Appendix 5　Evaluation Result of Project Site

Evaluation Result of Project Site

I. Primary Evaluation

(1) Evaluation Condition

	Criteria	Checkpoint	Evaluation (Score)		
A	Security condition	- Past conflict incidents - Current situation - Future prospect	Good (3 pts)	Conditional (1 pts)	Dangerous (0 pts)
B	Existence of water source	- Water source plan - Field reconnaissance	Good (3 pts)	Conditional (1 pts)	Poor (0 pts)

(2) Result of the Primary Evaluation

All the requested sites are evaluated based upon the above conditions. As a result, the following was identified. The evaluation result was tabulated below.

- Securities of the requested sites are confirmed as safe except Aracinovo sites where mine clearance shall be considered before implementation of the project.
- Water sources of the requested sites are assumed to be appropriate except Dolno Kolicani village where risk of water shortage in the proposed source was found.

Municipality	Inhabited Place	Score (points)		
		A Security	B Water Source	Total
Cucer Sandevo	Pobozje	3	3	6
	Kuceviste	3	3	6
	Kucevaska Bara	3	3	6
Cair	Radisani	3	3	6
Aracinovo	Grusino	1	3	4
	Orlanci	1	3	4
	Brnjarci	1	3	4
Gazi Baba	Goce Delcev	3	3	6
	Jurumleri	3	3	6
	Kolonie Idrizovo	3	3	6
	Idrizovo	3	3	6
Ilinden	Mralino	3	3	6
	Mrsevci	3	3	6
	Bujkovci	3	3	6
	Miladinovci	3	3	6
	Tekija	3	3	6
	Deljadrovci	3	3	6
	Bucinci	3	3	6

Municipality	Inhabited Place	Score (points)		
		A Security	B Water Source	Total
Petrovec	Petorovec	3	3	6
	Kjcjilja	3	3	6
	Rzanicino	3	3	6
	Ognjanci	3	3	6
Studenicani	Cvetovo	3	3	6
	Dolno Kolicani	3	1	4
Zelenikovo	Taor	3	3	6
	Pakosevo	3	3	6
	Novo Selo	3	3	6
	Strahojadica	3	3	6

II. Secondary Evaluation

(1) Evaluation Conditions

	Criteria	Checkpoint	Evaluation (Score)		
C	Purpose of domestic	C1: Rate of domestic water	Major (3 pts)	Less (1 pt)	Minor (0 pts)
	Urgency and necessity	C2: Rate of population served of Municipality	Less 70% (3 pts)	70 - 90% (1 pt)	90 - 100% (0 pts)
		C3: Situation of water born disease (Water quality)	Significant (3 pts)	Not much (1 pt)	Seldom (0 pts)
	Requested site	C4: Consistency with the original requested site	No change (1 pt)	-	Changed (0 pts)
		C5: Possibility to connected to the original system	Possible (1 pt)	-	No (0 pts)
		C6: Overlapping of request with other donor	No (3 pts)	-	Yes (0 pts)
D	Readiness of Technical documents (T/D)	D1: Availability of T/D	Ready (3 pts)	Underway (1 pt)	No (0 pts)
		D2: Technical appropriateness	Appropriate (1 pt)	-	Uncertain (0 pts)
		D3: Approval by Municipality	Approved (3 pts)	-	Not Yet (0 pts)
E	Management capability of Public Enterprise	E1: Existence of Public Enterprise	Exist (3 pts)	Underway (1 pt)	No (0 pts)
		E2: Willingness and Affordability to Pay	Good (3 pts)	Conditional (1 pt)	No (0 pts)
F	Environment	F1: Sewerage system	Existing (3 pts)	Planned (1 pt)	No Plan (0 pts)

