440	0.68			500	5	560	70	140д70		10	Pvc	N
Patresh-1	3500	2.79		4*600	1500	4	739	22	20Нд Н	P7	260	St	Y
Patresh-2	2940	2.51		3*600	1500	3	765	23	20Нд Н	P8	170	St	Y
Patresh-3	660	0.50		3*365	435	3	312	36	M1011	P9	475	As	N
Lipnitsite	1390	1.05		3*300	820	3	766	68	300д-90		417	St	Y
Karaisen Main	5870	4.00		4*600	1000	4	2574	50	22Нд С	Karaisen	1000	St	Y
Karaisen D1	310	0.36		3*150	1000	3	219	50	125E90		1000	As	N
Obedinenie Main	2030	2.89		9*80	500	9	1412	23	20Нд Н		1700	St	Y
Obedinenie D1	1402	0.87		9*300	500/350	11	1260	64	140д70		800	St	N
Obedinenie D2	1260	1.29		9*300	500/350	10	1380	70	140д70		1500	St	N
Maslarevo-1	568	0.58		300	500	3	580	64	250д90		1000	St	Y
Maslarevo-2	390	0.42		300	500	4	640	70	140д70		1200	St	Y
Gorna Studena	740	0.56		250	400	7	440	50	125E90		1000	St	Y
Varzulitsa-1	960	0.44		350	500	2	510	58	200д50		900	St	N
Varzulitsa-2	500	0.42		250	400	4	265	42	125E90A		800	St	N
Alekovo	240	0.28		350	450	3	332	67	150A70φ		60	St	Y
Main Left Nikyupsky Canal													
Banyovets	300	0.22				2	165	50					N
Nikyup	830	0.45		3*300	600	3	489	94	200д90		400	As	N
Pavlikeni													N
Main Lower Right Canal													
Tershokova	670	1.14		3*426	1000	3	762	54	300д90д		235	As	Y
Mihaltsi	290	0.30		200	250	4	360	70	EA100-250		10	St	N
Lesicheri	960	0.91			400	7	969	68			36	St	Y
Hotnitsa-1	590	0.60		400	475	2	520	60	300д90		476	As	N
Hotnitsa-2	3540	4.00		800	1600	4	2400	50	22Нд С		786	St	Y
Rousalya	1950	3.00			300/200	16	2484	70			84		Y
M-1	730	0.82			250		614	70			35		N

L:length(m) Mat:material(St:steel pipe As:asbestos pipe PVC:polyvinyl chloride pipe)
Y:work N:does'nt work

TABLE K-1-5 INVENTORY SURVEY OF SREDNA TUNDJA STUDY AREA(CANAL)

Name of Canal	Area (ha)	Q (m3/S)	Total Length (m)	Open Canal Length Lining (m)	Open Canal Length Earth (m)	Open Canal Size Bottom (m)	Open Canal Size Height (m)	Open Canal Size 1:m	Pipe Length (m)	Pipe φ (mm)	Pipe Material	Turn out Size BHI (mm)	Turn out Size φ (mm)	Remarks
Binkos Marash														
M1		20.50～41.00	44469	44469		2.50	3.70～4.20	1.5						
M1-1		20.00	604			2.00	2.00～5.80							
Siphon Ginovo		20.50	1375						1375	2*3000	Co			now 11m3/s
M1-1		(20.50) 10.00	4580	4580		2.00								
Tunnel Kovachite		21.00	3004						3004	4000				
Siphon Dzegodonova		5.50	4500						4500	2400	St			
P9		2.68	10170	10170		1.00	2.00	1.5						*
P10		2.62	4500	4500		1.00		1.5						*
Main Steel Pipe Straldja		3.60	4790						600 4190	1620 1420				
Main Irigation Canal 1		1.50	19181		19181									
P11		1.50	3500		3500									
Total			100673	63719	22681									
Nova Zagora														
Canal Mladovo Nova Zagora		4.00	(1700) 1000	( ):plan	1000									
Pressure Pipe Korten		81.00	441						441	3200				
Non Pressure Pipe Korten		(41.00) 24.70	4309	( ):plan					4309	3900				
M2	38800	(31.30) 15.60	(18000) 3429	3429 ( ):plan		1.40	2.91～3.25	0.5 2.0	L=824m	B=5.25m	H=4.15m			
M2-donejdasht headrace		15.60	638	638				1.5						
Siphon Nova Zagora	20000		8330						8330	2*2420				
M3		7.20 (6.00) ( ): usually	9937	9937		0.80～1.00 2.10	1.25～1.45 1.40	1.5 0.67	:earth Part :rock Part			Intake1:L=1460m Intake2:L=3056m	φ=630 Q=0.50m3/s φ=630 Q=0.36m3/s	
Main Steel Pipe2		2.14	9511						9511	1200 1000 800	Q=2.14m3/s Q=1.58m3/s Q=0.90m3/s			
Main Steel Pipe1		5.46	9610						9610	1820 1200	Q=4.10m3/s Q=1.37m3/s			
Total			47205	14004	1000									
Kermen Roza														
M1-3	21800	11.12～15.36	17617	17617		1.60～9.30	3.15～4.07	0.5～1.5						
MIC.Kermen		1.00～6.00	14000	12000	2000	1.00～1.50	1.20～2.00	1.5						*
GT-1		3.4	1000						1000	900				
RT22		0.62	2385						2385	700				
GT-3		0.6	2200						2200	400				
RT-8		0.70	7500						7500	530				
Total			44702	29617	2000									
PLAN														
M2	10630	5.13	18000			0.70～2.20	2.02～2.22							Nova Zagora
M1	11400	7.85	57085			0.80～2.90	3.51～3.66							Mlekaevo Padarevo
M5	8600	6.10	14700											Mlekaevo Padarevo

Material:(Co:concrete pipe St:steel pipe)

*:rehabilitation required for canal lining

TABLE K-1-6 INVENTORY SURVEY OF SREDNA TUNDJA STUDY AREA(PUMP)

Name of Pump	Area (ha)	Q (m3/s)	q (m3/s)	φ in (mm)	φ out (mm)	Number	Power (Kw)	H (m)	Name of Type	Source	Remarks	Y	N
Binkos Marash													
Gavrailovo	1495	1.06					2250	88				Y	
Rechitsa-2	381	0.45	4*0.100 2*0.025			6	4*160 2* 37	86 15		M1		Y	
Topolchane	4096	2.58	0.86			3	3*860	71		M1	V=31000m3	Y	
Dragodanovo	1620	1.40	0.35			4	4*400	76		M1	V=19000m3	Y	
G.Alexsandrovo	6115	3.80	1.90			2	2*1600	78		M1	V=38000m3	Y	
BPS-1 for drip	170						121				no need		N
BPS-2 for drip	150						133				〃		N
BPS-3 for drip	100						103				〃		N
BPS-4 for drip	90						156				〃		N
Samuilovo	504	0.18	0.04			4	4*55			R.tunja		Y	
Kamen-Tunja	230	1.00	0.50			2	94			〃		Y	
Jelyo Voivoda	520	0.60	0.10			6	6*75	52		〃			N
Zimnitsa-2	315	0.60	0.10			6	6*30	20/35		P9		Y	
Mogilata	460	0.54	0.09			6	6*30	20/35				Y	
Kovachite-Main	200	2.40	2*0.350 4*0.425			6	3600	78/123		M-1-1	V=26000m3	Y	
Binkos Marash													
Djinovo	829	0.56	0.28			2	2*320	81		M-1-1		Y	
Kovachite-1	110						61						N
Kovachite-2	88						61						N
Kamen-fel.voi	2392	1.50	0.75			2	2*630	58		M1-P5		Y	
Zimnitza-5	240	0.30	6*0.05				6*10	20		P-10		Y	
Zimnitza-6	1200	0.60	6*0.10				6*55	32		P-10		Y	
Zimnitza-3	553	0.60	6*0.10			6	6*30	20		P-9		Y	
Zimnitza-4	570	0.60	6*0.10			6	6*30	20		P-9		Y	
Zimnitza-7	800	0.91	7*0.13			7	7*132	58		GT-7			N
Veselinovo	300	0.50 0.20					100 75	15 10		R.Tunja		Y	
Kormen Roza													
Galabinitzi	1904	1.60					1930	110		M1-3		Y	
Bezmez-1	390	0.40					440	57		M1-3		Y	
Bezmez-2	1660	1.41					1368	230		M1-3		Y	
Skobelevo	1904	3.50					4000	69		M1-3		Y	
Kermen	350												N

BPS:booster pumping station

Y:work N:doesn't work

TABLE K-1-7 INVENTORY SURVEY OF SREDNA TUNDJA STUDY AREA(ON-FARM FACILITIES) REGION:PS GORNA ALEKSOPOVO(1/4)

Name	Length(m)	φ(mm)	Q(l/s)	Mat	Remarks	Name	Length(m)	φ(mm)	Q(l/s)	Mat	Remarks
23GL IR 5						104	806	φ235	56.0	As	A=2256.5 (ha)
GL IR Svaldia-1							624	φ189	〃	〃	Σ L=77299 (m)
90	486	φ235	95.6	As	A=2256.5 (ha)	105	545	φ189	〃	〃	Σ L／A=34.26
	504	φ279	〃	〃	Σ L=77299 (m)		342		〃	〃	(m/ha)
	617	φ235	47.6	〃	Σ L／A=34.26	106	930	φ235	〃	〃	
91	342	φ189	〃	〃	(m/ha)		448	φ189	〃	〃	
92	622	φ279	95.6	〃		324	810	φ250	47.6	〃	
	468	φ235	〃	〃			180	φ189	〃	〃	
	792	φ235	47.6	〃		31	954	φ500	95.2	〃	
93	702	φ189	〃	〃			328	φ279	47.6	〃	
94	360	φ235	95.6	〃			464	φ189	〃	〃	
	630	φ279	〃	〃		32	450	φ250	〃	〃	
	648	φ235	47.6	〃			504	φ200	〃	〃	
	288	φ235	〃	〃		33	954	φ200	〃	〃	
95	—	—	〃	—		34	378	φ250	〃	〃	
96	—	—	—	—			576	φ200	〃	〃	
97	800	φ235	47.6	As		35	954	φ200	〃	〃	
	154	φ279	〃	〃		36	954	φ250	〃	〃	
98	200	φ250	95.6	PVC		37	414	φ200	〃	〃	
	574	φ300	〃	As			540	φ189	〃	〃	
	216	φ279	〃	〃		38	954	φ250	〃	〃	
		φ235	47.6	〃		39	954	φ189	〃	〃	
99	554	φ250	〃	PVC		40	954	φ200	〃	〃	
	400	φ300	〃	As		41	954	φ189	〃	〃	
100	130	φ250	95.6	PVC		42	594	φ250	〃	〃	
	660	φ300	〃	As			360	φ189	〃	〃	
		φ250	47.6	PVC		43	954	φ200	〃	〃	
101	454	φ235	56.0	As		44	450	φ250	〃	〃	
	376	φ189	〃	〃			504	φ189	〃	〃	
102	806	φ235	〃	〃		45	198	φ229	〃	〃	
	—	φ189	〃	〃			648	φ189	〃	〃	
103	558	φ235	〃	〃		46	306	φ250	〃	〃	
	372	φ189	〃	〃			684	φ200	〃	〃	

Mat:material(As:asbestos pipe PVC:polyvinyl chloride pipe)

TABLE K-1-7 INVENTORY SURVEY OF SREDNA TUNDJA STUDY AREA(ON-FARM FACILITIES) REGION:PS GORNA ALEKSOPOVO(2/4)

Name	Length(m)	φ(mm)	Q(l/s)	Mat	Remarks	Name	Length(m)	φ(mm)	Q(l/s)	Mat	Remarks
47	378	φ279	47.6	As	A=2256.5 (ha)	70	378	φ250	47.6	PVC	
	576	φ189	〃	〃	Σ L=77299 (m)		632	φ189	〃	〃	
48	591	φ250	〃	〃	Σ L／A=34.26	71	542	φ279	〃	〃	
	360	φ200	〃	〃	(m/ha)		41	φ189	〃	〃	
49	630	φ250	〃	PVC			174	φ200	〃	〃	
	324	φ189	〃	〃			126	φ189	〃	〃	
50	360	φ250	〃	〃		72	606	φ250	〃	〃	
	594	φ200	〃	〃			180	φ189	〃	〃	
51	738	φ250	〃	〃		73	882	φ250	〃	〃	
	216	φ189	〃	〃		74	606	φ250	〃	〃	
52	491	φ250	〃	〃			180	φ189	〃	〃	
	252	φ189	〃	〃		75	162	φ250	〃	〃	
53	954	φ250	〃	〃			729	φ189	〃	〃	
23 GL IR-3	5700					76	414	φ189	〃	As	
63	666	φ189	47.6	PVC		77	630	φ250	〃	PVC	
	216	φ200	〃	〃			684	φ189	〃	〃	
64	410	φ189	〃	〃		78	198	φ189	〃	As	
	40	φ200	〃	〃		79	90	φ189	〃	〃	
	330	φ189	〃	〃		23 GL IR-3-1	800				
65	130	φ279	〃	As		80	630	φ250	〃	PVC	
	788	φ189	〃	〃			720	φ200	〃	〃	
66	292	φ189	〃	PVC		81	414	φ250	〃	〃	
	40	φ200	〃	〃			1095	φ200	〃	〃	
	478	φ189	〃	〃		82	306	φ250	〃	〃	
67	234	φ250	〃	〃			504	φ200	〃	〃	
	756	φ189	〃	〃		83	342	φ250	〃	〃	
68	276	φ250	〃	〃		84	680	φ250	〃	〃	
	432	φ189	〃	〃			324	φ200	〃	〃	
69	95	φ279	〃	〃		85	522	φ200	〃	〃	
	41	φ200	〃	〃		86	954	φ250	〃	〃	
	747	φ189	〃	〃			240	φ200	〃	〃	
						88	819	φ200	〃	〃	

Mat:material(As:asbestos pipe PVC:polyvinyl chloride pipe)

TABLE K-1-7 INVENTORY SURVEY OF SREDNA TUNDJA STUDY AREA(ON-FARM FACILITIES) REGION PS. CORNA ALEXANDROVO(1/4)

Name	Length(m)	φ (mm)	Q (l/s)	Mat.	Remarks	Name	Length(m)	φ (mm)	Q (l/s)	Mat.	Remarks
23-GL-IR-4	1500				A=2256.5 (ha)	119	910	φ 200	48	PVC	
55	918	φ 250	47.6	As	Σ L=17299 (m)		111	φ 100	〃	〃	
56	413	φ 250	〃	〃	Σ L／A=34.26	120	832	φ 200	〃	〃	
	504	φ 200	〃	〃	(m/ha)		108	φ 100	〃	〃	
57	918	φ 250	〃	PVC		121	256	φ 200	〃	〃	
58	218	φ 250	〃	As			288	φ 100	〃	〃	
	720	φ 200	〃	〃		GL-IR-SREDNJA-2	11150				
59	378	φ 250	〃	PVC		143	50	φ 200	74	PVC	
	918	φ 200	〃	〃		142	730	φ 250	〃	〃	
60	954	φ 200	〃	〃			192	φ 200	〃	〃	
61	54	φ 150	〃	〃		141	1182	φ 250	〃	〃	
	864	φ 200	〃	〃		140	474	φ 200	〃	〃	
62	90	φ 150	〃	〃			768	φ 250	〃	〃	
	792	φ 100	〃	〃		139	1242	φ 250	〃	〃	
23-GL-IR-5	7300				A=1409 (ha)	102	1458	φ 250	95/48	〃	
157	380	φ 300	74	As	Σ L=46001 (m)	108	〃	φ 250	〃	〃	
	168	φ 250	〃	PVC	Σ L／A=32.86	109	〃	φ 250	〃	〃	
136	657	φ 300	〃	As	(m/ha)	110	〃	φ 250	〃	〃	
	760	φ 250	〃	PVC		111	〃	φ 250	〃	〃	
135	445	φ 300	〃	As		112	126	φ 300	95	As	
	768	φ 250	〃	PVC			1298	φ 250	47	PVC	
134	761	φ 250	〃	〃		113	198	φ 300	95	As	
133	569	φ 250	〃	〃			1080	φ 250	47	PVC	
132	509	φ 250	〃	〃		114	595	φ 300	95	As	
131	791	φ 250	〃	〃				φ 250	47	PVC	
	192	φ 200	〃	〃		IInd Part					A=1730.8 (ha)
130	695	φ 250	〃	〃		23-IR-14-1	600				Σ L=52420 (m)
	192	φ 200	63	〃		23-IR-13-1	350				Σ L／A=30.29
117	1085	φ 200	73	〃		5'	937	φ 250	56	PVC	(m/ha)
	108	φ 200	42	〃			500	φ 200	〃	〃	
119	1156	φ 200	48	〃		3	562	φ 250	150	〃	
							716	φ 200	40	〃	

Mat:material(As:asbestos pipe PVC:polyvinyl chloride pipe)

TABLE K-1-7 INVENTORY SURVEY OF SREDNA TUNDJA STUDY AREA(ON-FARM FACILITIES) REGION PS. CORNA ALEXANDROVO(2/4)

Name	Length(m)	φ (mm)	Q (l/s)	Mat.	Remarks	Name	Length(m)	φ (mm)	Q (l/s)	Mat.	Remarks
5	687	φ 250	80	PVC		23-GL-IR-2-1	2520	φ 300～800	80～629		
	756	φ 200	40	〃		20	882	φ 300	80	As	
7	709	φ 200	80	〃			756	φ 200	40	PVC	
	696	φ 200	40	〃		22	846	φ 300	80	As	
9	846	φ 300	80	〃			624	φ 200	40	PVC	
	298	φ 200	40	〃		24	780	φ 300	80	As	
11	918	φ 200	40	〃			396	φ 200	40	PVC	
23-IR-12'	1700					26	522	φ 250	〃		
23-IR-11'	800						396	φ 200	〃		
6'	813	φ 200	40	PVC		28	419	φ 250	〃		
6	812	φ 200	〃	〃			238	φ 200	〃		
8	846	φ 200	〃	〃		30	414	φ 200	〃		
10	846	φ 200	〃	〃		19	846	φ 300	80	As	
12	162	φ 250	〃	〃			648	φ 200	40	PVC	
	684	φ 200	〃	〃			152	φ 150	〃	〃	
23-GL-IR-2	3300	φ 829～800	689～149			21	846	φ 300	80	As	
23-IR-10'	1000						546	φ 200	40	PVC	
23-IR-9'	1300						168	φ 150	〃	〃	
8'	1438	φ 250	56	PVC		23	846	φ 300	80	As	
14'	1000	φ 250	〃	〃			492	φ 200	40	PVC	
	687	φ 250	〃	〃			90	φ 150	〃	〃	
15	1437	φ 250	〃	〃		25	846	φ 300	80	As	
	250	φ 300	〃	〃			306	φ 200	40	PVC	
16	845	φ 300	90	As		27	846	φ 300	80	As	
	306	φ 250	48	PVC			144	φ 200	40	PVC	
	304	φ 200	48	〃		29	1200				
17	918	φ 300	80	As							
	897	φ 200	40	PVC							
18	882	φ 300	80	As							
	720	φ 200	40	PVC							
	132	φ 150	40	PVC							