(2) Result of the Secondary Evaluation

Requested Site		Population		Priority	Evaluation item												
					C1	C2	C3	C4	C5	C6	D1	D2	D3	E1	E2	F	Total
Cucer Sandevo	13 inhabited places	8,693	people	2002 census (7493) plus Kcevaka Bara (1200)													
	Population served	4,243	48.8%	Data based on 1994 census population													
	Pobozje	960	11.0%	3rd	3	3	1	1	1	3	3	1	3	3	3	1	26
	Kceviste	3,500	40.3%	1st	3	3	1	0	0	3	3	1	3	3	3	1	24
	Kcevaska Bara	1,200	13.8%	2nc	3	3	1	0	0	3	1	0	3	3	3	1	21
Cair	5 inhabited places	70,441	people	2002 census, One urban and four villages													
	Population served	42,265	60.0%	Rate of population served estimated													
	Radlsani	6,500	37.5%	1st	3	3	3	1	1	3	3	1	3	3	3	1	28
Aracinovo	6 inhabited places	11,315	people	2002 census													
	Population served	8,000	70.7%	Including on-going project													
	Grusino	1,500	13.3%	1st	3	1	1	1	1	3	3	1	3	1	3	1	22
	Orlanci	900	8.0%	2nd	3	1	1	1	1	3	3	1	3	1	3	1	22
	Brnjarci	418	3.7%	3rd	3	1	1	1	1	3	1	1	3	1	3	1	20
Gazi Baba	23 inhabited places	72,780	people	2002 census													
	Population served	45,124	62.0%	Rate of population served assumed from the urban populatio													
	Gorce Delcev	1,280	1.8%	2nd	3	3	3	0	1	3	3	1	3	3	3	1	27
	Jurumleri	3,326	4.6%	1st	3	3	3	1	1	3	3	1	3	3	3	1	28
	Kolonie Idrizovo	850	1.2%	4th	3	3	3	0	1	3	1	1	3	3	3	1	25
	Idrizovo	1,500	2.1%	3rd	3	3	3	1	1	3	1	1	3	3	3	1	26
Ilinden	12 inhabited places	16,180	people	Data from PE Ilinden													
	Population served	14,360	88.8%	Data including water supply system from Oil Refinery Factory													
	Mralino	830	5.1%	1st	3	1	3	1	1	3	3	1	3	3	3	1	26
	Mrsevci	700	4.3%	2nd	3	1	1	0	1	3	3	1	3	3	3	1	23
	Bujkovci	670	4.1%	2nd	3	1	1	0	1	3	3	1	3	3	3	1	23
	Miladinovci	1,500	9.3%	2nd	3	1	1	0	1	3	3	1	3	3	3	1	23
	Tekija	270	1.7%	6th	3	1	1	0	1	3	3	1	3	3	3	1	23
	Deljadrovci	490	3.0%	5th	3	1	1	0	1	3	3	1	3	3	3	1	23
	Bucinci	230	1.4%	7th	3	1	1	0	1	3	3	1	3	3	3	1	23
Petrovac	17 inhabited places	8,205	people	2002 census													
	Population served	1,085	13.2%	Including individual local water supply system													
	Petrovec	2,490	30.3%	1st	3	3	3	1	1	3	3	1	3	3	3	1	28
	Razanicino	903	11.0%	3rd	3	3	3	1	1	3	3	1	3	3	3	1	28
	Kojlija	354	4.3%	4th	3	3	3	1	1	3	1	1	3	3	3	1	26
	Ognjanci	1,207	14.7%	2nd	3	3	3	1	1	3	1	1	3	3	3	1	26
Studenicani	18 inhabited places	17,314	people	2002 census													
	Population served	15,100	87.2%	Including on-going project													
	Cvetovo	1,000	5.8%	1st	3	1	1	0	0	3	3	1	3	1	3	1	20
	Dolno Kolicani	1,800	10.4%	2nd	3	1	1	0	0	3	3	0	3	1	3	1	19
Zelenikovo	15 inhabited places	4,115	people	2002 census													
	Population served	2,500	60.8%	Without weekend house residents													
	Taor	158	3.8%	4th	3	3	3	0	1	3	3	1	3	3	3	1	27
	Pakosevo	222	5.4%	1st	3	3	3	1	1	3	3	1	3	3	3	1	28
	Novo Selo	168	4.1%	2nd	3	3	3	1	1	3	3	1	3	3	3	1	28
	Strahojadica	222	5.4%	3rd	3	3	1	1	1	3	3	1	3	3	3	1	26

(Note)

- Population data sources are based on 2002 census, interview from municipality, figure in the technical document.
- Each requested village is prioritized among each municipality based on opinion of municipality as well as the consultant.
- Evaluation points are scored by the consultant based on field survey and discuss on with MTC.