Mat:material(As:asbestos pipe PVC:polyvinyl chloride pipe)

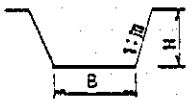
TABLE K-1-7 INVENTORY SURVEY OF SREONA TUNDJA STUDY AREA(ON-FARM FACILITIES)

REGION:KO

Name	Length(m)	Remarks	Name	Length(m)	Remarks	Name	Length(m)	Remarks	Name	Length(m)	Remarks	Name	Length(m)	Remarks
GL-TK-13	1180	A=253 (ha)	T-1	2000	A=517.5 (ha)	BT-3-7	900		B3-BT-66	1700		T-8-21	200	
TK-13-1	2250	Σ L=8330 (m)	T-1-1	550	Σ L=14700 (m)	BT-3-8	900		B3-BT-65	1700		T-8-20	700	
TK-13-2	2250	Σ L / A=32.93	T-1-2	10950	Σ L / A=28.41	BT-3-9	900		M1-GL-TK-1	6850	A=2205 (ha)	T-8-19	1050	
TK-13-3	2250	(m/ha)	T-1-3	1400	(m/ha)	BT-3-10	900		BT-14	1000	Σ L=81450 (m)	T-8-18	550	
TK-13-4	400		T-1-4	1800		BT-3-11	800		BT-13	1000	Σ L / A=28.04	T-8-17	800	
GL-TK-14	2600	A=270 (ha)	T-1-5	1050		BT-3-12	350		BT-12	1050	(ha)	T-8-16	600	
TK-14-1	2250	Σ L=10400 (m)	T-1-6	800		BT-3-10-1	800		BT-12-1	200		T-8-15	1350	
TK-14-2	2250	Σ L / A=38.52	H-T-2	1650		BT-3-13	750		BT-12-2	400		T-8-14	950	
TK-14-3	1650	(m/ha)	T-3	2000		B3-GT-TK-1	3340	A=2720 (ha)	BT-11	750		T-8-13	1700	
TK-14-4	750		T-3-1	200		B3-BT-31	2400	Σ L=77040 (m)	BT-11-1	500		T-8-13-2	550	
TK-14-5	900		T-4	200		B3-BT-32	2300	Σ L / A=28.32	BT-10	750		T-8-12	650	
90-GL-TK-1	1000		T-5	200		B3-BT-33	1100	(m/ha)	BT-10-1	500		T-8-11	1000	
90-TK-1-2	900		T-5-1	900		B3-BT-34	1000		BT-9	750		T-8-10	150	
90-TK-1-1	1300		T-5-2	400		B3-BT-35	900		BT-9-1	600		T-8-10'	300	
90-TK-1-3	2500		T-5-3	300		B3-BT-36	650		BT-6	900		T-8-9	700	
90-TK-1-4	3050		H-T-3	1870	A=250 (ha)	B3-BT-37	800		BT-6-1	700		T-8-8	1500	
90-TK-2-1	1050		T-6-2	1200	Σ L=8870 (m)	B3-BT-38	750		BT-5	900		T-8-8-1	950	
90-TK-2-2	1100		T-7-3	500	Σ L / A=35.48	B3-BT-39	550		BT-5-1	900		T-8-8-2	600	
90-TK-2-3	1100		T-7-2	1200	(m/ha)	77-BT-12	550		BT-4	750		T-8-7	900	
90-TK-2-4	1100		T-7-1	1500		B3-GL-TK-2	1900		BT-4-1	700		T-8-7-1	1150	
90-TK-2-5	1100		T-6-1	2000		B3-BT-44	600		BT-3	700		T-8-7-2	900	
90-TK-2-6	850		T-11	600		B3-BT-41	1350		BT-3-1	500		T-9	2550	A=437.5 (ha)
90-TK-2-7	600		HT-4	750	A=221 (ha)	B3-TK-3	1400		BT-2	600		T-9-1	800	Σ L=8800 (m)
90-TK-2-8	350		T-9-1	1450	Σ L=5900 (m)	B3-BT-48	600		BT-2-1	300		T-9-1-1	250	Σ L / A=20.11
90-TK-2-9	900		T-9-2	1450	Σ L / A=26.70	B3-BT-49	1700		BT-1	600		T-9-3	400	(m/ha)
90-TK-2-10	200		T-10	1950	(m/ha)	B3-BT-47	1150		BT-1-1	750		T-8-5	450	
90-TK-3	1500		T-10-3	400		B3-BT-46	1150		BT-1-2	400		T-8-4	1000	
89-GL-TK-1	5600	A=600(ha)	T-10-4	500		B3-TK-2	3900		BT-9	600		T-8-4-2	350	
89-BT-1	1400	Σ L=18680(m)	T-10-5	850		B3-BT-45	500		BT-9-1	600		T-8-4-1	300	
89-BT-2	1300	Σ L / A=31.15	GT-1	2500	A=315 (ha)	B3-BT-44	1350		BT-8	600		T-8-3	600	
89-BT-3	500	(m/ha)	HT-1	350	Σ L=13050 (m)	B3-BT-43	1050		BT-8-1	600		T-8-2	350	
89-BT-4	500		HT-5	1550	Σ L / A=41.43	B3-BT-42	950		H-TP-11-2	550		T-9-2	1350	
89-BT-5	520		HT-2	200	(m/ha)	B3-BT-20	850		H-TP-11-1	900		T-8-13-1	400	
89-BT-6	550		HT-2-1	100		B3-BT-21	850		H-TP-11	2700				
89-BT-7	570		HT-6	1800		B3-BT-22	950		H-TP-12	1100				
89-BT-8	600		HT-6-1	100		B3-BT-23	900		H-TP-13	1400				
89-BT-9	600		HT-3	650		B3-BT-24	950		H-TP-14	1750				
89-BT-10	500		HT-7	650		B3-BT-25	900		H-TP-15	1400				
89-BT-11	550		HT-4	400		B3-GL-TK-3	5100		H-TP-16	500				
89-BT-12	670		HT-8	800		B3-BT-6	1100		H-TP-17	400				
89-BT-13	720		HT-9	900		B3-BT-5	1200		H-TP-18	1250				
89-BT-14	850		T-12	3050		B3-BT-4	900		T-7	1200				
89-BT-15	950					B3-BT-3	850		T-8	1200				
89-BT-16	1100		BT-1-1	1000	A=357.5 (ha)	B3-BT-1	1000		T-5	700				
89-BT-17	1200		BT-1-2	1000	Σ L=7650 (m)	B3-BT-15	700		T-6	1000				
81-GL-TK-1	1400	A=760 (ha)	BT-1-3	1000	Σ L / A=21.40	B3-BT-14	1650		T-3	950				
81-BT-1	850	Σ L=26770 (m)	BT-1-4	1050	(m/ha)	B3-BT-13	2000		T-4	1200				
81-BT-2	1400	Σ L / A=35.22	BT-1-5	850		B3-BT-12	800		T-4-1	150				
81-TK-2	1600	(m/ha)	BT-1-6	300		B3-BT-11	1600		T-4-2	600				
81-BT-3	1450		BT-1-7	250		B3-BT-10	1400		T-2	500				
81-BT-4	1720		GST-1	450		B3-BT-9	2000		T-1	1000				
81-BT-5	2700		GST-2	1350		B3-BT-16	900		H-TP-18-1	600				
81-TK-4	1100		BT-4	400		B3-BT-17	1050		GT-2	900				
81-BT-11	600		GT-2	2600	A=507 (ha)	B3-BT-18	950		T-11-4	1050				
81-BT-10	900		BT-2-1	650	Σ L=16700 (m)	B3-BT-19	400		T-11-3	700				
81-TK-3	2000		BT-2-2	200	Σ L / A=32.94	B3-T-12	2250		T-11-2	1700				
81-BT-6	1150		BT-2-3	450	(m/ha)	B3-BT-66	950		T-11-1	1200				
81-BT-7	1000		GT-3	2800		B3-BT-63	1200		T-4-3	250				
81-BT-8	900		BT-3-1	300		B3-BT-62	1200		T-11-3'	1000				
81-BT-9	1900		BT-3-2	500		B3-BT-61	850		T-11-2'	800				
81-BT-15A	1750		BT-3-4	250		B3-BT-60	800		T-11-1'	500				
81-BT-16	2300		BT-3-3	400		B3-BT-59	800		GT-3	7100				
81-BT-16	1900		BT-3-5	950		B3-BT-58	800		T-8-23	600				
81-BT-17	2450		BT-3-5-1	500		B3-T-13	1200		T-8-22	700				
			BT-3-6	800		B3-BT-68	1450		T-8-21	900				
						B3-BT-67	1700		T-8-21'	300				

TABLE K-1-8 INVENTORY SURVEY OF SREDNA TUNDJA STUDY AREA(DRAINAGE)

REGION:YAMBOL

No.	Name of Drainage Area	Area (dka)	Farm Drainage			Drainage Canal			Note	Sizes of canals B/H/m
			φ (mm)	Material	Length(m)	φ (mm)	Material	Length(m)		
1	Straldjansko Blato	15732	-	-	-	-	-	-	Open canals ①Colecting canals L= 16.14 km ②Main drainage canals L= 8.50 km	
2	Lozenetz-Atolovo--Straldja-Ipart	10300							Open canals ①Colecting canals L= 23.34 km ②Main drainage canals L= 6.52 km	① B= 1.00 m H= 0.13～0.72 m m= 1:1.5 ② B= 1.00 H= 0.30～1.23 m m= 1:1.5
3	Zimnitza-straldja	12665	65 80	PVC PVC	217551 79974		PVC, As	56275	Gully-1:L= 3195 m Gully-2:L= 2300 m	
4	Straldja-Vodenichane	9280	65 80	PVC PVC	183970 64365	160 200 250 300 400 500	PVC PVC As As As Co	16740 11530 3563 1021 660 200		
5	Zimnitza(Charda)	3385	65 80	PVC PVC	34556 16389	160 200 250 300 350 400 600	PVC PVC As As As As Co	6575 2017 1832 115 195 170 205		
6	Veselinovo	3002	65	PVC	59777	φ 250 φ 300 110 200	As 〃 PVC 〃	4670 3516 	Main Colectors C1:L1= 1510 m C2:L2= 2600 m Total:4110 m	
7	Bezmez-i (Chokoba)	674		PVC	20400		PVC	2110		
8	Galabintzi-Bolyarsko	8050			170900			24900	Main drainage canals L= 21800 m	
9	Kermensko Blato	1804						6300	Open canal L= 2.0 km	