Appendix 6 Village Survey

Village Survey

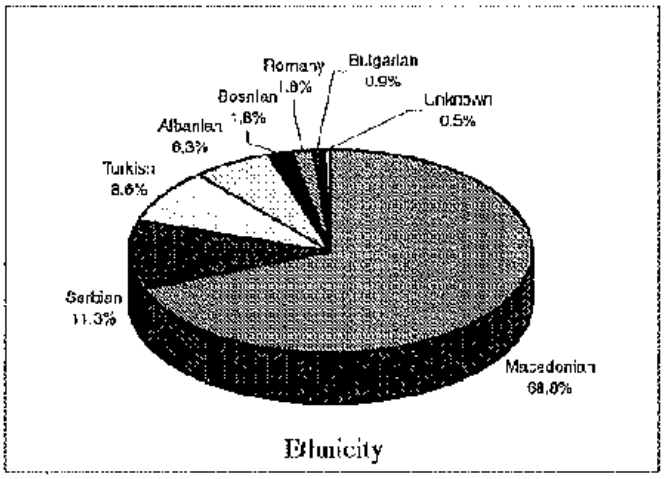
1. Outline of the survey

Survey method	: Interview
Survey schedule	: ANNEX-1
Interview items	: ANNEX-2
Population	: 31,936 persons (21 villages of 7 municipalities)
Interviewed households	: 221 households (1,251 persons)
Sampling rate	: 3.9%

2. Summary of the survey result

(1) Ethnicity

The ethnic makeup of the interviewed households is shown in the figure.



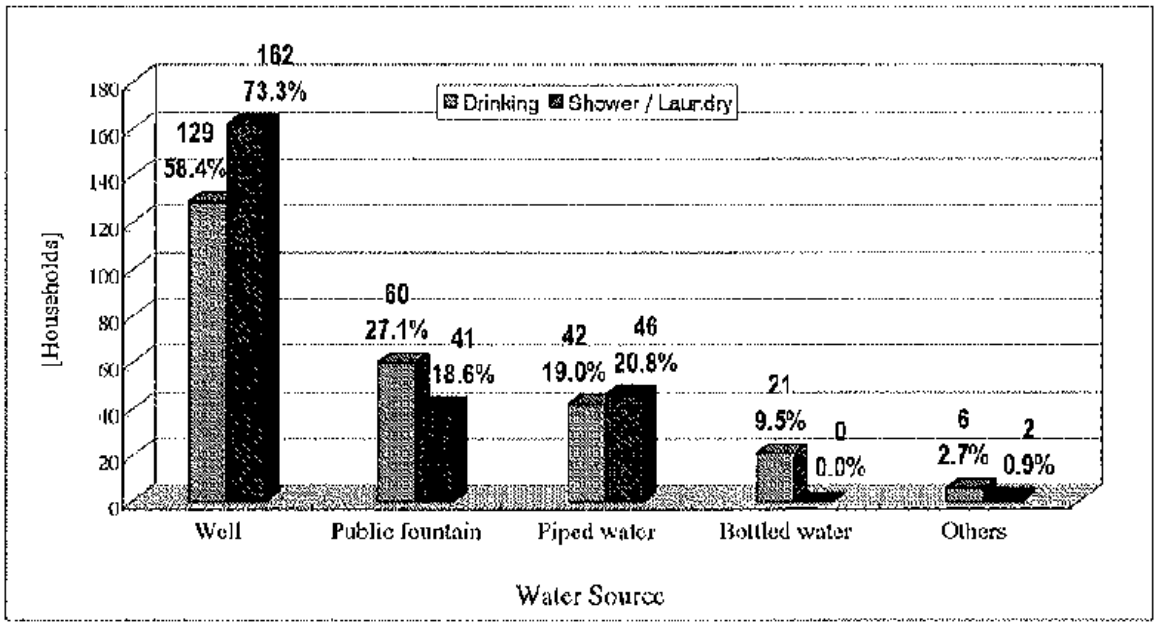
Ethnicity

Selection of interviewed households (sampling) was done with cooperation of the municipality offices. There is possibility that the ethnic makeup of the interviewed households does not correspond to the actual makeup of the villages due to availability of the residents, etc. However, most of the target villages are comparatively small and there is not considerable difference in living conditions within one village. It is supposed that the ethnic makeup would not have considerable influence to the survey results.