PVC:polyvinyl chloride pipe As:asbestos pipe Co:concrete pipe

K-2 Irrigation Networks Diagram

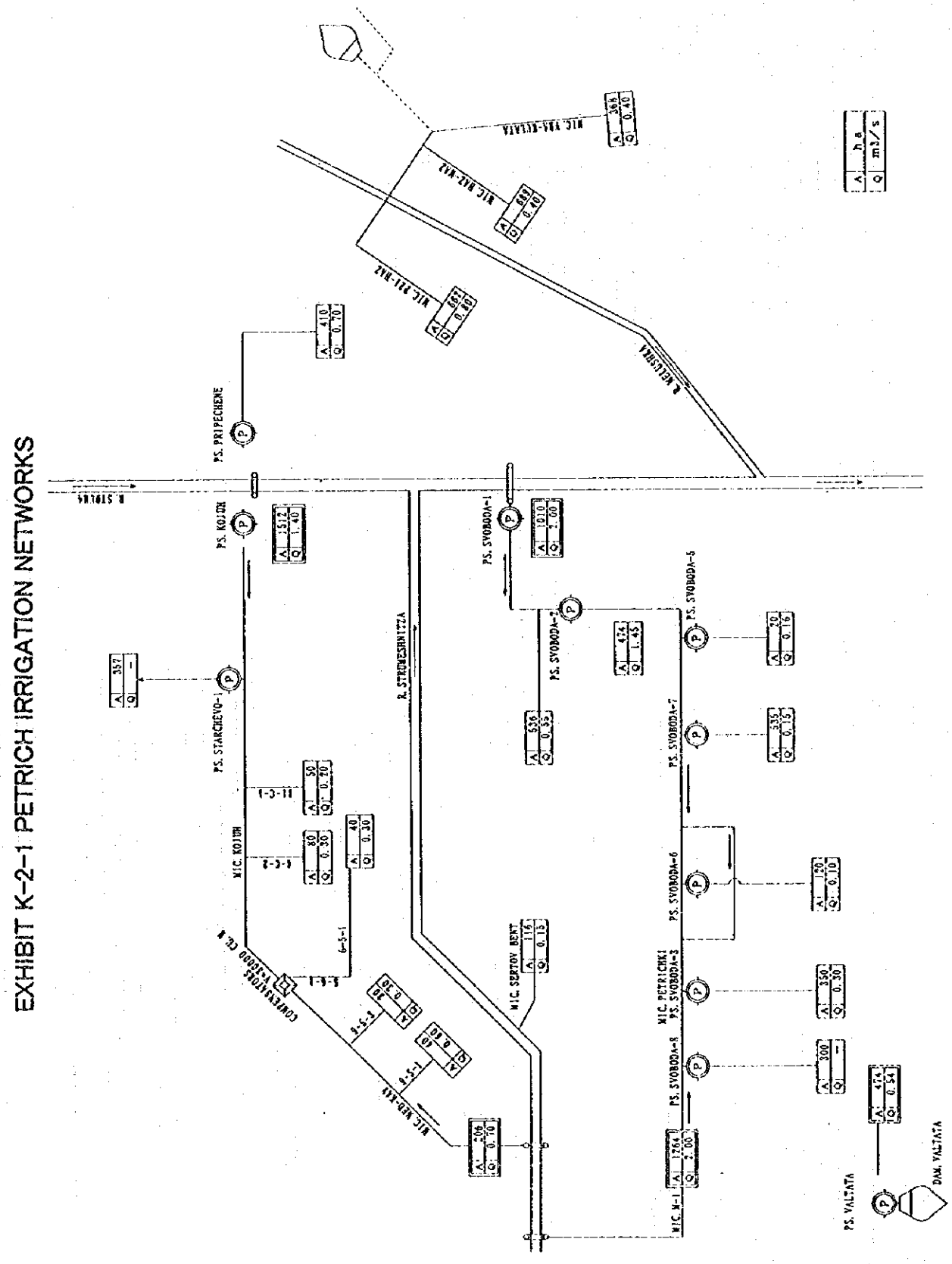


EXHIBIT K-2-2 ROSITZA IRRIGATION NETWORKS

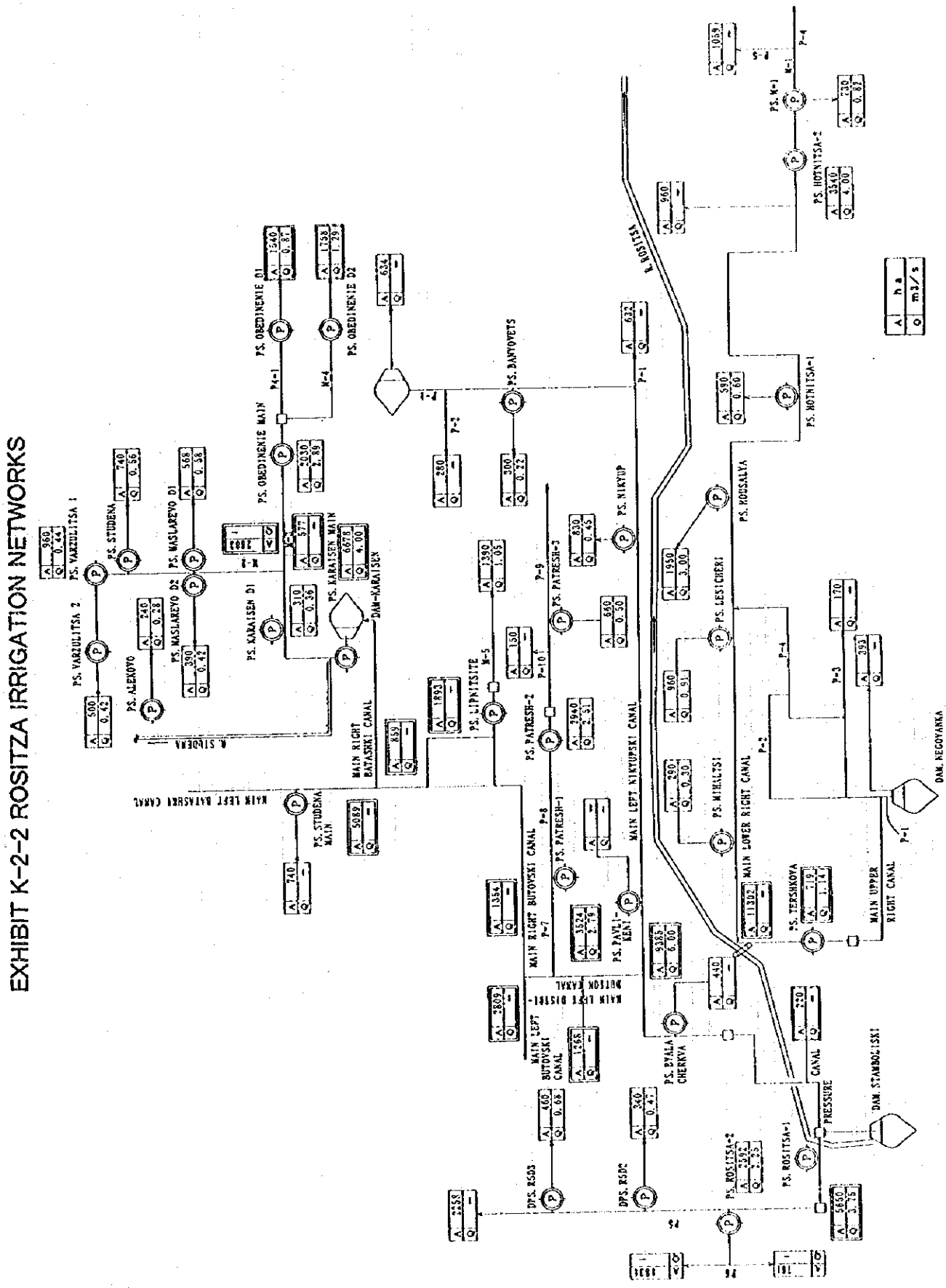


EXHIBIT K-2-3 SREDNA TUNDJA IRRIGATION NETWORKS

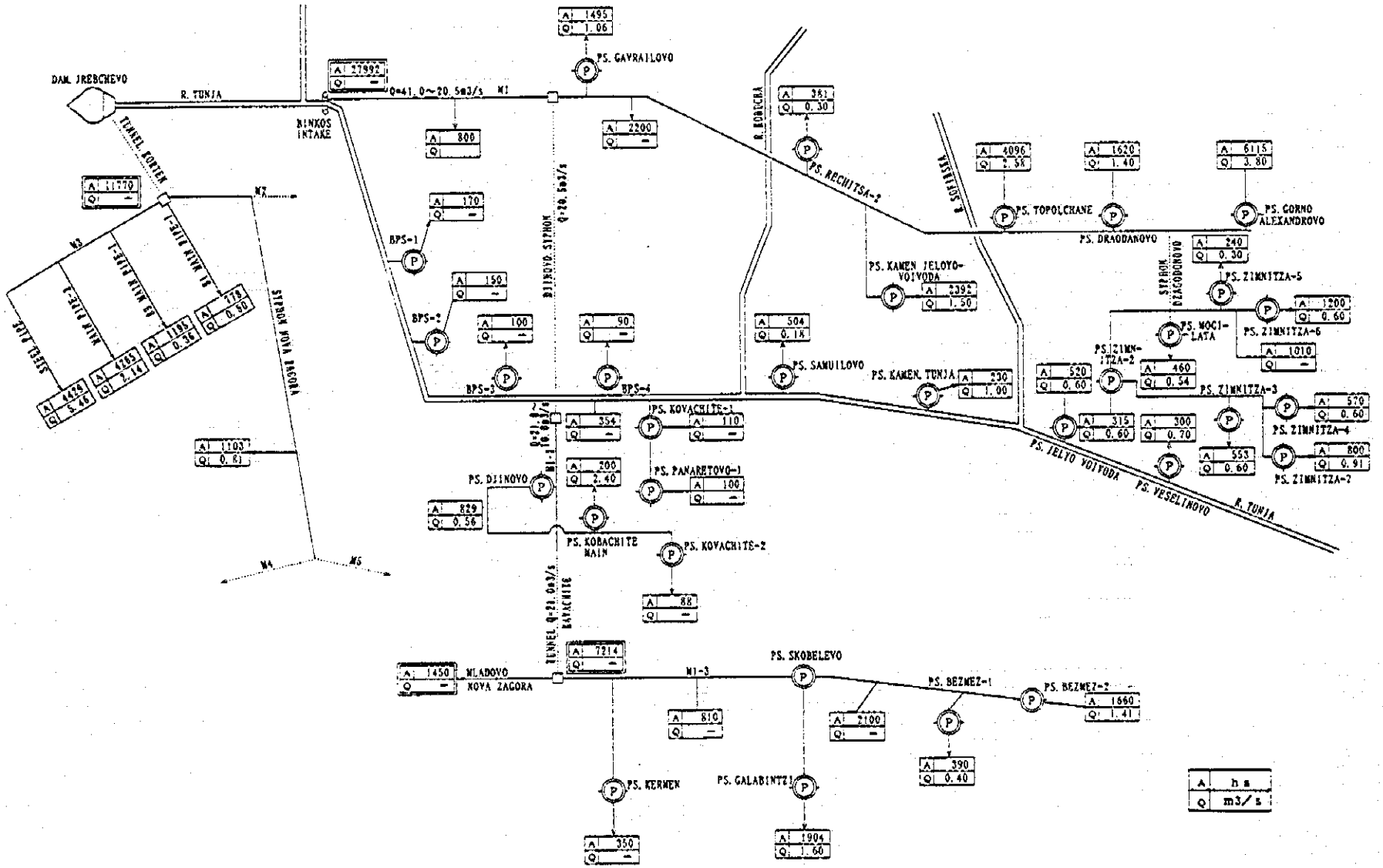
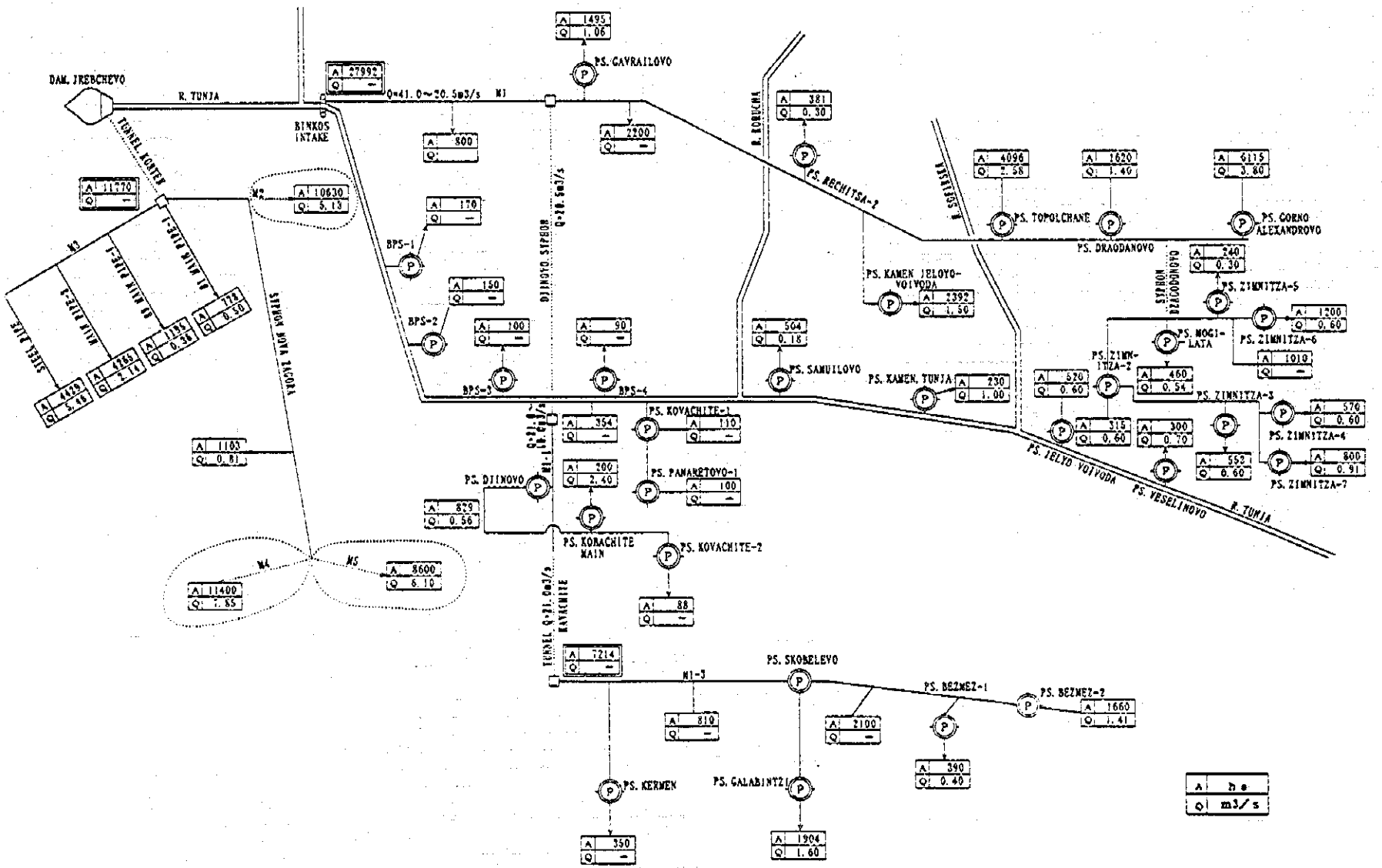


EXHIBIT K-2-4 SREDNA TUNDJA IRRIGATION NETWORKS(PLAN)



K-3 Existing Facilities in Nova Zagora

TABLE K-3-1 MAIN PIPELINE DIMENSION

Name	Length (m)	Caliber (mm)	Flow rate (m^3/s)	Pipe kind	Remarks
81-GL-TR-1	1460	φ630	0.48	SP	No.1 turn out
89-GL-TR-1	2820	φ630	0.36	SP	No.2 turn out
	236	φ530	0.36	〃	
GST-2	4300	φ1200	2.14	SP	No.3 turn out
	2680	φ1000	1.58	〃	
	2521	φ800	0.90	〃	
GST-2(New)	1873	φ1400	2.07	SP	
	2460	φ1200	〃	〃	
	2650	〃	〃	PC	
	664	φ900	〃	〃	
	1864	φ920	〃	SP	
GST-1	2116	φ1820	4.10	SP	No.4 turn out
		φ1200	1.37	〃	
	2044	φ1820	4.10	〃	
	2300	φ2020	〃	〃	
	3150	〃	〃	〃	

SP: steel pipe PC: prestressed concrete pipe

TABLE K-3-2 BRANCH PIPELINE DIMENSION (SAMPLE AREA)

Name	Length (m)	Caliber (mm)	Flow rate (L/s)	Pipe kind	Remarks
90-GL-TR-1	1082	φ720	490	SP	
	808	〃	450	〃	
	400	φ530	300		
ET-90-1-1	894	φ350	180	AS	
	1292	φ300	120	〃	
	1292	φ250	60	〃	
ET-90-1-2	266	φ300	180	AS	
	1292	〃	120	〃	
	1432	φ250	60	〃	
ET-90-1-3	610	φ300	120	AS	
	416	φ250	〃	〃	
	1439	〃	60	〃	
ET-90-1-4	750	φ300	120	AS	
	520	φ250	〃	〃	
	1780	〃	60	〃	
90-GL-TR-2	310	φ630	360	SP	
	400	φ530	300	〃	
	80	〃	240	〃	
ET-90-2-1	543	φ400	180	AS	
	1292	φ350	120	〃	
	1292	φ250	60	〃	
ET-90-2-2	1428	φ350	350	AS	
	988	φ300	300	〃	
	760	φ250	60	〃	
ET-90-2-2-1	922	φ250	60	AS	
ET-90-2-3	915	φ200	60	AS	
ET-90-2-4	1670	φ250	60	AS	
ET-90-2-5	1100	φ250	60	AS	
ET-90-2-6	850	φ250	60	AS	
ET-90-2-7	600	φ250	60	AS	
ET-90-2-8	350	φ200	60	AS	
ET-90-2-9	900	φ250	60	AS	
ET-90-2-10	200	φ200	60	AS	

SP: steel pipe PC: prestressed concrete pipe AS: asbestos pipe

TABLE K-3-2 BRANCH PIPELINE DIMENSION (SAMPLE AREA)

Name	Length (m)	Caliber (mm)	Flow rate (L/s)	Pipe kind	Remarks
GST-1	535	φ250	50	PVC	
GST-2	380	φ300	131	PVC	
	480	φ250	81	〃	
	505	φ250	50	〃	
GST-3	840	φ400	141	SP	
	420	〃	86	〃	
	785	φ350	55	〃	
	420	〃	120	〃	
GST-4	420	φ250	99	PVC	
	300	〃	68	〃	
GT-1	997	φ500	284	SP	
	210	〃	253	〃	
	1482	〃	151	〃	
	375	〃	127	〃	
	420	φ450	127	〃	
	420	φ300	49	〃	
BT-1-1	1026	φ250	48	PVC	
BT-1-2	198	φ300	79	PVC	
	828	φ250	55	〃	
BT-1-3	198	φ315	48	PVC	
BT-1-4	1026	φ250	55	PVC	
BT-1-5	1134	φ315	103	PVC	
	252	〃	55	〃	
	252	φ250	55	〃	
BT-1-6	324	φ160	31	PVC	
BT-1-7	324	φ160	31	PVC	
GT-2	330	φ315	109	PVC	
	90	φ250	109	〃	
	420	〃	55	〃	
	210	φ160	31	〃	
BT-2-1	324	φ160	31	PVC	
BT-2-2	306	φ160	24	PVC	
BT-2-3	306	φ200	55	PVC	
	288	φ160	31	〃	
BT-2-4	324	φ160	31	PVC	
GT-3	420	φ450	386	PVC	
	420	〃	356	〃	
	455	〃	325	〃	
	420	〃	271	〃	
	210	〃	223	〃	
	210	〃	192	〃	
	210	〃	168	〃	
	210	〃	144	〃	
	20	φ315	72	〃	
	190	φ250	48	〃	
BT-3-1	453	φ125	24	PVC	
BT-3-2	486	φ315	79	PVC	
	254	φ250	55	〃	
	286	φ200	55	〃	
BT-3-3	270	φ125	24	PVC	
BT-3-4	324	φ160	31	PVC	
BT-3-5	486	φ315	79	PVC	
	254	φ250	55	〃	
	286	φ200	55	〃	

SP: steel pipe PVC: polyvinyl chloride pipe

TABLE K-3-2 BRANCH PIPELINE DIMENSION (SAMPLE AREA)

Name	Length (m)	Caliber (mm)	Flow rate (L/s)	Pipe kind	Remarks
BT-3-5-1	486	φ200	24	PVC	
BT-3-6	1026	φ250	48	PVC	
BT-3-7	882	φ315	55	PVC	
BT-3-8	1025	φ250	48	PVC	
BT-3-9	882	φ250	48	PVC	
BT-3-10	470	φ250	72	PVC	
	556	〃	48	〃	
BT-3-10-1	790	φ200	24	PVC	
BT-3-11	846	φ200	24	PVC	
BT-3-12	342	φ200	48	PVC	
BT-3-13	810	φ250	48	PVC	
BT-1	368	φ160	31	PVC	
BT-2	368	φ160	31	PVC	
BT-3	368	φ160	31	PVC	
BT-4	368	φ160	31	PVC	

SP: steel pipe PVC: polyvinyl chloride pipe

NOVA ZAGORA BLOCK

0 1 2 KM
SCALE:1:50,000

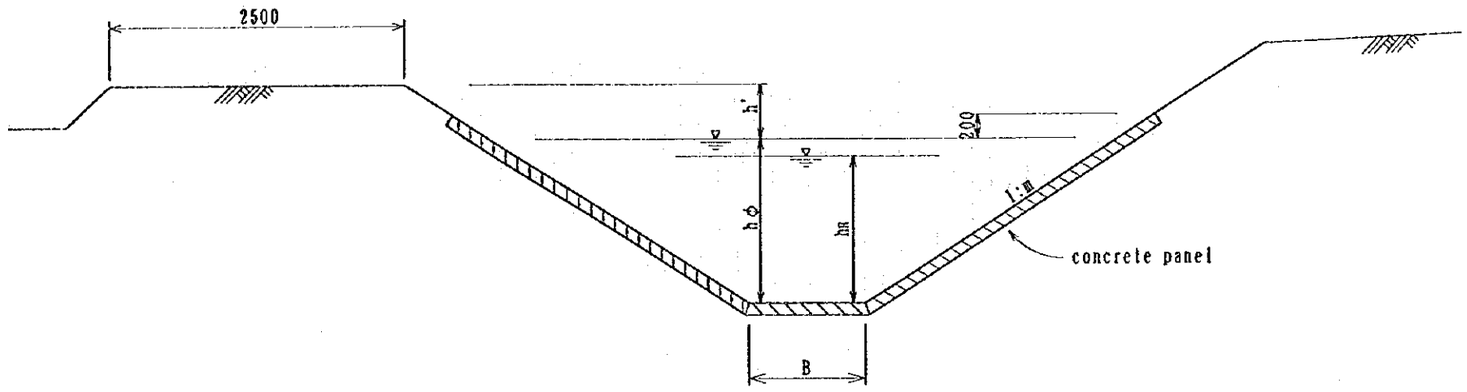
Legend
- Project Area
- Towns and Villages Boundary
- Towns & Villages Proper
- Open Canal(M3,M2)
- Pipe Line
- Sample Area
- Pivot

TZENINO
Nova Zagora Siphon
M2
NOVA ZAGORA
EZERO
DOBRINOVO
KORTEN
BT-GL-TR-1
Tunnel Korten
STOIL BOIVODA
BOGDANOVO
SENOVETZ
M3
BT-GL-TR-1
BRYASTOVO
GST-2(New)
GST-2
KARANOVO
GST-1
ZAGORTZI
LUBENETZ
SABRANO

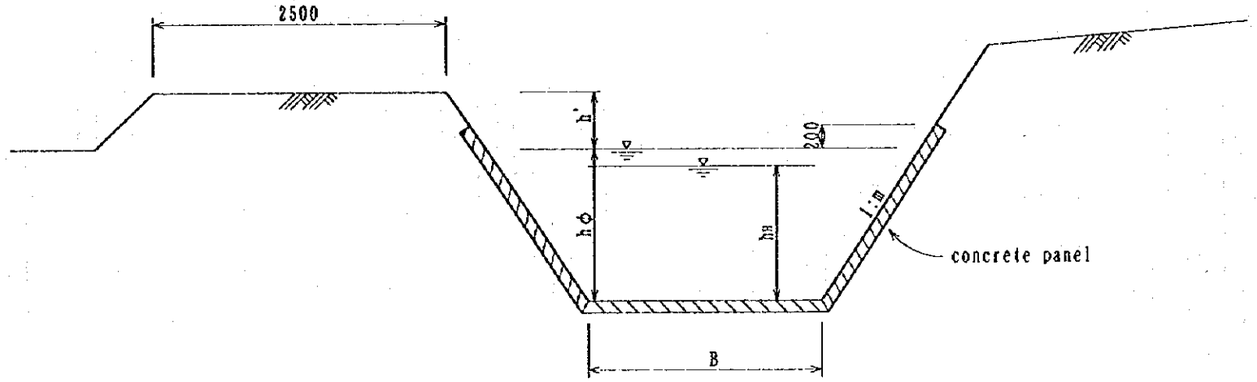
FEASIBILITY STUDY	
THE PROJECT FOR AGRICULTURAL REFORM IN BULGARIA	
PLAN OF NOVA ZARORA BLOCK	
DRAWING NO.1	MARCH ,1997
JAPAN INTERNATIONAL COOPERATION AGENCY	

M3 Standard Section

Banking



Cutting



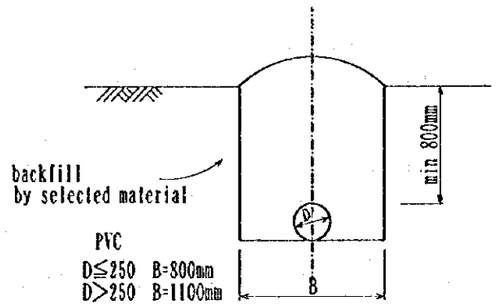
M3 Canal specification table

NO	Section	Q_H m^3/s	Q_ϕ m^3/s	I ‰	B m	h_R m	h_ϕ m	V_H m/s	V_ϕ m/s	h' m	m	Remarks
1	0+00.00 - 23+18.60	6.00	7.20	0.5	1.00	1.45	1.58	1.32	1.36	0.40	1.50	
2	0+00.00 - 0+55.80	6.00	7.20	0.5	1.00	1.45	1.58	1.32	1.36	0.40	1.50	
3	0+55.80 - 1+53.80	Siphon(ϕ 2000, ϕ 1200)										
4	25+63.98 - 29+15.00	6.00	7.20	0.5	1.00	1.45	1.58	1.32	1.36	0.40	1.50	
5	29+15.00 - 31+78.93	6.00	7.20	0.5	2.10	1.40	1.58	1.38	1.42	0.40	0.67	
6	0+00.00 - 1+32.90	6.00	7.20	0.5	1.00	1.45	1.58	1.32	1.36	0.40	1.50	
7	33+08.75 - 35+31.06	6.00	7.20	0.5	2.10	1.40	1.58	1.38	1.42	0.40	0.67	
8	35+31.06 - 36+25.66	Siphon(ϕ 2000, ϕ 1200)										
9	36+25.66 - 38+52.00	6.00	7.20	0.5	2.10	1.40	1.58	1.38	1.42	0.40	0.67	
10	38+52.00 - 45+20.18	6.00	7.20	0.5	1.00	1.45	1.58	1.32	1.36	0.40	1.50	
11	0+00.00 - 1+94.20	6.00	7.20	0.5	1.00	1.45	1.58	1.32	1.36	0.40	1.50	
12	47+13.51 - 48+31.51	Siphon(ϕ 2000, ϕ 1200)										
13	48+31.51 - 51+22.00	6.00	7.20	0.5	1.00	1.45	1.58	1.32	1.36	0.40	1.50	
14	51+22.00 - 63+22.00	5.30	6.36	0.5	1.00	1.37	1.48	1.26	1.32	0.40	1.50	
15	63+22.00 - 65+65.50	3.60	4.50	0.5	0.80	1.29	1.40	1.20	1.28	0.40	1.50	
16	65+65.50 - 65+85.00	Siphon(ϕ 2000, ϕ 1200)										
17	65+85.00 - 99+12.00	3.60	4.50	0.6	0.80	1.25	1.38	1.28	1.35	0.40	1.50	

FEASIBILITY STUDY	
THE PROJECT FOR AGRICULTURAL REFORM IN BULGARIA	
M3 STANDARD SECTION	
DRAWING NO.2	MARCH ,1997
JAPAN INTERNATIONAL COOPERATION AGENCY	

Pipe Standard Section

Type I



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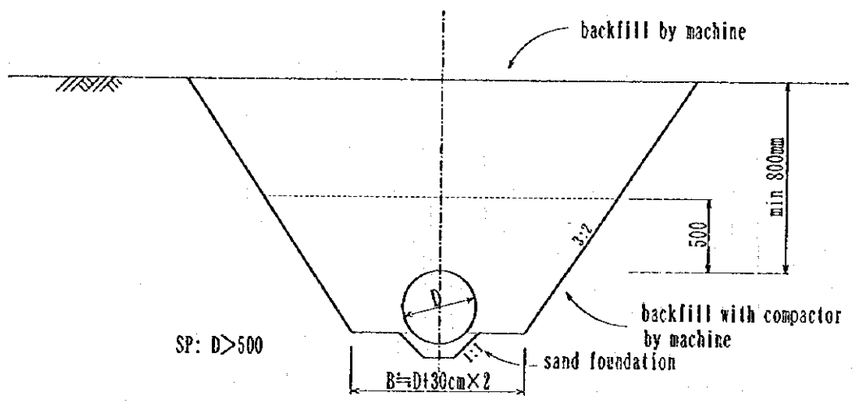

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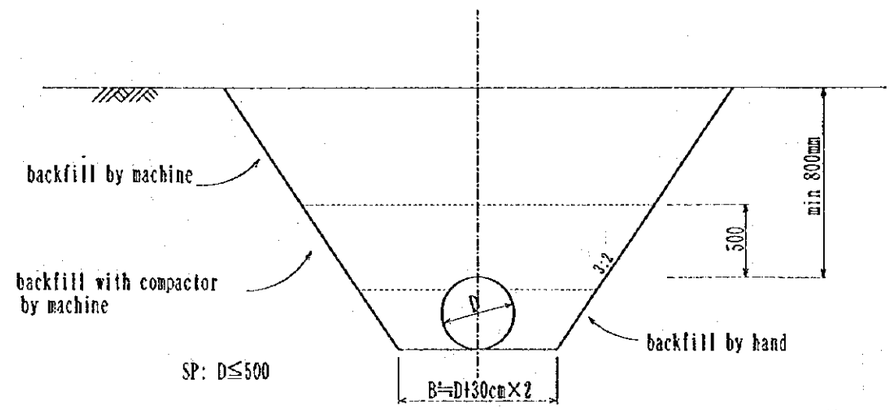
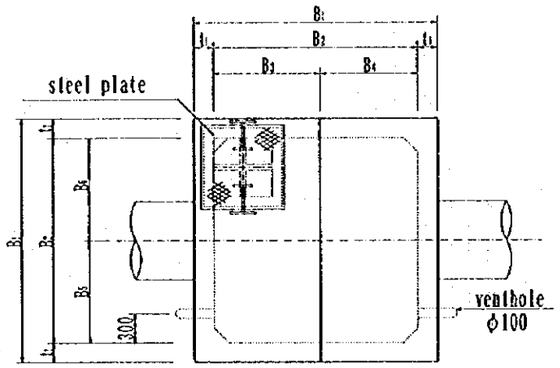


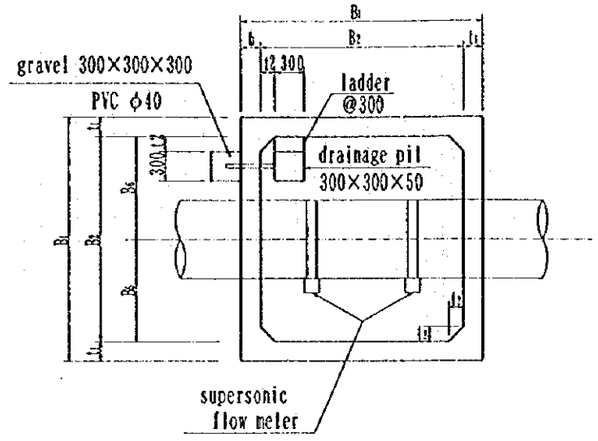
FEASIBILITY STUDY	
THE PROJECT FOR AGRICULTURAL REFORM IN BULGARIA	
PIPE STANDARD SECTION	
DRAWING NO.3	MARCH ,1997
JAPAN INTERNATIONAL COOPERATION AGENCY	

Flow Meter Box Structure

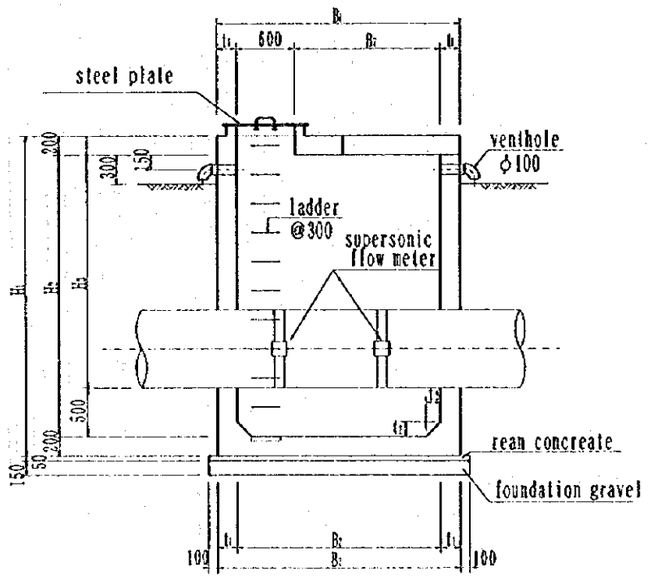
Cover Plan



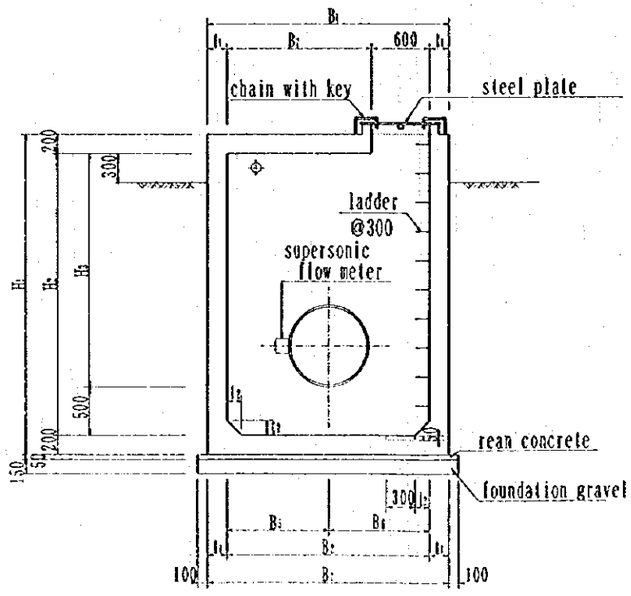
Plan



Vertical Section



Cross Section



Supersonic flow meter box dimension

Unit:(mm)

Description	B1	B2	B3	B4	B5	B6	B7	H1	H2	H3	t1	t2
ϕ630	2300	1900	1000	900	950	950	1300	2700	2300	1800	200	150
ϕ1000	2800	2400	1200	1200	1200	1200	1800	3200	2800	2300	200	200
ϕ1200	2800	2400	1200	1200	1200	1200	1800	3200	2800	2300	200	200
ϕ1400	3200	2700	1400	1300	1350	1350	2100	3500	3100	2600	250	200
ϕ1820	3500	3000	1500	1500	1500	1500	2400	3800	3400	2900	250	200