(2) Water Source

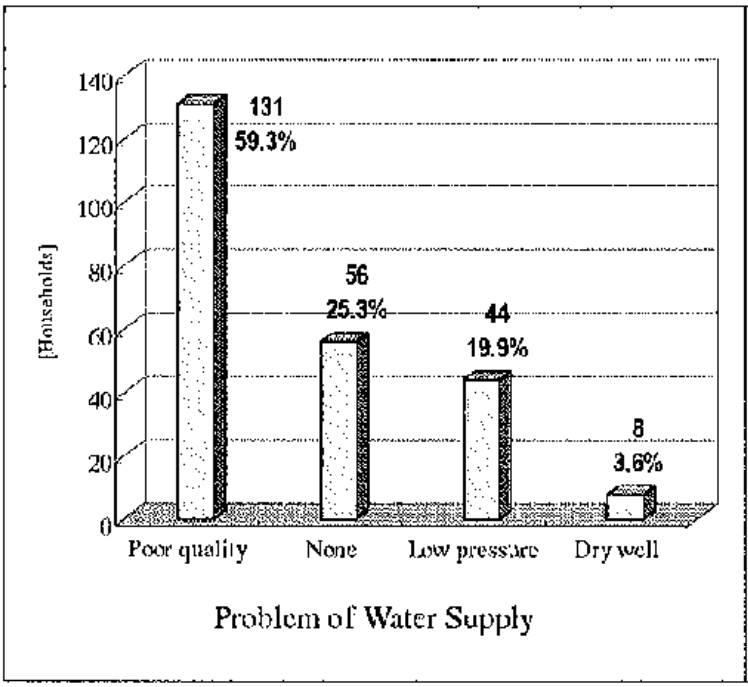
As the following bar chart shows, many of the residents obtain water from well. Almost of all wells are equipped with electric pumps. Significant numbers of household cannot intake water stably from the well due to its low water level or drying up, so that they have to get water from alternative sources. Some of households served by pipelines also fetch water to public fountain due to its frequent suspension.

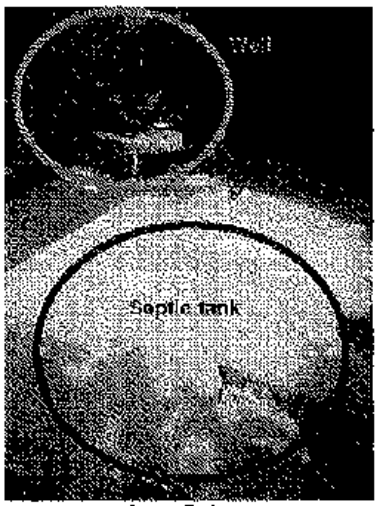
The percentage of households using well as drinking water source is about 15 points lower than that as shower and laundry. The reason is that some of wells are contaminated by wastewater so that residents have to obtain water from other source such as public fountain. As for drinking water source, the percentage of bottled water is considerable rate of 9.5%. Most of households who purchase bottled water are observed at the villages near to Skopje city such as villages of Cair and Gazi Baba municipality.



(3) Problem of Current Water Supply

The biggest concern of residents is "Poor water quality" as shown in the following graph. It is answered from 19 villages of 21 villages, 131 households of 221 households. It is noted that almost of all answerer of "Poor water quality" are residents depending drinking water on wells. Major cause is considered the contamination by wastewater.