FEASIBILITY STUDY

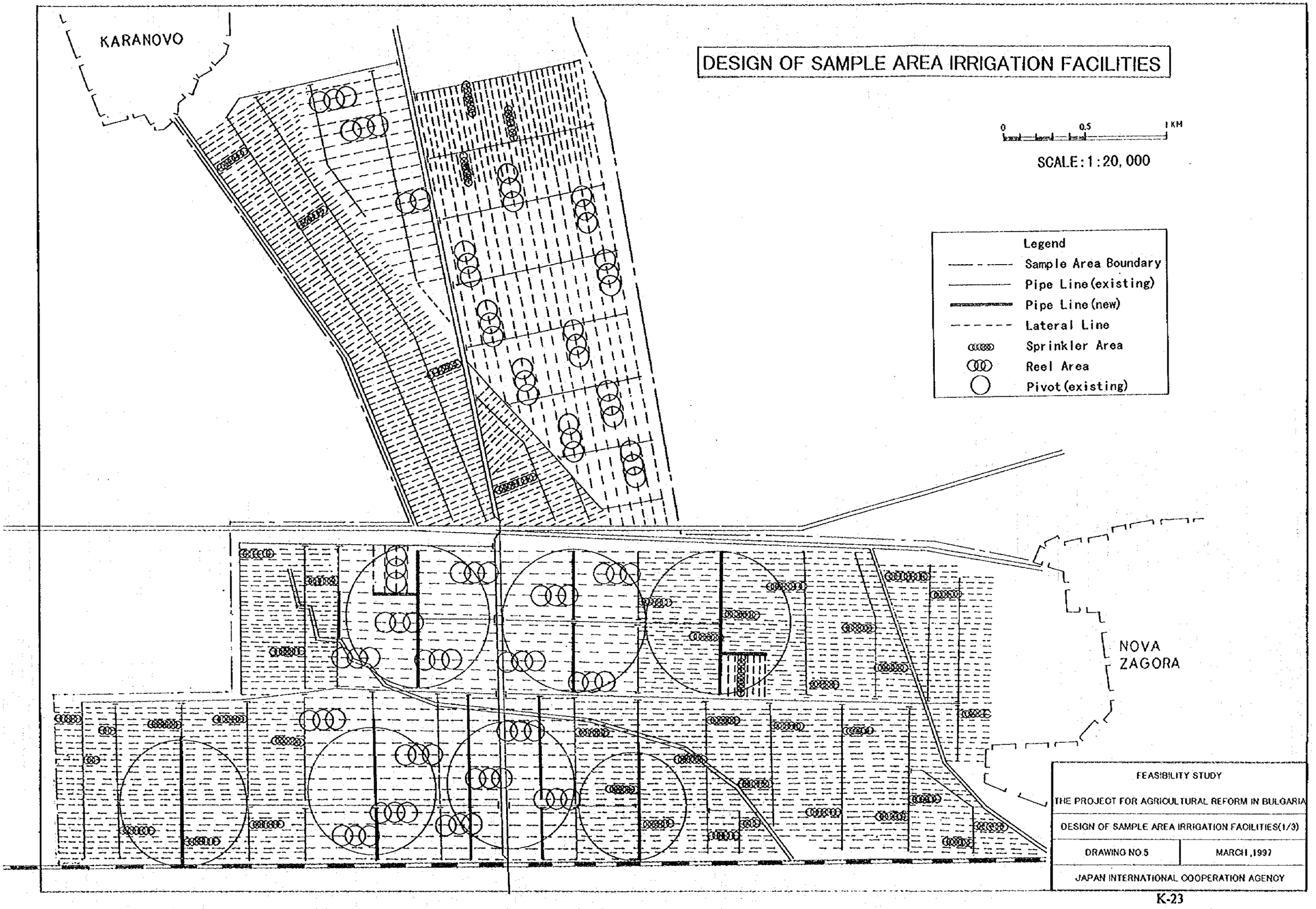
THE PROJECT FOR AGRICULTURAL REFORM IN BULGARIA

FLOW METER BOX STRUCTURE

DRAWING NO.4 | MARCH ,1997

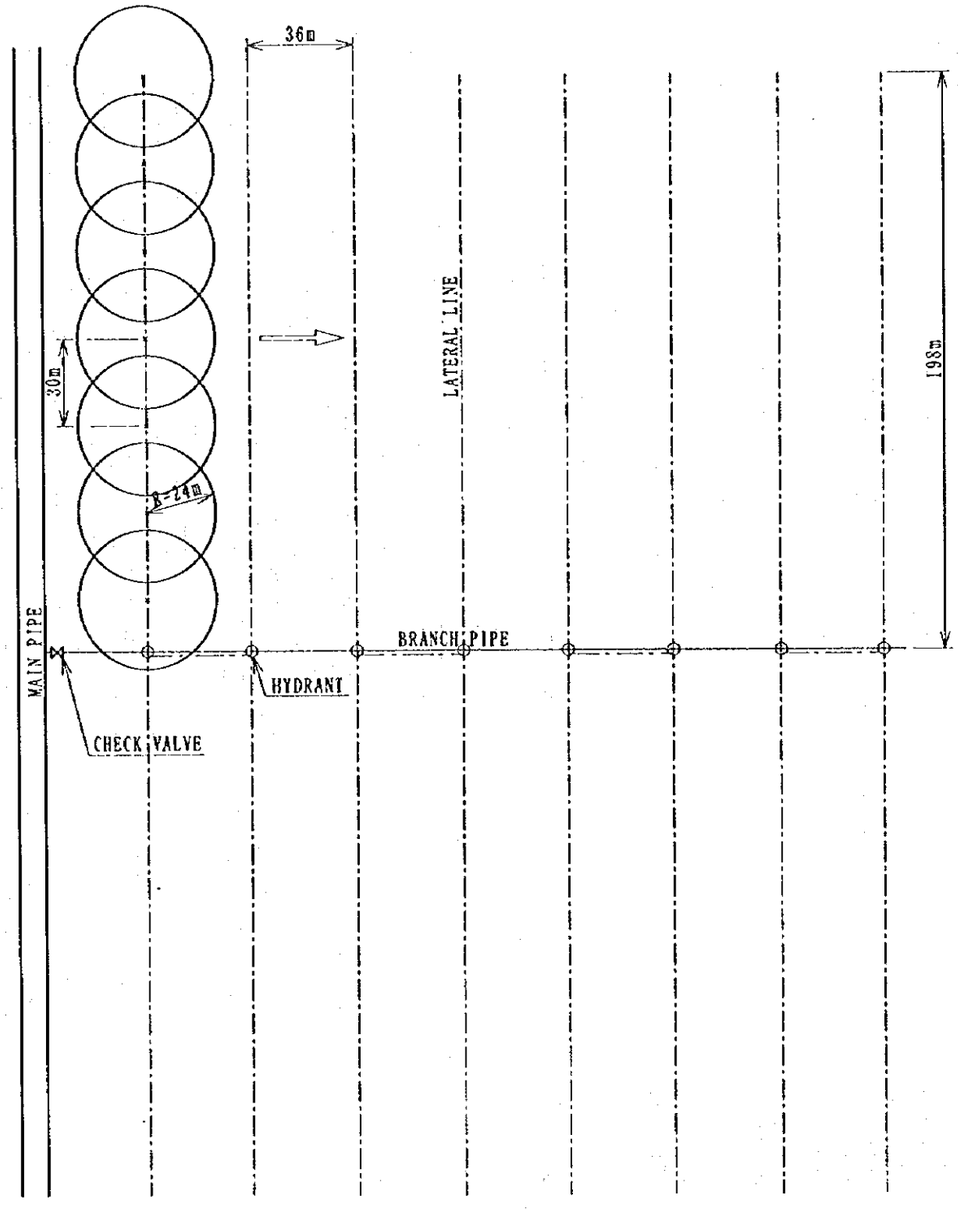
JAPAN INTERNATIONAL COOPERATION AGENCY

DESIGN OF SAMPLE AREA IRRIGATION FACILITIES

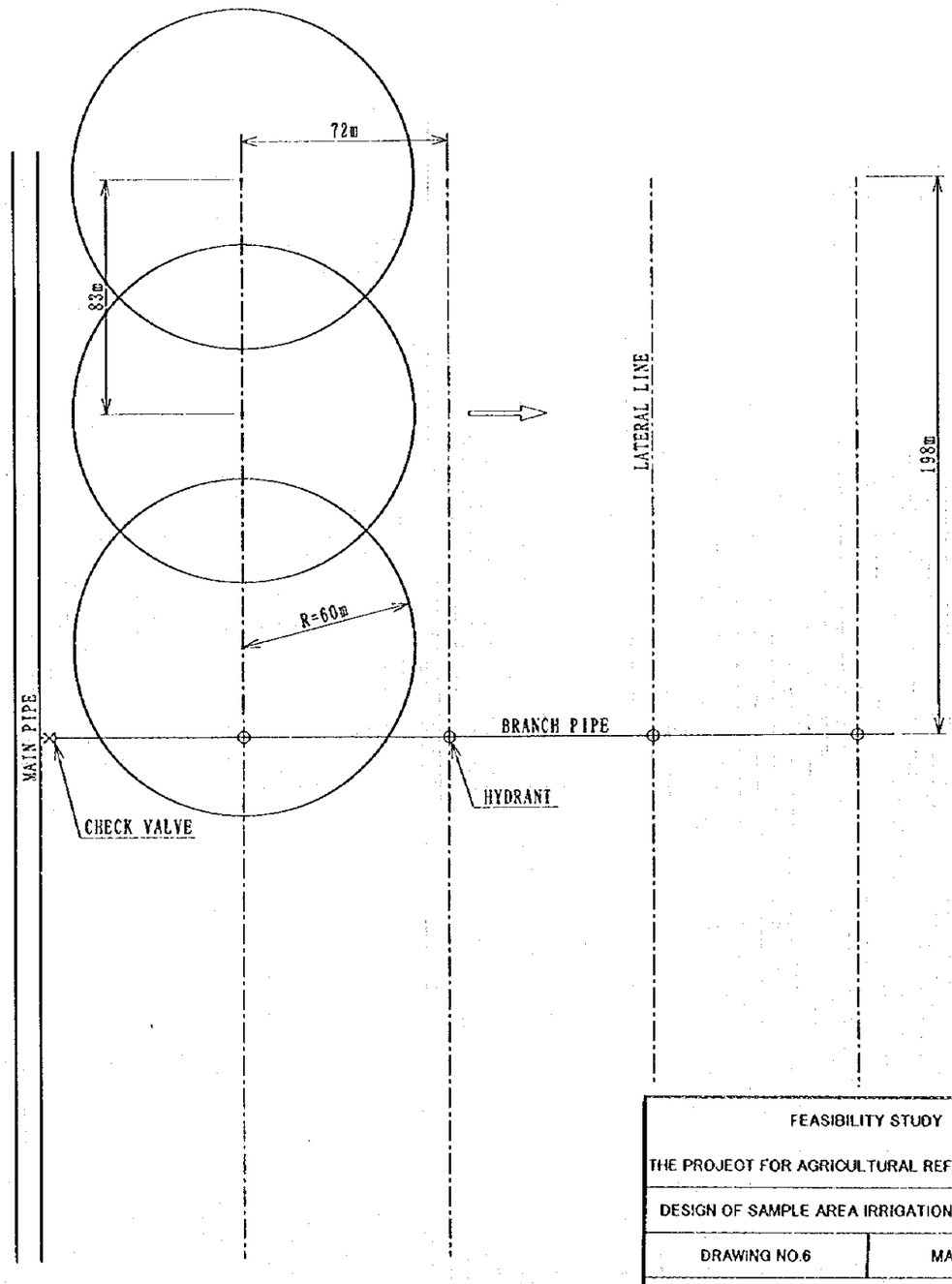


FEASIBILITY STUDY	
THE PROJECT FOR AGRICULTURAL REFORM IN BULGARIA	
DESIGN OF SAMPLE AREA IRRIGATION FACILITIES(1/3)	
DRAWING NO.5	MARCH ,1997
JAPAN INTERNATIONAL COOPERATION AGENCY	

Sprinkler Irrigation Standard Arrangement Diagram



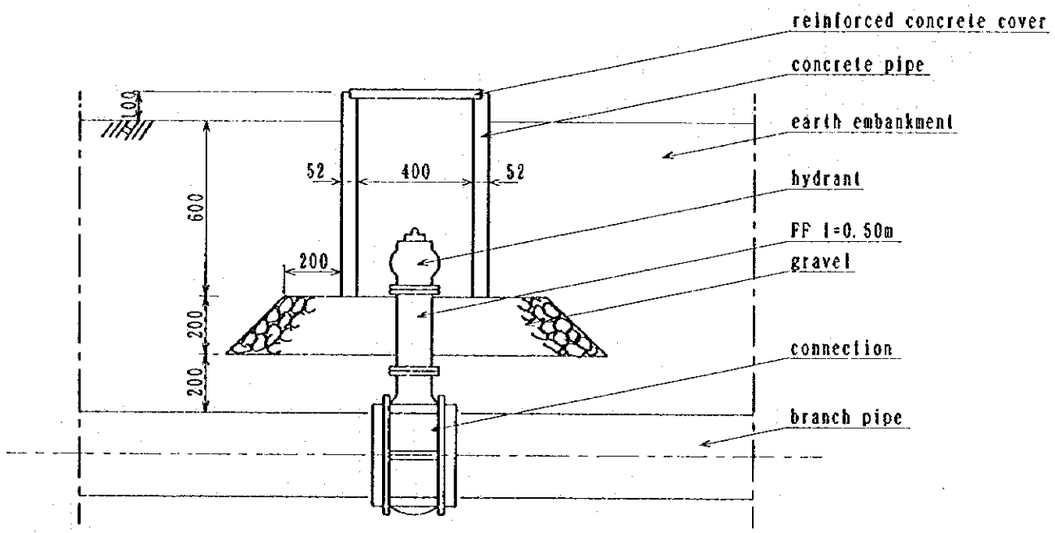
Reel Irrigation Standard Arrangement Diagram



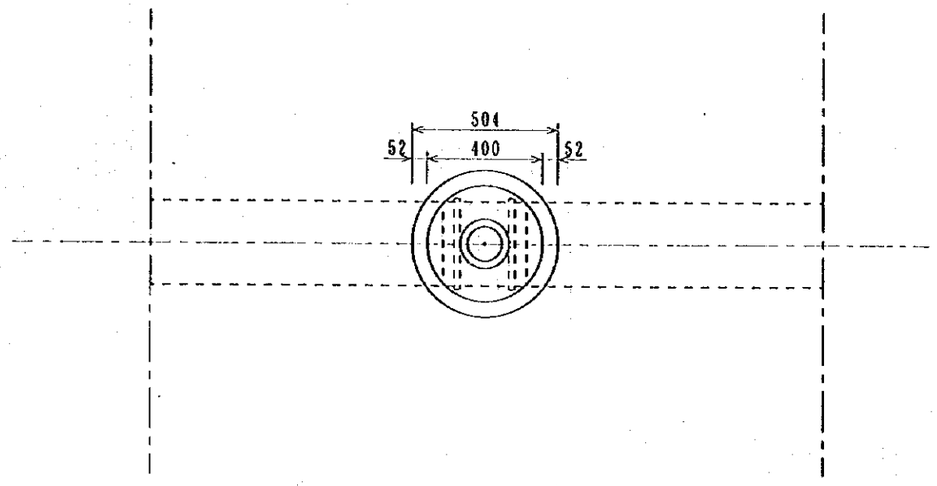
FEASIBILITY STUDY	
THE PROJECT FOR AGRICULTURAL REFORM IN BULGARIA	
DESIGN OF SAMPLE AREA IRRIGATION FACILITIES(2/3)	
DRAWING NO.6	MARCH ,1997
JAPAN INTERNATIONAL COOPERATION AGENCY	

Hydrant structure

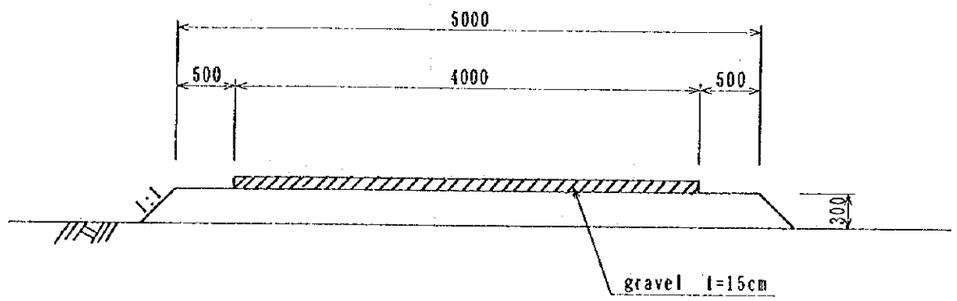
Vertical Section



Plan



Farm Road Section



FEASIBILITY STUDY	
THE PROJECT FOR AGRICULTURAL REFORM IN BULGARIA	
DESIGN OF SAMPLE AREA IRRIGATION FACILITIES(3/3)	
DRAWING NO.7	MARCH ,1997
JAPAN INTERNATIONAL COOPERATION AGENCY	

TABLE K-5-1 SUMMARY OF CONSTRUCTION COST

Region	Name of Study Block	Developing Area (ha)	Investment Cost ($)	Unit Cost ($/ha)	Remarks
Petrich	Petrich Case I	6,584.6	8,120,000	1233	
	Petrich Case II	11,000.0	12,657,000	1151	
Rositza	North Main Canal	28,959.6	22,892,000	790	
	Main Left Nikyupsky Canal	9,377.5	11,094,000	1183	
	Main Lower Right Canal	12,010.6	6,590,000	549	
	Total	50,347.7	40,576,000	806	
Sredna Tundja	Nova Zagora	22,400.0	21,291,000	950	
	Miekarevo Padarevo	20,000.0	44,263,000	2213	
	Binkos Marash	33,174.3	16,950,000	511	
	Kermen Roza	19,358.1	14,409,000	744	
	Total	94,932.4	96,913,000	1021	
	Nova Zagora(only M3 Block)	13,200.0	5,200,000	394	

TABLE K-5-2 CONSTRUCTION COST OF PETRICH STUDY AREA
(CASE I)

CONSTRUCTION COST of PETRICH
Case I (A=6600ha)

$8,120,000

	Description	Unit	Q'ty	Unit Price ($)	Amount (1000$)	Remarks
I.	Construction Cost					
1.	Canal					necessity of
a	canal lining	sq.m	152,000	15	2,280	lining 50%
b	hydrometric equipments	eq	40	1,875	75	
	Sub-total				2,355	
2.	Pipe					
a	replacement of concrete structures and pipes	L.S			0	
b	construction of the network according to the new land division	L.S			1,875	
c	hydrometric equipments	eq	40	625	25	
	Sub-total				1,900	
3.	Compensator					
a	building compensators	L.S			78	
b	compensator lining	sq.m	4,000	15	60	
	Sub-total				138	
4.	Pumping station					
a	replacement of moter and pump units	L.S			147	8 pumps
b	new installation of pumping station	L.S			0	
	Sub-total				147	
5.	Institutional development	L.S			93	
6.	Connection of WUAs to main delivery system	ha	6,600	210	1,386	
7.	Supply and installation of irrigation equipements					
a	sprinkler system	ha	2,000	188	376	
b	surface irrigation	ha	4,000	32	128	
c	drip irrigation	ha	600	313	188	
	Sub-total				692	
	total(1-7)				6,711	
8.	Miscellaneous Works(10%)				671	
	total(1-8)				7,382	
II.	Engineering Fee (10%)				738	
	Grand Total				8,120	

TABLE K-5-3 CONSTRUCTION COST OF PETRICH STUDY AREA
(CASE II)

CONSTRUCTION COST of PETRICH
Case II (A=11000ha)

$12,657,000

	Description	Unit	Q'ty	Unit Price ($)	Amount (1000$)	Remarks
I.	Construction Cost					
1.	Canal					necessity of
a	canal lining	sq.m	182,400	15	2,736	lining 50%
b	hydrometric equipments	eq	50	1,875	91	
	Sub-total				2,830	
2.	Pipe					
a	replacement of concrete structures and pipes	L.S			0	
b	construction of the network according to the new land division	L.S			3,125	
c	hydrometric equipments	eq	70	625	44	
	Sub-total				3,169	
3.	Compensator					
a	building compensators	L.S			130	
b	compensator lining	sq.m	6,700	15	101	
	Sub-total				231	
4.	Pumping station					
a	replacement of moter and pump units	L.S			147	8 pumps
b	new installation of pumping station	L.S			469	5 pumps
	Sub-total				616	
5.	Institutional development	L.S			157	
6.	Connection of WUAs to main delivery system	ha	11,000	210	2,310	
7.	Supply and installation of irrigation equipements					
a	sprinkler system	ha	3,300	188	620	
b	surface irrigation	ha	6,700	32	214	
c	drip irrigation	ha	1,000	313	313	
	Sub-total				1,147	
	total (1-7)				10,160	
8.	Miscellaneous Works (10%)				1,016	
	total (1-8)				11,506	
II.	Engineering Fee (10%)				1,151	
	Grand Total				12,657	

TABLE K-5-4 CONSTRUCTION COST OF ROSITZA STUDY AREA
(NORTH MAIN CANAL BLOCK)

CONSTRUCTION COST of ROSITZA
Notrh Main Canal

$22,892,000

	Description	Unit	Q'ty	Unit Price ($)	Amount (1000$)	Remarks
I.	Construction Cost					
1.	Canal					necessity of
a	canal lining	sq.m	830,000	15	12,450	lining 50%
b	hydrometric equipments	eq	130	1,875	241	
	Sub-total				12,691	
2.	Pipe					
a	replacement of concrete structures and pipes	L.S			125	
b	construction of the network according to the new land division	L.S			420	
c	hydrometric equipments	eq	50	625	31	
	Sub-total				576	
3.	Compensator					
a	building compensators	L.S			325	
b	compensator lining	sq.m	7,300	15	110	
	Sub-total				435	
4.	Pumping station					
a	replacement of moter and pump units	L.S			503	11 pumps
b	new installation of pumping station	L.S			1,138	9 pumps
	Sub-total				1,641	
5.	Institutional development	L.S			188	
6.	Connection of WUAs to main delivery system	ha	2,520	210	529	
7.	Supply and installation of irrigation equipements					
a	sprinkler system	ha	12,300	188	2,312	
b	surface irrigation	ha	17,000	32	544	
c	drip irrigation	ha	0	0	0	
	Sub-total				2,856	
	total(1-7)				18,919	
8.	Miscellaneous Works(10%)				1,892	
	total(1-8)				20,811	
II.	Engineering Fee(10%)				2,081	
	Grand Total				22,892	

TABLE K-5-5 CONSTRUCTION COST OF ROSITZA STUDY AREA
(MAIN LEFT NIKYUPSKY CANAL BLOCK)

CONSTRUCTION COST of ROSITZA
Main Left Nikyupsky Canal

$11,094,000

	Description	Unit	Q'ty	Unit Price ($)	Amount (1000$)	Remarks
I.	Construction Cost					
1.	Canal					necessity of
a	canal lining	sq.m	524,300	15	7,865	lining 80%
b	hydrometric equipments	eq	30	1,875	56	
	Sub-total				7,921	
2.	Pipe					
a	replacement of concrete structures and pipes	L.S			15	
b	construction of the network according to the new land division	L.S			50	
c	hydrometric equipments	eq	10	625	6	
	Sub-total				71	
3.	Compensator					
a	building compensators	L.S			101	
b	compensator lining	sq.m	2,400	15	36	
	Sub-total				140	
4.	Pumping station					
a	replacement of moter and pump units	L.S			412	3 pumps
b	new installation of pumping station	L.S			0	
	Sub-total				412	
5.	Institutional development	L.S			62	
6.	Connection of WUAs to main delivery system	ha	130	210	27	
7.	Supply and installation of irrigation equipements					
a	sprinkler system	ha	1,500	188	282	
b	surface irrigation	ha	7,900	32	253	
c	drip irrigation	ha	0	0	0	
	Sub-total				535	
	total(1-7)				9,168	
8.	Miscellaneous Works(10%)				917	
	total(1-8)				10,085	
II.	Engineering Fee(10%)				1,009	
	Grand Total				11,091	

TABLE K-5-6 CONSTRUCTION COST OF ROSITZA STUDY AREA
(MAIN LOWER RIGHT CANAL BLOCK)

CONSTRUCTION COST of ROSITZA
Main Lower Right Canal

$6,590,000

	Description	Unit	Q'ty	Unit Price ($)	Amount (1000$)	Remarks
I.	Construction Cost					
1.	Canal					necessity of
a	canal lining	sq.m	182,000	15	2,730	lining 50%
b	hydrometric equipments	eq	40	1,875	75	
	Sub-total				2,805	
2.	Pipe					
a	replacement of concrete structures and pipes	L.S			50	
b	construction of the network according to the new land division	L.S			150	
c	hydrometric equipments	eq	20	625	13	
	Sub-total				213	
3.	Compensator					
a	building compensators	L.S			131	
b	compensator lining	sq.m	3,000	15	45	
	Sub-total				179	
4.	Pumping station					
a	replacement of moter and pump units	L.S			475	4 pumps
b	new installation of pumping station	L.S			565	3 pumps
	Sub-total				1,040	
5.	Institutional development	L.S			62	
6.	Connection of MUAs to main delivery system	ha	270	210	57	
7.	Supply and installation of irrigation equipements					
a	sprinkler system	ha	1,520	188	850	
b	surface irrigation	ha	7,500	32	240	
c	drip irrigation	ha	0	0	0	
	Sub-total				1,090	
	total(1-7)				5,446	
8.	Miscellaneous Works(10%)				545	
	total(1-8)				5,991	
II.	Engineering Fee(10%)				599	
	Grand Total				6,590	

TABLE K-5-7 CONSTRUCTION COST OF SREDNA TUNDJA STUDY AREA
(BINKOS MARSH BLOCK)

CONSTRUCTION COST of SREDNA TUNDJA
Binkos Marsh

$16,950,000

	Description	Unit	Q'ty	Unit Price ($)	Amount (1000$)	Remarks
I.	Construction Cost					
1.	Canal					necessity of
a	canal lining	sq.m	306,000	15	1,590	lining 10%
b	hydrometric equipments	eq	160	1,875	300	
	Sub-total				1,890	
2.	Pipe					
a	replacement of concrete structures and pipes	L.S			122	
b	construction of the network according to the new land division	L.S			106	
c	hydrometric equipments	eq	60	625	38	
	Sub-total				566	
3.	Compensator					
a	building compensators	L.S			397	
b	compensator lining	sq.m	8,700	15	131	
	Sub-total				528	
4.	Pumping station					
a	replacement of moter and pump units	L.S			391	17 pumps
b	new installation of pumping station	L.S			125	4 pumps
	Sub-total				819	
5.	Institutional development	L.S			226	
6.	Connection of WUAs to main delivery system	ha	4,500	210	915	
7.	Supply and installation of irrigation equipements					
a	sprinkler system	ha	31,500	188	5,922	
b	surface irrigation	ha	3,500	32	112	
c	drip irrigation	ha	0	0	0	
	Sub-total				6,031	
	total(1-7)				14,008	
8.	Miscellaneous Works(10%)				1,401	
	total(1-8)				15,409	
II.	Engineering Fee (10%)				1,511	
	Grand Total				16,950	

TABLE K-5-8 CONSTRUCTION COST OF SREDNA TUNDJA STUDY AREA
(KERMEN ROZA BLOCK)

CONSTRUCTION COST of SREDNA TUNDJA
Kormen Roza

$14,409,000

	Description	Unit	Q'ty	Unit Price ($)	Amount (1000$)	Remarks
I.	Construction Cost					
1.	Canal					necessity of
a	canal lining	sq.m	122,000	15	1,830	lining 45%
b	hydrometric equipments	eq	60	1,875	113	
	Sub-total				1,943	
2.	Pipe					
a	replacement of concrete structures and pipes	L.S			140	
b	construction of the network according to the new land division	L.S			389	
c	hydrometric equipments	eq	50	625	31	
	Sub-total				560	
3.	Compensator					
a	building compensators	L.S			222	
b	compensator lining	sq.m	4,900	15	74	
	Sub-total				296	
4.	Pumping station					
a	replacement of moter and pump units	L.S			184	5 pumps
b	new installation of pumping statio	L.S			0	
	Sub-total				184	
5.	Institutional development	L.S			126	
6.	Connection of WUAs to main delivery system	ha	12,100	210	2,541	
7.	Pipe internal network	ha	12,100	250	3,025	
8.	Supply and installation of irrigation equipements					
a	sprinkler system	ha	16,700	188	3,140	
b	surface irrigation	ha	2,900	32	93	
c	drip irrigation	ha	0	0	0	
	Sub-total				3,233	
	total(1-8)				11,908	
9	Miscellaneous Works(10%)				1,191	
	total(1-9)				13,099	
II.	Engineering Fee (10%)				1,310	
	Grand Total				14,409	

TABLE K-5-9 CONSTRUOTION COST OF SREDNA TUNDJA STUDY AREA
(NOVA ZAGORA BLOCK)

CONSTRUCTION COST of SREDNA TUNDJA
Nova Zagora

$21,291,000

	Description	Unit	Q'ty	Unit Price ($)	Amount (1000$)	Remarks
I.	Construction Cost					
1.	Canal					accessity of
a	canal lining	sq.m	0	15	0	lining 0%
b	hydrometric equipments	eq	60	1,875	113	
c	new canal M2	m	18,000	380	6,840	
	Sub-total				6,953	
2.	Pipe					
a	replacement of concrete structures and pipes	L.S			335	
b	construction of the network according to the new land division	L.S			1,672	
c	hydrometric equipments	eq	230	625	144	
	Sub-total				2,151	
3.	Compensator					
a	building compensators	L.S			251	
b	compensator lining	sq.m	0	15	0	
	Sub-total				251	
4.	Pumping station					
a	replacement of moter and pump units	L.S			0	
b	new installation of pumping statio	L.S			0	
	Sub-total				0	
5.	Institutional development	L.S			143	
6.	Connection of WUAs to main delivery system	ha	9,200	210	1,932	
7.	Pipe internal network	ha	9,200	250	2,300	
8.	Supply and installation of irrigation equipements					
a	sprinkler system	ha	20,160	188	3,790	
b	surface irrigation	ha	2,210	32	72	
c	drip irrigation	ha	0	0	0	
	Sub-total				3,862	
	total(1-8)				17,595	
9.	Miscellaneous Works(10%)				1,760	
	total				19,355	
II.	Engineering Fee (10%)				1,936	
	Grand Total				21,291	

TABLE K-5-10 CONSTRUCTION COST OF SREDNA TUNDJA STUDY AREA
(MLEKAREVO PADAREVO BLOCK)

CONSTRUCTION COST of SREDNA TUNDJA
Mlekarevo Padarevo

$41,263,000

	Description	Unit	Q'ty	Unit Price ($)	Amount (1000$)	Remarks
I.	Construction Cost					
1.	Canal					
a	canal lining	sq.m	0	15	0	
b	hydrometric equipments	eq	130	1,875	244	
c	new canal M4, M5	m	71,800	310	22,258	
	Sub-total				22,502	
2.	Pipe					
a	replacement of concrete structures and pipes	L.S			0	
b	construction of the network according to the new land division	L.S			992	
c	hydrometric equipments	eq	130	625	81	
	Sub-total				1,073	
3.	Compensator					
a	building compensators	L.S			229	
b	compensator lining	sq.m	0	15	0	
	Sub-total				229	
4.	Pumping station					
a	replacement of moter and pump units	L.S			0	
b	new installation of pumping statio	L.S			125	3 pumps
	Sub-total				125	
5.	Institutional development	L.S			126	
6.	Connection of WUAs to main delivery system	ha	20,000	210	4,200	
7.	Pipe internal network	ha	20,000	250	5,000	
8.	Supply and installation of irrigation equipments					
a	sprinkler system	ha	17,220	188	3,237	
b	surface irrigation	ha	2,780	32	89	
c	drip irrigation	ha	0	0	0	
	Sub-total				3,326	
	total(1-8)				36,581	
9.	Miscellaneous Works(10%)				3,658	
	total(1-9)				40,239	
II.	Engineering Fee (10%)				4,021	
	Grand Total				11,263	

TABLE K-5-11 CONSTRUCTION COST OF SREDNA TUNDJA STUDY AREA
(NOVA ZAGORA ONLY M3 BLOCK)

CONSTRUCTION COST of SREDNA TUNDJA
Nova Zagora (only M3 block)

$5,200,000

	Description	Unit	Q'ty	Unit Price ($)	Amount (1000$)	Remarks
I.	Construction Cost					
1.	Canal					necessity of
a	canal lining	sq.m	0	15	0	lining 0%
b	hydrometric equipments	eq	30	1,875	56	
	Sub-total				56	
2.	Pipe					
a	replacement of concrete structures and pipes	L.S			335	
b	construction of the network according to the new land division	L.S			1,115	
c	hydrometric equipments	eq	150	625	91	
	Sub-total				1,511	
3.	Compensator					
a	building compensators	L.S			150	
b	compensator lining	sq.m	0	15	0	
	Sub-total				150	
4.	Pumping station					
a	replacement of moter and pump units	L.S			0	
b	new installation of pumping station	L.S			0	
	Sub-total				0	
5.	Institutional development	L.S			62	
6.	Connection of WUAs to main delivery system	ha	0	210	0	
7.	Supply and installation of irrigation equipements					
a	sprinkler system	ha	13,220	188	2,185	
b	surface irrigation	ha	0	32	0	
c	drip irrigation	ha	0	0	0	
	Sub-total				2,185	
	total(1-7)				1,297	
8.	Miscellaneous Works(10%)				130	
	total(1-8)				1,727	
II.	Engineering Fee (10%)				173	
	Grand Total				5,200	

TABLE K-5-12 SUMMARY OF OPERATION & MAINTENANCE COST

Region	Name of Study Block	Gravity Irrigation			Pumping Irrigation			Total		Remarks
		Area (ha)	Unit Cost ($/ha)	Cost ($)	Area (ha)	Unit Cost ($/ha)	Cost ($)	Area (ha)	Cost ($)	
Petrich	Petrich Case I	2,900.0	0.42	1,218	3,700.0	0.63	2,331	6,600.0	3,549	
	Petrich Case II	6,700.0	0.42	2,814	4,300.0	0.63	2,709	11,000.0	5,523	
Rositza	North Main Canal	15,095.5	0.42	6,340	14,200.0	0.63	8,946	29,295.5	15,286	
	Main Left Nikvupsky Canal	8,254.5	0.42	3,467	1,130.0	0.63	712	9,384.5	4,179	
	Main Lower Right Canal	3,970.0	0.42	1,667	8,050.0	0.63	5,072	12,020.0	6,739	
	Total	27,320.0		11,474	23,380.0		14,730	50,700.0	26,204	
Sredna Tundja	Nova Zagora	22,400.0	0.42	9,408	0.0	0.63	0	22,400.0	9,408	
	Mlekarevo Padarevo	6,200.0	0.42	2,604	13,800.0	0.63	8,694	20,000.0	11,298	
	Binkos Marash	4,700.0	0.42	1,974	30,300.0	0.63	19,089	35,000.0	21,063	
	Kermen Roza	7,900.0	0.42	3,318	11,700.0	0.63	7,371	19,600.0	10,689	
	Total	41,200.0		17,304	55,800.0		35,154	97,000.0	52,458	
	Nova Zagora(only M3)	13,220.0	0.42	5,552	0.0	0.63	0	13,220.0	5,552	

K-6 Cost Estimate(F/S)

TABLE K-6-1 CONSTRUCTION COST OF AGRI-SERVICE CENTER
(AGRI-BUSINESS INFORMATION CENTER & EXTENSION SERVICE OFFICE)

$354,016

Unit:$

Description	unit	Quantity	Unit Price	L/C		F/C		Total	Remarks
			$	(%)	Cost	(%)	Cost		
1. Construction of Facilities									
Main Building	sq.m	672	230.0	80	123,648	20	30,912	154,560	
sub-total					123,648		30,912	154,560	
Overhead					12,365		3,091	15,456	
Total					136,013		34,003	170,016	
2. Equipment & Furniture									
Equipment	LS		100,000.0	0	0	100	100,000	100,000	
Furniture	LS		10,000.0	100	10,000	0	0	10,000	
sub-total					10,000		100,000	110,000	
3. Transporting Equipment									
Station Wagon	No.	2	30,000.0	0	0	100	60,000	60,000	
Motorcycle	No.	4	3,500.0	0	0	100	14,000	14,000	
sub-total					0		74,000	74,000	
Grand Total					146,013		208,003	354,016	
4. Land Acquisition									
Land Acquisition	sq.m	700	100.0	100	70,000	0	0	70,000	
Total					70,000		0	70,000	

1$=224.3Lev

TABLE K-6-2 CONSTRUCTION COST OF AGRI-SERVICE CENTER (AGRICULTURAL MACHINERY WORKSHOP)

$366,024

Unit:$

Description	unit	Quantity	Unit Price	L/C		F/C		Total	Remarks
			$	(%)	Cost	(%)	Cost		
1. Construction of Facilities									
Workshop	sq.m	288	230.0	80	52,992	20	13,248	66,240	
Garage A	sq.m	336	230.0	80	61,824	20	15,456	77,280	
Garage B	sq.m	324	230.0	80	59,616	20	14,904	74,520	
Pavement (conc. 15 cm)	sq.m	4,380	3.3	85	12,286	15	2,168	14,454	
Fence	m	320	15.0	80	3,840	20	960	4,800	
sub-total					190,558		46,736	237,294	
Overhead					19,056		4,674	23,730	
Total					209,614		51,410	261,024	
2. Workshop Equipment									
Equipment	LS		100,000.0	0	0	100	100,000	100,000	
Furniture	LS		5,000.0	100	5,000	0	0	5,000	
sub-total					5,000		100,000	105,000	
Grand Total					214,614		151,410	366,024	
3. Agricultural Machines									
Tractor 80 Ps	No.	5	55,000.0	0	0	100	275,000	275,000	
Attachment of Tractor									
Disk Plow	No.	5	6,100.0	0	0	100	30,500	30,500	
Disk Harrow	No.	5	6,200.0	0	0	100	31,000	31,000	
Trailer	No.	5	11,200.0	0	0	100	56,000	56,000	
Combine 120Ps w/ Attachmen	No.	9	200,000.0	0	0	100	1,800,000	1,800,000	
Truck	No.	3	30,000.0	0	0	100	90,000	90,000	
Station Wagon	No.	2	30,000.0	0	0	100	60,000	60,000	
Motorcycle	No.	4	3,500.0	0	0	100	14,000	14,000	
Total					0		2,356,500	2,356,500	
4. Land Acquisition									
Land Acquisition	sq.m	5,300	100.0	100	530,000	0	0	530,000	
Total					530,000		0	530,000	

1$=224.3Lev

TABLE K-6-3 CONSTRUCTION COST OF ON-FARM STORAGE FACILITIES

$1,060,300

Unit:$

Description	unit	Quantity	Unit Price	L/C		F/C		Total	Remarks
			$	(%)	Cost	(%)	Cost		
1. Rehabilitation Works									
Asenovetz	sq.m	500	115.00	80	46,000	20	11,500	57,500	
Bryastovo	sq.m	400	115.00	80	36,800	20	9,200	46,000	
Karanovo	sq.m	400	115.00	80	36,800	20	9,200	46,000	
Sabrano	sq.m	600	115.00	80	55,200	20	13,800	69,000	
Stoil Voivoda	sq.m	800	115.00	80	73,600	20	18,400	92,000	
Zagortzi	sq.m	0	115.00	80	0	20	0	0	
sub-total					248,400		62,100	310,500	
2. New Construction									
Asenovetz	sq.m	310	230.00	80	57,040	20	14,260	71,300	
Bryastovo	sq.m	0	230.00	80	0	20	0	0	
Karanovo	sq.m	670	230.00	80	123,280	20	30,820	154,100	
Sabrano	sq.m	100	230.00	80	18,400	20	4,600	23,000	
Stoil Voivoda	sq.m	400	230.00	80	73,600	20	18,400	92,000	
Zagortzi	sq.m	1,780	230.00	80	327,520	20	81,880	409,400	
sub-total		3,260			599,840		149,960	749,800	
TOTAL					848,240		212,060	1,060,300	
3. Land Acquisition									
Land Acquisition	sq.m	3,912	100.0	100	391,200	0	0	391,200	
Total					391,200		0	391,200	

1$=224.3Lev

TABLE K-6-4 COST FOR KORTEN COLLECTING POINT

$382,480

Unit:$

Description	unit	Quantity	Unit Price	L/C		F/C		Total	Remarks
			$	(%)	Cost	(%)	Cost		
1. Equipment									
Tomato Grading Equipmen	unit	1	113,520	0	0	100	113,520	113,520	
Fruit Grading Equipment	unit	1	113,520	0	0	100	113,520	113,520	
Cucumber Sealer	unit	1	54,000	0	0	100	54,000	54,000	
sub-total					0		281,040	281,040	
2. Consumable									
Crates (40x60x15)	unit	46,520	2.00	100	93,040	0	0	93,040	
Pallets	unit	1,400	6.00	100	8,400	0	0	8,400	
sub-total					101,440		0	101,440	
TOTAL					101,440		281,040	382,480	

1$=224.3Lev

TABLE K-6-5 TOTAL CONSTRUCTION COST OF IRRIGATION FACILITIES

$9,013,394

(Unit:$)

Item	L/C	F/C	Total	Remarks
1. Construction Cost				
a. Main Pipeline	16,414	151,644	168,058	
b. On-Farm Facilities(Rehabilitation)	95,756	17,293	113,049	
On-Farm Facilities(New Construction)	4,357,991	462,267	4,820,258	
total(1)	4,470,161	631,204	5,101,365	
2. Engineering Fee(10%)	255,069	255,068	510,137	
total(1-2)	4,725,230	886,272	5,611,502	
3. VAT(22%)	1,234,531	0	1,234,531	
total(1-3)	5,959,761	886,272	6,846,033	
4. Contingency(10%)	595,976	88,627	684,603	
total(1-4)	6,555,737	974,899	7,530,636	
5. Price Escalation	1,319,039	163,719	1,482,758	
total(1-5)	7,874,776	1,138,618	9,013,394	

1$=224.3Lev

TABLE K-6-6 CONSTRUCTION COST OF MAIN PIPELINE
$168,058

Unit:$

Description	unit	Quantity	Unit Price	L/C		F/C		Total	Remarks
			$	(%)	Cost	(%)	Cost		
1. Main Pipeline									
a. Flow Meter Works									
Supersonic flow Meter	piece	9	15,000.00	0	0	100	135,000	135,000	
Excavation(machine)	cu.m	1140	0.73	60	499	40	333	832	
Back filling(machine)	cu.m	890	0.38	60	203	40	135	338	
Compaction	cu.m	890	0.24	90	193	10	21	214	
Reinforced concrete	cu.m	100	45.58	85	3,874	15	684	4,558	
Rean concrete	cu.m	7	21.28	85	127	15	22	149	
Foundation Gravel	cu.m	14	9.32	100	130	0	0	130	
Gravel	cu.m	1	9.32	100	9	0	0	9	
Form work	sq.m	650	2.18	100	1,417	0	0	1,417	
sub-total					6,452		136,195	142,647	
b. Steel Pipe									
Excavation(machine)	cu.m	220	0.73	60	97	40	64	161	
Back filling(machine)	cu.m	70	0.38	60	16	40	11	27	
Back filling(manual)	cu.m	110	1.16	100	128	0	0	128	
Compaction	cu.m	170	0.24	90	37	10	4	41	
Sand	cu.m	10	8.81	100	88	0	0	88	
Steel Pipeϕ1200	m	30	236.00	85	6,018	15	1,062	7,080	
Pavement restoration	sq.m	170	15.34	80	2,086	20	522	2,608	
sub-total					8,470		1,663	10,133	
total					14,922		137,858	152,780	
2. Over Head(10%)					1,492		13,786	15,278	
Grand total					16,414		151,644	168,058	

1$=224.3Lev

TABLE K-6-7 CONSTRUCTION COST OF ON-FARM FACILITIES(REHABILITATION)

$113,049

Unit:$

Description	unit	Quantity	Unit Price	L/C		F/C		Total	Remarks
			$	(%)	Cost	(%)	Cost		
1. Branch Pipeline									
Excavation(machine)	cu.m	2600	0.82	80	1,706	20	426	2,132	
Back filling(machine)	cu.m	2400	0.38	60	547	40	365	912	
Compaction	cu.m	2400	0.24	90	518	10	58	576	
PVC φ315	m	260	39.13	85	8,648	15	1,526	10,174	
PVC φ250	m	2200	24.35	85	45,535	15	8,035	53,570	
Hydrant	piece	790	44.82	85	30,097	15	5,311	35,408	
sub-total					87,051		15,721	102,772	
2. Over Head(10%)					8,705		1,572	10,277	
Grand Total					95,756		17,293	113,049	

1$=224.3Lev

TABLE K-6-8 CONSTRUCTION COST OF ON-FARM FACILITIES(NEW CONSTRUCTION)