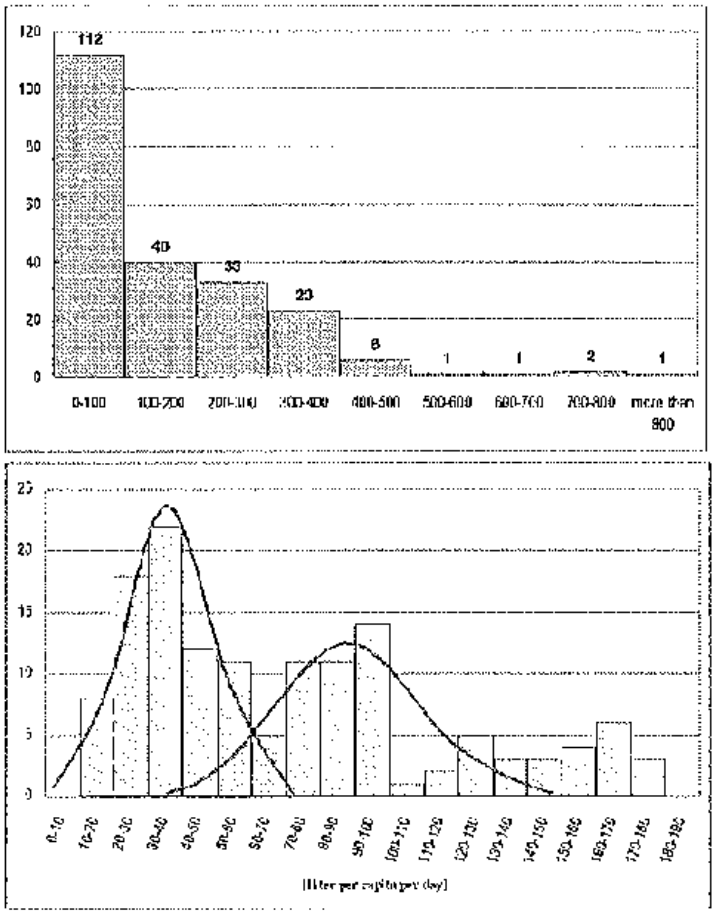


Goce Delcev

A well and a septic tank are so close to each other. Overflow or leak of wastewater contaminates groundwater. Residents purchase bottled water for drinking.

(4) Water Consumption

Daily water consumption per capita ranges widely from 26.5 liters to 719.0 liters (average figure by villages). As for the consumption of household fetching to the public fountain or purchasing bottled water, the data is reliable because the capacity of the container was measured by surveyors. However, as for wells with electric pumps, the consumption could not measured, because almost of all pumps are not equipped with flow meters, so the data might not be reliable.



In order to estimate the meaningful figure from the data, histograms are made from the data of consumption in winter, which does not include water for gardening and liveslocks.

In the above histogram, 0~100 liters/capita/day is the most frequent. In light of the unit demand of T/D, 150 liters/capita/day, the analysis is focused on the data from 0 to 200 liters/capita/day. In the histogram below, there seem two peaks around at 40 liters and at 100 liters. It is supposed that the water consumption is around 80 liters at most even in the villages with better conditions in water.

(5) Affordable or Acceptable Water Charge (AWC)

The average figures by villages widely range from 187 MKD/month to 975 MKD/month (the average of all villages is 390 MKD/month). The percentage to monthly income also widely ranges from 1.5 % to 7.6 % (all villages, 3.1 %)

[MKD/month]

	Average		Average by village	
			Max.	Min.
Income	12,778	100.0%	20,750	6,200
Expense				
Water*	363	2.8%	825	100
Electricity	2,043	16.0%	2,833	900
Solid Waste*	135	1.1%	151	120
Affordable or acceptable water charge	390	3.1%	975	187

*: As for expenses on "Water" and "Solid Waste", the data of households who pay the charges are summed up.

[MKD/month]

Villages	Income	AWC		Villages	Income	AWC	
Pobozje	10,586	311	2.9%	Petrovec	8,450	213	2.5%
Kuceviste	10,823	361	3.3%	Rzanicino	13,250	500	3.8%
Radisani	14,500	404	2.8%	Kjojlija	10,600	400	3.8%
Jurumleri	15,429	321	2.1%	Ognjanci	20,625	975	4.7%
Idrizovo	12,180	390	3.2%	Cvetovo	8,086	393	4.9%
Kolonie. Idrizovo	8,583	187	2.2%	Dolno Kolicani	10,167	388	3.8%
Goce Delcev	12,778	339	2.7%	Novo Selo	9,740	370	3.8%
Mralino	10,643	279	2.6%	Pakosevo	11,200	410	3.7%
Bujkovci	19,600	380	1.9%	Taor	14,000	530	3.8%
Mrsevci	20,750	975	4.7%	Strahojadica	6,200	470	7.6%
Miladinovci	16,000	245	1.5%	All Villages	12,778	390	3.1%

Data was summed up, classifying households into charged household and non-charged household as shown in the table below. The table says that the charged households can agree the higher water charge if sound water supply were served. AWC is 128 % of the current charge.