$4,820,258

Unit:$

Description	unit	Quantity	Unit Price	L/C		F/C		Total	Remarks
			$	(%)	Cost	(%)	Cost		
1. Branch Pipeline									
Excavation(machine)	cu.m	7700	0.82	80	5,051	20	1,263	6,314	
Back filling(machine)	cu.m	7320	0.38	60	1,669	40	1,113	2,782	
Compaction	cu.m	7320	0.24	90	1,581	10	176	1,757	
PVC φ250	m	7700	24.35	85	159,371	15	28,124	187,495	
Hydrant	piece	140	44.82	85	5,334	15	941	6,275	
Check Valve φ250	piece	20	216.46	85	3,680	15	649	4,329	
Air Valve φ250	piece	20	62.20	85	1,057	15	187	1,244	
sub-total					177,743		32,453	210,196	
2. Irrigation Facilities etc.									
Sprinkler	ha	1014	190.00	85	163,761	15	28,899	192,660	
Self moving(Reel)	ha	676	60.00	85	34,476	15	6,084	40,560	
Farm road(gravel)	m	60400	4.30	100	259,720	0	0	259,720	
sub-total					457,957		34,983	492,940	
total(1-2)					635,700		67,436	703,136	
3. Over Head(10%)					63,570		6,744	70,314	
total(1-3)					699,270		74,180	773,450	
Cost/ha (Sample Area)	ha	1690			413.77		43.89	457.66	
Grand Total	ha	10532.4			4,357,991		462,267	4,820,258	

15=224.3Lev

TABLE K-6-9 PROPOSED SCHEDULE FOR CONSTRUCTION & CONSULTING SERVICES

Description	1998				1999				2000				2001				2002			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
I. Construction Cost																				
Main Pipeline																				
On-Farm Facilities																				
Rehabilitation																				
New Construction																				
II. Engineering Fee																				
Detail Design																				
Construction Supervision																				

TABLE K-6-10 LIST OF UNIT PRICE

Description	Quantity	Unit	Unit Price Lev	Unit Price $	L/C (%)	L/C Cost	F/C (%)	F/C Cost
1. Earth Work								
Excavation by Manual	1.0	cu.m	849.20	3.79	100	3.79	0	0.00
Back filling by Manual	1.0	cu.m	260.48	1.16	100	1.16	0	0.00
Back filling by Machine	1.0	cu.m	84.39	0.38	60	0.23	40	0.15
Embankment by Machine	1.0	cu.m	179.38	0.80	60	0.48	40	0.32
Excavation and Pushing by Bulldozer	1.0	cu.m	81.91	0.37	55	0.20	45	0.17
Excavation by Backhoe(0.35 cu.m)	1.0	cu.m	184.14	0.82	80	0.66	20	0.16
Excavation by Backhoe(0.60 cu.m)	1.0	cu.m	163.07	0.73	60	0.44	40	0.29
Compaction by vibration roller	1.0	cu.m	54.41	0.24	90	0.22	10	0.02
Soil bank with Transportation(5Km)	1.0	cu.m	402.74	1.80	60	1.08	40	0.72
2. Concrete Work								
Reinforced Concrete	1.0	cu.m	10224.31	45.58	85	38.74	15	6.84
Plain Concrete	1.0	cu.m	4772.71	21.28	85	18.09	15	3.19
Form work(5Kg/m^2)	1.0	sq.m	488.25	2.18	100	2.18	0	0.00
Mortar(t=2.5cm)	1.0	sq.m	347.08	1.55	85	1.32	15	0.23
Sand	1.0	cu.m	1975.01	8.81	100	8.81	0	0.00
Gravel	1.0	cu.m	2090.71	9.32	100	9.32	0	0.00
Concrete Panel	1.0	sq.m	10628.69	47.39	85	40.28	15	7.11
3. Pipes								
Steel Pipe ϕ1820 t=8mm	1.0	m	95058.88	423.80	85	360.23	15	63.57
Steel Pipe ϕ1620 t=8mm	1.0	m	83420.51	371.91	85	316.12	15	55.79
Steel Pipe ϕ720 t=6mm	1.0	m	22360.38	99.69	85	84.74	15	14.95
Steel Pipe ϕ630 t=6mm	1.0	m	18401.99	82.04	85	69.73	15	12.31
Steel Pipe ϕ600 t=6mm	1.0	m	18401.99	82.04	85	69.73	15	12.31
Steel Pipe ϕ530 t=6mm	1.0	m	15377.58	68.56	85	58.28	15	10.28
PVC ϕ450	1.0	m	18268.64	81.45	85	69.23	15	12.22
PVC ϕ400	1.0	m	14266.47	63.60	85	54.06	15	9.54
PVC ϕ350	1.0	m	11140.21	49.67	85	42.22	15	7.45
PVC ϕ300	1.0	m	8777.26	39.13	85	33.26	15	5.87
PVC ϕ250	1.0	m	5460.87	24.35	85	20.70	15	3.65
PVC ϕ200	1.0	m	3523.79	15.71	85	13.35	15	2.36
Reinforcing Pipe ϕ1000	1.0	m	16438.86	73.29	85	62.30	15	10.99
4. Valves								
Check Valve ϕ546	1.0	piece	163361.88	728.32	85	619.07	15	109.25
Check Valve ϕ450	1.0	piece	126247.00	562.85	85	478.42	15	84.43
Check Valve ϕ400	1.0	piece	102702.60	457.88	85	389.20	15	68.68
Check Valve ϕ350	1.0	piece	76377.40	340.51	85	289.43	15	51.08
Check Valve ϕ300	1.0	piece	61241.40	273.03	85	232.08	15	40.95
Check Valve ϕ250	1.0	piece	48551.36	216.46	85	183.99	15	32.47
Check Valveϕ 200	1.0	piece	31264.20	139.39	85	118.48	15	20.91
Air Valve200/100	1.0	piece	10210.20	45.52	85	38.69	15	6.83
Air Valve350/100	1.0	piece	17690.20	78.87	85	67.04	15	11.83
Air Valve300/150	1.0	piece	17690.20	78.87	85	67.04	15	11.83
Air Valve350/150	1.0	piece	21505.00	95.88	85	81.50	15	14.38
Air Valve400/200	1.0	piece	23786.40	106.05	85	90.14	15	15.91
Air Valve475/250	1.0	piece	26741.00	119.22	85	101.34	15	17.88
Air Valve546/250	1.0	piece	29546.00	131.73	85	111.97	15	19.76
Hydrant	1.0	piece	10052.98	44.82	85	38.10	15	6.72
Metal goods 1400*1000	1.0	sq.m	11893.50	53.02	85	45.07	15	7.95
5. Road Work								
Asphalt pavement t=5cm	1.0	sq.m	3440.00	15.34	80	12.27	20	3.07
Gravel Road t=15cm	1.0	m	1480.40	6.60	100	6.60	0	0.00
6. Irrigation Facilities								
Sprinkler	1.0	ha		190.00	85	161.50	15	28.50
Self moving(reel)	1.0	ha		60.00	85	51.00	15	9.00
Center Pivot	1.0	ha		900.00	10	90.00	90	810.00
7. Building								
dimension17m*21m 2nd story	1.0	sq.m	51600	230.05	80	184.04	20	46.01

1$=224.31ev

TABLE K-6-11 SUMMARY OF PROJECT COST

(unit US$)

Description	Agri-Service Center									Sub-Total (A)		
	Agribusiness Information Center & Extension Service Office (Building & Facility)			Agricultural Machinery Workshop in Extension Service Office (Workshop & Store)			(Machinery)					
	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total
I. Construction Cost												
1. Construction of Facilities	136,013	34,003	170,016	209,614	51,410	261,024			0	345,627	85,413	431,040
2. Equipment & Furniture	10,000	174,000	184,000	5,000	100,000	105,000	0	2,356,500	2,356,500	15,000	2,630,500	2,645,500
3. Consumption			0			0			0	0	0	0
Total (I)	146,013	208,003	354,016	214,614	151,410	366,024	0	2,356,500	2,356,500	360,627	2,715,913	3,076,540
II. Engineering Fee	17,701	17,701	35,402	18,301	18,301	36,602	58,913	58,913	117,826	94,915	94,915	189,830
Total (I+II)	163,714	225,704	389,418	232,915	169,711	402,626	58,913	2,415,413	2,474,326	455,542	2,810,828	3,266,370
III. VAT (22%)	85,672	0	85,672	88,577	0	88,577	544,352	0	544,352	718,601	0	718,601
IV. Land Acquisition												
Land Acquisition	70,000	0	70,000	530,000	0	530,000	0	0	0	600,000	0	600,000
Vat (22%)	15,400	0	15,400	116,600	0	116,600	0	0	0	132,000	0	132,000
Total (IV)	85,400	0	85,400	646,600	0	646,600	0	0	0	732,000	0	732,000
V. Contingency (10%)	33,478	22,570	56,048	96,809	16,971	113,780	60,326	241,542	301,868	190,613	281,083	471,696
VI. Price Escalation	30,956	34,861	65,827	55,132	23,859	78,991	57,458	241,505	298,963	143,556	300,225	443,781
Grand Total	399,230	283,135	682,365	1,120,033	210,541	1,330,574	721,049	2,898,460	3,619,509	2,240,312	3,392,136	5,632,448

Description	On-Farm Storage Facilities			Korten Collecting Point			Rehabilitation of Irrigation Facilities			Sub-Total (B)		
	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total
I. Construction Cost												
1. Construction of Facilities	848,240	212,060	1,060,300			0	4,470,161	631,204	5,101,365	5,318,401	843,264	6,161,665
2. Equipment & Furniture			0	0	281,040	281,040			0	0	281,040	281,040
3. Consumption			0	101,440	0	101,440			0	101,440	0	101,440
Total (I)	848,240	212,060	1,060,300	101,440	281,040	382,480	4,470,161	631,204	5,101,365	5,419,841	1,124,304	6,544,145
II. Engineering Fee	53,015	53,015	106,030	19,126	19,126	38,252	255,069	255,068	510,137	327,210	327,209	654,419
Total (I+II)	901,255	265,075	1,166,330	120,566	300,166	420,732	4,725,230	886,272	5,611,502	5,747,051	1,451,513	7,198,564
III. VAT (22%)	256,592	0	256,592	92,561	0	92,561	1,234,531	0	1,234,531	1,583,684	0	1,583,684
IV. Land Acquisition												
Land Acquisition	391,200	0	391,200			0			0	391,200	0	391,200
Vat (22%)	86,064	0	86,064			0			0	86,064	0	86,064
Total (IV)	477,264	0	477,264			0			0	477,264	0	477,264
V. Contingency (10%)	115,785	26,507	142,292	21,312	30,017	51,330	595,976	88,627	684,603	733,073	145,151	878,225
VI. Price Escalation	184,327	36,174	220,501	34,646	29,953	64,599	1,319,039	163,719	1,482,758	1,538,012	229,846	1,767,858
Grand Total	1,935,223	327,756	2,262,979	269,085	360,136	629,222	7,874,776	1,138,618	9,013,394	10,079,084	1,826,510	11,905,595

Description	Total (A)+(B)		
	L/C	F/C	Total
I. Construction Cost			
1. Construction of Facilities	5,664,028	928,677	6,592,705
2. Equipment & Furniture	15,000	2,911,540	2,926,540
3. Consumption	101,440	0	101,440
Total (I)	5,780,468	3,840,217	9,620,685
II. Engineering Fee	422,125	422,124	844,249
Total (I+II)	6,202,593	4,262,341	10,464,934
III. VAT (22%)	2,302,285	0	2,302,285
IV. Land Acquisition			
Land Acquisition	991,200	0	991,200
Vat (22%)	218,064	0	218,064
Total (IV)	1,209,264	0	1,209,264
V. Contingency (10%)	923,686	426,234	1,349,921
VI. Price Escalation	1,681,568	530,071	2,211,639
Grand Total	12,319,396	5,218,646	17,538,043

TABLE K-6-12 DISBURSEMENT SCHEDULE OF AGRI-SERVICE CENTER
(AGRI-BUSINESS INFORMATION CENTER & EXTENSION SERVICE OFFICE- BUILDING & FACILITY)

unit : $

Description	1998			1999			2000			2001			2002			Total		
	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total
I. Construction Cost																		
1. Construction of Facilities	0	0	0	136,013	34,003	170,016	0	0	0	0	0	0	0	0	0	136,013	34,003	170,016
2. Equipment & Furniture	0	0	0	0	0	0	10,000	174,000	184,000	0	0	0	0	0	0	10,000	174,000	184,000
Total (I)	0	0	0	136,013	34,003	170,016	10,000	174,000	184,000	0	0	0	0	0	0	146,013	208,003	354,016
II. Engineering Fee	10,621	10,621	21,241	3,540	3,540	7,080	3,540	3,540	7,080	0	0	0	0	0	0	17,701	17,701	35,402
Total (I+II)	10,621	10,621	21,241	139,553	37,543	177,096	13,540	177,540	191,080	0	0	0	0	0	0	163,714	225,704	389,418
III. VAT	4,673	0	4,673	38,961	0	38,961	42,038	0	42,038	0	0	0	0	0	0	85,672	0	85,672
Total (I+II+III)	15,294	10,621	25,914	178,514	37,543	216,057	55,578	177,540	233,118	0	0	0	0	0	0	249,386	225,704	475,090
IV. Land Acquisition																		
Land Acquisition	70,000	0	70,000	0	0	0	0	0	0	0	0	0	0	0	0	70,000	0	70,000
Vat	15,400	0	15,400	0	0	0	0	0	0	0	0	0	0	0	0	15,400	0	15,400
Total (IV)	85,400	0	85,400	0	0	0	0	0	0	0	0	0	0	0	0	85,400	0	85,400
Total (I+II+III+IV)	100,694	10,621	111,314	178,514	37,543	216,057	55,578	177,540	233,118	0	0	0	0	0	0	334,786	225,704	560,490
V. Contingency	10,069	1,062	11,131	17,851	3,754	21,605	5,558	17,754	23,312	0	0	0	0	0	0	33,478	22,570	56,048
Total (I+II+III+IV+V)	110,763	11,683	122,445	196,365	41,297	237,662	61,136	195,294	256,430	0	0	0	0	0	0	368,264	248,274	616,538
VI. Price Escalation	3,323	350	3,673	18,026	3,791	21,817	9,617	30,720	40,337	0	0	0	0	0	0	30,966	34,861	65,827
Grand Total	114,086	12,033	126,118	214,391	45,088	259,479	70,753	226,014	296,767	0	0	0	0	0	0	399,230	283,135	682,365

TABLE K-6-13 DISBURSEMENT SCHEDULE OF AGRI-SERVICE CENTER
(AGRICULTURAL MACHINERY WORKSHOP-WORKSHOP & STORE)

unit : $

Description	1998			1999			2000			2001			2002			Total		
	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total
I. Construction Cost																		
1. Construction of Facilities	0	0	0	209,614	51,410	261,024	0	0	0	0	0	0	0	0	0	209,614	51,410	261,024
2. Workshop Equipment	0	0	0	0	0	0	5,000	100,000	105,000	0	0	0	0	0	0	5,000	100,000	105,000
Total (I)	0	0	0	209,614	51,410	261,024	5,000	100,000	105,000	0	0	0	0	0	0	214,614	151,410	366,024
II. Engineering Fee	10,981	10,981	21,961	3,660	3,660	7,320	3,660	3,660	7,320	0	0	0	0	0	0	18,301	18,301	36,602
Total (I+II)	10,981	10,981	21,961	213,274	55,070	268,344	8,660	103,660	112,320	0	0	0	0	0	0	232,915	169,711	402,626
III. VAT	4,831	0	4,831	59,036	0	59,036	24,710	0	24,710	0	0	0	0	0	0	88,577	0	88,577
Total (I+II+III)	15,812	10,981	26,792	272,310	55,070	327,380	33,370	103,660	137,030	0	0	0	0	0	0	321,492	169,711	491,203
IV. Land Acquisition																		
Land Acquisition	530,000	0	530,000	0	0	0	0	0	0	0	0	0	0	0	0	530,000	0	530,000
VAT	116,600	0	116,600	0	0	0	0	0	0	0	0	0	0	0	0	116,600	0	116,600
Total (IV)	646,600	0	646,600	0	0	0	0	0	0	0	0	0	0	0	0	646,600	0	646,600
Total (I+II+III+IV)	662,412	10,981	673,392	272,310	55,070	327,380	33,370	103,660	137,030	0	0	0	0	0	0	968,092	169,711	1,137,803
V. Contingency	66,241	1,098	67,339	27,231	5,507	32,738	3,337	10,366	13,703	0	0	0	0	0	0	96,809	16,971	113,780
Total (I+II+III+IV+V)	728,653	12,079	740,731	299,541	60,577	360,118	36,707	114,026	150,733	0	0	0	0	0	0	1,064,901	186,682	1,251,583
V Price Escalation	21,860	362	22,222	27,498	5,561	33,059	5,774	17,936	23,710	0	0	0	0	0	0	55,132	23,859	78,991
Grand Total	750,513	12,441	762,953	327,039	66,138	393,177	42,481	131,962	174,443	0	0	0	0	0	0	1,120,033	210,541	1,330,574

TABLE K-6-14 DISBURSEMENT SCHEDULE OF AGRI-SERVICE CENTER
(AGRICULTURAL MACHINERY WORKSHOP-MACHINERY)

unit : $

Description	1998			1999			2000			2001			2002			Total		
	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total
I. Agrimachine																		
1. Procurement	0	0	0	0	2,356,500	2,356,500	0	0	0	0	0	0	0	0	0	0	2,356,500	2,356,500
Total (I)	0	0	0	0	2,356,500	2,356,500	0	0	0	0	0	0	0	0	0	0	2,356,500	2,356,500
II. Engineering Fee	35,348	35,348	70,695	23,565	23,565	47,130	0	0	0	0	0	0	0	0	0	58,913	58,913	117,826
Total (I+II)	35,348	35,348	70,695	23,565	2,380,065	2,403,630	0	0	0	0	0	0	0	0	0	58,913	2,415,413	2,474,326
III. VAT	15,553	0	15,553	528,799	0	528,799	0	0	0	0	0	0	0	0	0	544,352	0	544,352
Total (I+II+III)	50,901	35,348	86,248	552,364	2,380,065	2,932,429	0	0	0	0	0	0	0	0	0	603,265	2,415,413	3,018,678
IV. Contingency	5,090	3,535	8,625	55,236	238,007	293,243	0	0	0	0	0	0	0	0	0	60,326	241,542	301,868
Total (I+II+III+IV)	55,991	38,883	94,873	607,600	2,618,072	3,225,672	0	0	0	0	0	0	0	0	0	663,591	2,656,955	3,320,546
V. Price Escalation	1,680	1,166	2,846	55,778	240,339	296,117	0	0	0	0	0	0	0	0	0	57,458	241,505	298,963
Grand Total	57,671	40,049	97,719	663,378	2,858,411	3,521,789	0	0	0	0	0	0	0	0	0	721,049	2,898,460	3,619,509