[MKD/month]

	No. of households ①	Current charge ②	AWC ③	③/②	Income ④	③/④
Charged household	24	363	464	128%	14,920	3.1%
Non-charged household	197	—	381	—	12,517	3.0%

Interview Survey Plan

1. Schedule

Date		Team-A	Team-B
14-May	wed	Kceviste (orientation)	
15-May	thu	Kceviste (east)	Kceviste (west)
16-May	fri	Radicani (north)	Radicani (south)
17-May	sat		
18-May	sun		
19-May	mon	Radicani (north)	Radicani (south)
20-May	tue	Pobozje	Idorizovo
21-May	wed	Goce Delcev	Coloni idorizovo
22-May	thu	Jurumlei	Petrovec
23-May	fri	Jurumlei	Petrovec, Rzanichlo
24-May	sat		
25-May	sun		
26-May	mon	Cvetovo	Ognjanci, Kojlija
27-May	tue	Dolno Kolicani	Mralino
28-May	wed	Pakosevo, Novo Selo	Mrsevci, Bujkovci
29-May	thu	Taor, Stranhojadica	Miladinovci

2. Number of Households to Interview

TEAM-A

Municipality	Inhabited Place	Number of Household
Cair	Radisani	23
Cucer Sandevo	Kcevicte	11
	Pohozje	7
Gazi Baba	Jurumleri	21
	Goce Delcev	9
Studenicani	Cvetovo	7
	Dolno Kolicani	12
Zelenikovo	Pakosevo	5
	Novo Selo	5
	Taor	5
	Stranhojadica	5
Total		110

TEAM-B

Municipality	Inhabited Place	Number of Household
Cair	Radisani	23
Cucer Sandevo	Kcevicte	11
Gazi Baba	Idrizovo	10
	Colonie Idrizovo	6
Petrovec	Petrovec	16
	Rzanichino	6
	Ognjanci	8
	Kojlija	5
Ilinden	Mralino	6
	Mrsevci	5
	Bujkovci	5
	Miladinovci	10
Total		111

ANNEX-2

The Project for Improvement of Water Supply in Inhabited Places in Skopje Outskirts in the Republic of Macedonia

QUESTIONNAIRE

Ref. No. ____ - _____.
Name of village: _____ of _____ municipality
Number of persons of a household: _____ persons

Q1. Type of water source

Q1-1. for drinking and cooking: piped water / shallow well / bottled water / others (_____)
Q1-2. for shower: piped water / shallow well / bottled water / others (_____)
Q1-3. for laundry: piped water / shallow well / bottled water / others (_____)
Q1-4. for garden watering: piped water / shallow well / bottled water / others (_____)
Q1-5. for livestock: piped water / shallow well / bottled water / others (_____)

Q2. Water usage		summer	winter
Q2-1.	Drinking & cooking:	_____ liters/day or_____ buckets/day;	_____ liters/day or_____ buckets/day
Q2-2.	Shower:	_____ times/day, _____ buckets/day;	_____ times/day, _____ buckets/day
Q2-4.	Garden watering:	_____ times/week, _____ buckets/day;	_____ times/week, _____ buckets/day
Q2-5.	Livestock:	_____ times/week, _____ buckets/day;	_____ times/week, _____ buckets/day

(size of the bucket: diameter ____ cm, height _____ cm)

Q3. Problem of water supply

Q3-1. poor water quality / low pressure / dry well / others (_____)
Q3-2. How far is water source from the house ? _____ km or _____ minutes for one way
How many times do you fetch water ? _____ times a day

Q4. Monthly expenses of a household

Q4-1. for water _____ Denar per month
Q4-2. for power (electricity) _____ Denar per month
Q4 3. for solid waste disposal _____ Denar per month

Q5. Average monthly income of a household (Unit: Denar/month)

_____ Denar per month

Q6. Acceptable or affordable expense for piped water (Unit: Denar/month)

_____ Denar per month

Q7. Type of sanitary facility

sewerage / septic tank / pit latrine / others (_____)

Note:

Name of Surveyor_____

ANNEX-3

Summary of Interview Survey

Municipality	Village	Population		Ethnicity			Type of water source* [households]			Problem of current water supply [households]			Water usage for drinking, shower, laund	summer	winter	average	Monthly income and expense [Dener/month]		
All municipalities	All villages	Village population	31,936	Ethnicity:			Drinking:						Persons per household			5.7	Income	12,778	100.0%
				Macedonian	152	68.8%	Well	129	58.4%	Poor quality	131	59.3%	Water volume [Liter per capita per day				Expense		
		Interviewed household	221	Serbian	25	11.3%	Public fountain	60	27.1%	None	56	25.3%		213.0	157.2	185.1	Water	363	2.8%
		Persons of the interviewed households	1,251	Turkish	19	8.6%	Piped water	42	19.0%	Low pressure	44	19.9%	Frequency [times per week]				Power	2,043	16.0%
		Persons per household	5.7	Albanian	14	6.3%	Bottled water	21	9.5%	Dry well	8	3.6%	Shower	5.4	3.8	4.6	Solid Waste	135	1.1%
		Sampling rate	3.9%	Bosnian	4	1.8%	Others	6	2.7%				Laundry	4.1	3.3	3.7	Acceptable Water Charge		
				Romany	4	1.8%												390	3.1%
				Bulgarian	2	0.9%	Shower / Laundry:												
				Unknown	1	0.5%	Well	162	73.3%										
					221	100.0%	Piped water	46	20.8%										
							Public fountain	41	18.6%										
							Others	2	0.9%										
							Gardening / Livestock												
							Well	119	53.8%										
							Public fountain	31	14.0%										
							Piped water	30	13.6%										
Cucer Sandevo	Pobozje	Village population	768	Household:		7	Drinking:			Low pressure		7	Persons per household			4.7	Income	10,586	100.0%
				Ethnicity			Piped water		5	Poor quality		2	Water volume [Liter per capita per day				Expense		
		Interviewed household	7	Macedonian		7	Public fountain		2					66.4	80.6	73.5	Water	286	2.7%
		Persons of the interviewed households	33				Shower / Laundry:						Frequency [times per week]				Power	1,507	14.2%
		Persons per household	4.7				Piped water		5				Shower	3.8	2.9	3.4	Solid Waste	0	0.0%
		Sampling rate	4.3%				Public fountain		2				Laundry	3.4	2.5	3.0	Acceptable Water Charge		
							Gardening / Livestock											311	2.9%
							Piped water		5										
							Public fountain		2										
	Kceviste	Village population	2,057	Household:		22	Drinking:			Low pressure		0	Persons per household			6.5	Income	10,323	100.0%
				Ethnicity:			Public fountain		20	Poor quality		1	Water volume [Liter per capita per day				Expense		
		Interviewed household	22	Serbian		18	Well		5	Dry well		1		39.6	60.7	90.1	Water	0	0.0%
		Persons of the interviewed households	144	Macedonian		3	Piped water		3	None		14	Frequency [times per week]				Power	1,392	12.9%
		Persons per household	6.5	Unknown		1	Shower / Laundry:						Shower	5.6	2.3	4.0	Solid Waste	0	0.0%
		Sampling rate	7.0%				Public fountain		17				Laundry	3.8	3.1	3.4	Acceptable Water Charge		
							Well		7									361	3.3%
							Piped water		3										
							Gardening / Livestock												
							Public fountain		16										
							Well		7										
							Piped water		3										