TABLE K-6-15 DISBURSEMENT SCHEDULE OF ON-FARM STORAGE FACILITIES

unit : $

Description	1998			1999			2000			2001			2002			Total		
	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total
I. Construction Cost																		
1. Rehabilitation Works	0	0	0	248,400	62,100	310,500	0	0	0	0	0	0	0	0	0	248,400	62,100	310,500
2. New Construction Works	0	0	0	0	0	0	599,840	149,960	749,800	0	0	0	0	0	0	599,840	149,960	749,800
Total (I)	0	0	0	248,400	62,100	310,500	599,840	149,960	749,800	0	0	0	0	0	0	848,240	212,060	1,060,300
II. Engineering Fee	31,809	31,809	63,618	10,603	10,603	21,206	10,603	10,603	21,206	0	0	0	0	0	0	53,015	53,015	106,030
Total (I+II)	31,809	31,809	63,618	259,003	72,703	331,706	610,443	160,563	771,006	0	0	0	0	0	0	901,255	265,075	1,166,330
III. VAT	13,996	0	13,996	72,975	0	72,975	169,621	0	169,621	0	0	0	0	0	0	256,592	0	256,592
Total (I+II+III)	45,805	31,809	77,614	331,978	72,703	404,681	780,064	160,563	940,627	0	0	0	0	0	0	1,157,847	265,075	1,422,922
IV. Land Acquisition																		
Land Acquisition	391,200	0	391,200	0	0	0	0	0	0	0	0	0	0	0	0	391,200	0	391,200
Vat	86,064	0	86,064	0	0	0	0	0	0	0	0	0	0	0	0	86,064	0	86,064
Total (IV)	477,264	0	477,264	0	0	0	0	0	0	0	0	0	0	0	0	477,264	0	477,264
Total (I+II+III+IV)	523,069	31,809	554,878	331,978	72,703	404,681	780,064	160,563	940,627	0	0	0	0	0	0	1,635,111	265,075	1,900,186
IV. Contingency	4,581	3,181	7,762	33,198	7,270	40,468	78,006	16,056	94,062	0	0	0	0	0	0	115,785	26,507	142,292
Total (I+II+III+IV)	527,650	34,990	562,640	365,176	79,973	445,149	858,070	176,619	1,034,689	0	0	0	0	0	0	1,750,896	291,582	2,042,478
V. Price Escalation	15,830	1,050	16,880	33,523	7,342	40,865	134,974	27,782	162,756	0	0	0	0	0	0	184,327	36,174	220,501
Grand Total	543,480	36,040	579,520	398,699	87,315	486,014	993,044	204,401	1,197,445	0	0	0	0	0	0	1,935,223	327,756	2,262,979

TABLE K-6-16 DISBURSEMENT SCHEDULE for KORTEN COLLECTING POINT

unit : $

Description	1998			1999			2000			2001			2002			Total		
	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total
I. Construction Cost																		
1. Equipment	0	0	0	0	281,040	281,040	0	0	0	0	0	0	0	0	0	0	281,040	281,040
2. Consumable	0	0	0	0	0	0	50,720	0	50,720	50,720	0	50,720	0	0	0	101,440	0	101,440
Total (I)	0	0	0	0	281,040	281,040	50,720	0	50,720	50,720	0	50,720	0	0	0	101,440	281,040	382,480
II. Engineering Fee	11,475	11,475	22,949	3,825	3,825	7,650	1,913	1,913	3,825	1,913	1,913	3,825	0	0	0	19,126	19,126	38,252
Total (I+II)	11,475	11,475	22,949	3,825	284,865	288,690	52,633	1,913	54,545	52,633	1,913	54,545	0	0	0	120,566	300,166	420,732
III. VAT	5,049	0	5,049	63,512	0	63,512	12,000	0	12,000	12,000	0	12,000	0	0	0	92,561	0	92,561
Total (I+II+III)	16,524	11,475	27,998	67,337	284,865	352,202	64,633	1,913	66,545	64,633	1,913	66,545	0	0	0	213,127	300,166	513,293
IV. Contingency	1,652	1,148	2,800	6,734	28,487	35,221	6,463	191	6,654	6,463	191	6,655	0	0	0	21,312	30,017	51,330
Total (I+II+III+IV)	18,176	12,623	30,798	74,071	313,352	387,423	71,096	2,104	73,199	71,096	2,104	73,200	0	0	0	234,439	330,183	564,623
V. Price Escalation	545	379	924	6,800	28,766	35,566	11,183	331	11,514	16,118	477	16,595	0	0	0	34,646	29,953	64,599
Grand Total	18,721	13,002	31,722	80,871	342,118	422,989	82,279	2,435	84,713	87,214	2,581	89,795	0	0	0	269,085	360,136	629,222

TABLE K-6-17 DISBURSEMENT SCHEDULE OF IRRIGATION FACILITIES

Unit:$

Description	1998			1999			2000			2001			2002			Total		
	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total	L/C	F/C	Total
I. Construction Cost																		
1. Main Pipeline	0	0	0	16,414	151,644	168,058	0	0	0	0	0	0	0	0	0	16,414	151,644	168,058
2. On farm Facilities																		
Rehabilitation	0	0	0	95,756	17,293	113,049	0	0	0	0	0	0	0	0	0	95,756	17,293	113,049
New Constructi	0	0	0	622,570	66,038	688,608	1,245,140	132,077	1,377,217	1,245,140	132,077	1,377,217	1,245,141	132,075	1,377,216	4,357,991	462,267	4,820,258
Sub-total	0	0	0	718,326	83,331	801,657	1,245,140	132,077	1,377,217	1,245,140	132,077	1,377,217	1,245,141	132,075	1,377,216	4,453,747	479,560	4,933,307
Total(I)	0	0	0	734,740	234,975	969,715	1,245,140	132,077	1,377,217	1,245,140	132,077	1,377,217	1,245,141	132,075	1,377,216	4,470,161	631,204	5,101,365
II. Engineering Fee	76,521	76,520	153,041	44,637	44,637	89,274	44,637	44,637	89,274	44,637	44,637	89,274	44,637	44,637	89,274	255,069	255,068	510,137
Total(I-II)	76,521	76,520	153,041	779,377	279,612	1,058,989	1,289,777	176,714	1,466,491	1,289,777	176,714	1,466,491	1,289,778	176,712	1,466,490	4,725,230	886,272	5,611,502
III. VAT	33,669	0	33,669	232,978	0	232,978	322,628	0	322,628	322,628	0	322,628	322,628	0	322,628	1,234,531	0	1,234,531
Total(I-III)	110,190	76,520	186,710	1,012,355	279,612	1,291,967	1,612,405	176,714	1,789,119	1,612,405	176,714	1,789,119	1,612,406	176,712	1,789,118	5,959,761	886,272	6,846,033
IV. Contingency	11,019	7,652	18,671	101,236	27,961	129,197	161,241	17,671	178,912	161,241	17,671	178,912	161,239	17,672	178,911	595,976	88,627	684,603
Total(I-IV)	121,209	84,172	205,381	1,113,591	307,573	1,421,164	1,773,646	194,385	1,968,031	1,773,646	194,385	1,968,031	1,773,645	194,384	1,968,029	6,555,737	974,899	7,530,636
V. Price Escalation	3,636	2,525	6,161	102,228	28,235	130,463	278,995	30,577	309,572	402,086	44,967	446,153	532,094	58,315	590,409	1,319,039	163,719	1,482,758
VI. Grand Total	124,845	86,697	211,542	1,215,819	335,808	1,551,627	2,052,641	224,962	2,277,603	2,175,732	238,452	2,414,184	2,305,739	252,699	2,558,438	7,874,776	1,138,618	9,013,394

K-6-18 Training Fee and Annual Maintenance Cost

TABLE K-6-18(1) TRAINING FEE FOR AGRI-SERVICE CENTER STAFF (ABC & EXTENSION SERVICE OFFICE)

$144,500 (5-year)

Unit:$

Description	unit	Quantity	Unit Price	L/C		F/C		Total	Remarks
			$	(%)	Cost	(%)	Cost		
1. Overseas Study Tours									
Air Fair	trips	10	1,500.0	100	15,000	0	0	15,000	10 persons
Hotel Accommodation	days	300	80.0	100	24,000	0	0	24,000	10x30 days
Per diem	days	300	35.0	100	10,500	0	0	10,500	10x30
sub-total					49,500		0	49,500	
2. Farmer Study Tours									
Air Fair	trips	25	1,500.0	100	37,500	0	0	37,500	25 persons
Hotel Accommodation	days	500	80.0	100	40,000	0	0	40,000	25x20 days
Per diem	days	500	35.0	100	17,500	0	0	17,500	25x20
sub-total					95,000		0	95,000	
TOTAL					144,500		0	144,500	5-year
ANNUAL EXPENDITURE					28,900		0	28,900	Annual

1$=224.3Lev

TABLE K-6-18(2) TRAINING FEE FOR WATER MANAGEMENT

$108,400 (5-year) Unit:$

Description	unit	Quantity	Unit Price	L/C		F/C		Total	Remarks
			$	(%)	Cost	(%)	Cost		
1. Overseas Study Tours									
Air Fair	trips	4	1,000.0	100	4,000	0	0	4,000	4 persons
Hotel Accommodation	days	40	80.0	100	3,200	0	0	3,200	4x10 days
Per diem	days	40	35.0	100	1,400	0	0	1,400	4x10
sub-total					8,600		0	8,600	
2. District WUAs Training									
Salary	month	300	80.0	100	24,000	0	0	24,000	5x12x5
Training fee	month	300	150.0	100	45,000	0	0	45,000	5x12x5
Stationary & Others	L.S	1	2,000.0	100	2,000	0	0	2,000	
sub-total					71,000		0	71,000	
3. Management Support Travel									
Travel Allowance	month	300	3.0	100	900	0	0	900	5x12x5
Per Diem	month	300	3.0	100	900	0	0	900	5x12x5
sub-total					1,800		0	1,800	
4. Farmer Training on WUAs									
Salary of Trainee	month	0	100.0	100	0	0	0	0	
Training fee	times	50	500.0	100	25,000	0	0	25,000	
Stationary & Others	L.S	1	2,000.0	100	2,000	0	0	2,000	
sub-total					27,000		0	27,000	
TOTAL					108,400		0	108,400	5-year
ANNUAL EXPENDITURE					21,680		0	21,680	Annual

1$=224.3Lev

TABLE K-6-18(3) ANNUAL MAINTENANCE COST OF AGRI-SERVICE CENTER (ABC & EXTENSION SERVICE OFFICE)

$15,960

Unit:$

Description	unit	Quantity	Unit Price	L/C		F/C		Total	Remarks
			$	(%)	Cost	(%)	Cost		
1. Personel Expenditure									
Permanent Employee	M/M	72	80.0	100	5,760	0	0	5,760	6 persons
Permanent Labor	M/M	60	40.0	100	2,400	0	0	2,400	5 persons
Temporary Labor	M/M	72	25.0	100	1,800	0	0	1,800	5 persons
sub-total					9,960		0	9,960	
2. Consumption									
Electrical Fee	L.S	1	2,000.0	80	1,600	20	400	2,000	
Fuel	L.S	1	2,000.0	80	1,600	20	400	2,000	
Stationary & Others	L.S	1	2,000.0	80	1,600	20	400	2,000	
sub-total					4,800		1,200	6,000	
TOTAL					14,760		1,200	15,960	

1$=224.3Lev

TABLE K-6-18(4) ANNUAL MAINTENANCE COST OF AGRI-SERVICE CENTER (AGRICULTURAL MACHINERY WORKSHOP)

$13,560

Unit:$

Description	unit	Quantity	Unit Price	L/C		F/C		Total	Remarks
			$	(%)	Cost	(%)	Cost		
1. Personel Expenditure									
Permanent Employee	M/M	48	80.0	100	3,840	0	0	3,840	4 persons
Permanent Labor	M/M	48	40.0	100	1,920	0	0	1,920	4 persons
Temporary Labor	M/M	72	25.0	100	1,800	0	0	1,800	6 persons
sub-total					7,560		0	7,560	
2. Consumption									
Electrical Fee	L.S	1	3,000.0	100	3,000	0	0	3,000	
Fuel	L.S	1	2,000.0	100	2,000	0	0	2,000	
Stationary & Others	L.S	1	1,000.0	100	1,000	0	0	1,000	
sub-total					6,000		0	6,000	
TOTAL					13,560		0	13,560	

1$=224.3Lev

TABLE K-6-18(5) ANNUAL MAINTENANCE COST OF ON-FARM STORAGE FACILITIES

$14,920

Unit:$

Description	unit	Quantity	Unit Price	L/C		F/C		Total	Remarks
			$	(%)	Cost	(%)	Cost		
1. Personel Expenditure									
Permanent Employee	M/M	72	80.0	100	5,760	0	0	5,760	6 persons
Permanent Labor	M/M	144	40.0	100	5,760	0	0	5,760	12 persons
Temporary Labor	M/M	72	25.0	100	1,800	0	0	1,800	6 persons
sub-total					13,320		0	13,320	
2. Consumption									
Electrical Fee	L.S	1	1,000.0	100	1,000	0	0	1,000	
Fuel	L.S	1	500.0	100	500	0	0	500	
Stationary & Others	L.S	1	100.0	100	100	0	0	100	
sub-total					1,600		0	1,600	
TOTAL					14,920		0	14,920	

1$=224.3Lev

TABLE K-6-18(6) ANNUAL MAINTENANCE COST OF KORTEN COLLECTING POINT

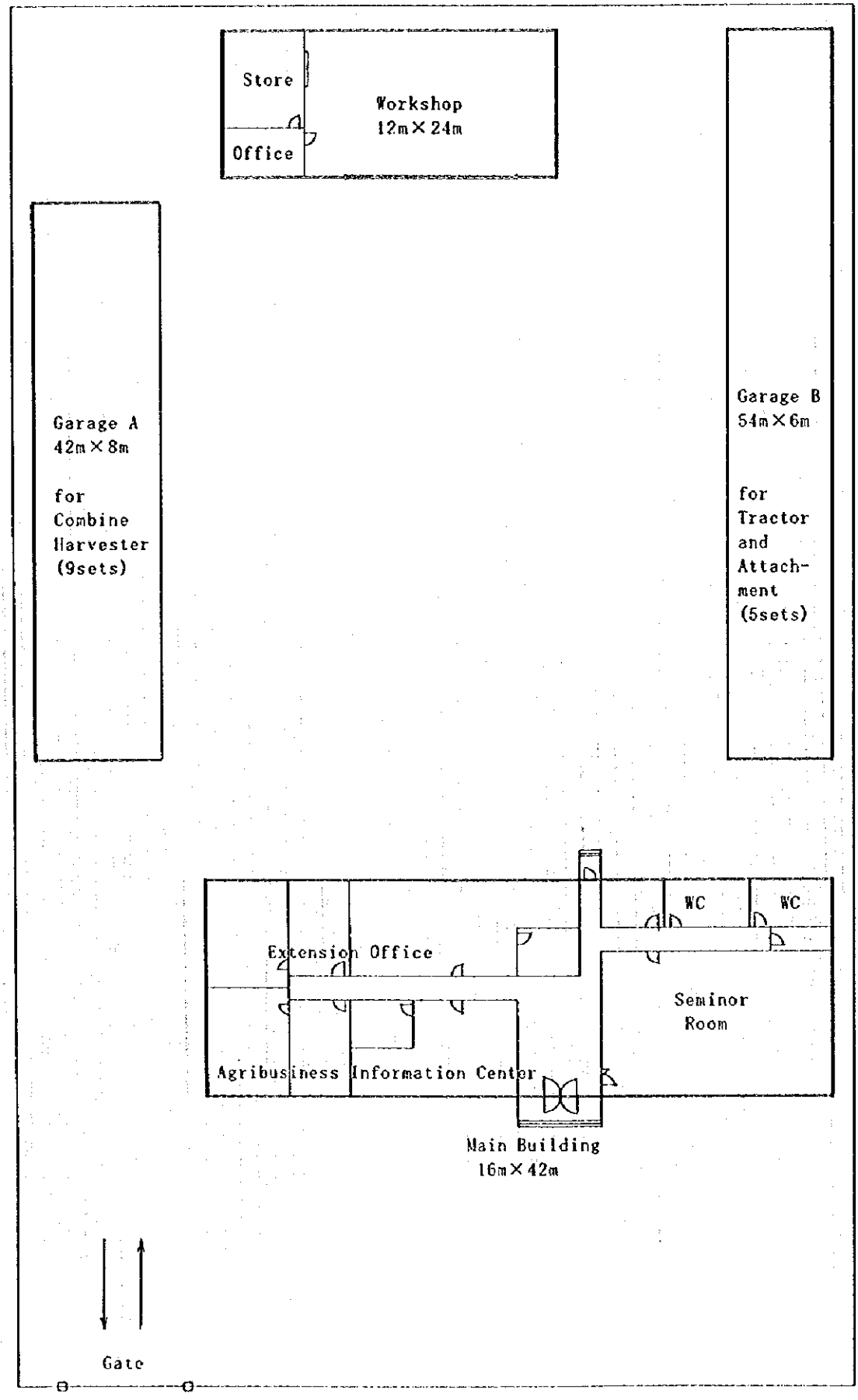
$8,680

Unit:$

Description	unit	Quantity	Unit Price	L/C		F/C		Total	Remarks
			$	(%)	Cost	(%)	Cost		
1. Personel Expenditure									
Permanent Employee	M/M	48	80.0	100	3,840	0	0	3,840	4 persons
Permanent Labor	M/M	36	40.0	100	1,440	0	0	1,440	3 persons
Temporary Labor	M/M	12	25.0	100	300	0	0	300	1 person
sub-total					5,580		0	5,580	
2. Consumption									
Electrical Fee	L.S	1	2,000.0	80	1,600	20	400	2,000	
Fuel	L.S	1	1,000.0	80	800	20	200	1,000	
Stationary & Others	L.S	1	100.0	80	80	20	20	100	
sub-total					2,480		620	3,100	
TOTAL					8,060		620	8,680	

1$=224.3Lev

FIGURE K-6-1 LAYOUT OF AGRI-SERVICE CENTER



Plot area : 60m×100m