* Plural answers can be chosen

Summary of Interview Survey

Municipality	Village	Population		Ethnicity		Type of water source* (households)		Problem of current water supply (households)		Water usage for drinking, shower, laund			Monthly income and expense (Denar/month)		
											summer	winter	average		
Cair	Radisani	Village population	8,676	Household:	46	Drinking:		Poor quality	34	Persons per household			4.7	Income	14,500 100.0%
				Ethnicity		Well	40	Dry well	5	Water volume [Liter per capita per day				Expense	
		Interviewed household	46	Macedonian	41	Bottled water	4	None	1		145.9	110.5	128.2	Water	0 0.0%
		Persons of the interviewed households	215	Bulgarian	2	Water tanker	1			Frequency [times per week]				Power	2,456 16.9%
		Persons per household	4.7	Romany	2	Piped water	1			Shower	5.2	3.3	4.3	Solid Waste	0 0.0%
		Sampling rate	2.5%	Serbian	1	Fetching to Skopje city	1			Laundry	3.9	3.1	3.5	Acceptable Water Charge	
						Shower / Laundry									404 2.8%
						Well	43								
						Water tanker	1								
						Piped water	1								
						Fetching to other village or city	1								
						Gardening / Livestock									
						Well	34								
Gazi Baba	Jurumlei	Village population	3,319	Household:	21	Drinking:		Poor Quality	14	Persons per household			4.9	Income	15,429 100.0%
				Ethnicity		Well	18	None	7	Water volume [Liter per capita per day				Expense	
		Interviewed household	21	Macedonian	20	Bottled water	5				199.0	80.3	139.7	Water	0 0.0%
		Persons of the interviewed households	103	Serbian	1	Shower / Laundry				Frequency [times per week]				Power	2,517 16.3%
		Persons per household	4.9			Well	21			Shower	4.5	3.6	4.1	Solid Waste	151 1.0%
		Sampling rate	3.1%			Gardening / Livestock				Laundry	4.1	3.7	3.9	Acceptable Water Charge	
						Well	21								321 2.1%
Gazi Baba	Idrizovo	Village population	2,384	Household:	10	Drinking:		Poor quality	2	Persons per household			4.0	Income	12,180 100.0%
				Ethnicity		Well	10	None	8	Water volume [Liter per capita per day				Expense	
		Interviewed household	10	Macedonian	8	Shower / Laundry					370.0	257.5	313.8	Water	0 0.0%
		Persons of the interviewed households	40	Albanian	2	Well	10			Frequency [times per week]				Power	1,980 16.3%
		Persons per household	4.0			Gardening / Livestock				Shower	7.0	2.5	4.8	Solid Waste	0 0.0%
		Sampling rate	1.7%			Well	5			Laundry	6.4	2.4	4.4	Acceptable Water Charge	
															390 3.2%
	Kolonija Idrizovo	Village population	1,288	Household:	6	Drinking:		Poor quality	3	Persons per household			4.3	Income	8,583 100.0%
				Ethnicity		Piped water	3	None	3	Water volume [Liter per capita per day				Expense	
		Interviewed household	6	Macedonian	6	Well	2				334.6	253.8	294.2	Water	100 1.2%
		Persons of the interviewed households	26			Bottled water	1			Frequency [times per week]				Power	2,550 29.7%
		Persons per household	4.3			Shower / Laundry				Shower	7.0	2.5	4.8	Solid Waste	0 0.0%
		Sampling rate	2.3%			Piped water	3			Laundry	5.3	3.3	4.3	Acceptable Water Charge	
						Well	3								187 2.2%
						Gardening / Livestock									
						Well	1								
	Goce Delcev	Village population	1,427	Household:	9	Drinking:		Poor quality	9	Persons per household			5.0	Income	12,778 100.0%
				Ethnicity:		Bottled water	8			Water volume [Liter per capita per day				Expense	
		Interviewed household	9	Macedonian	9	Well	3				51.1	41.1	46.1	Water	0 0.0%
		Persons of the interviewed households	45			Shower / Laundry				Frequency [times per week]				Power	1,939 15.2%
		Persons per household	5.0			Well	9			Shower	4.1	3.5	3.8	Solid Waste	150 1.2%
		Sampling rate	3.2%			Gardening / Livestock				Laundry	3.1	3.1	3.1	Acceptable Water Charge	
						Well	3								339 2.7%

*: Plural answers can be chosen

Summary of Interview Survey

Municipality	Village	Population		Ethnicity		Type of water source* (households)		Problem of current water supply (households)		Water usage for drinking, shower, laund	summer	winter	average	Monthly income and expense (Denar/month)		
Ilinden	Mralinc	Village population	830	Household:	7	Drinking:		Poor quality	7	Persons per household			7.3	Income	10,643	100.0%
				Ethnicity:		Well	5			Water volume [Liter per capita per day]				Expense		
		Interviewed household	7	Macedonian	6	Public fountain	2				421.6	372.5	397.1	Water	0	0.0%
		Persons of the interviewed households	51	Serbian	1	Shower / Laundry:				Frequency [times per week]				Power	2,357	22.1%
		Persons per household	7.3			Well	7			Shower	7.0	5.6	6.3	Solid Waste	120	1.1%
		Sampling rate	6.1%			Gardening / Livestock				Laundry	4.7	4.7	4.7	Acceptable Water Charge		
						Well	5								279	2.6%
	Bujkovci	Village population	670	Household:	5	Drinking:		Poor quality	5	Persons per household			5.0	Income	19,600	100.0%
				Ethnicity:		Piped water	4	Low pressure	5	Water volume [Liter per capita per day]				Expense		
		Interviewed household	5	Macedonian	5	Well	3				372.0	272.0	322.0	Water	520	2.7%
		Persons of the interviewed households	25			Bottled water	1			Frequency [times per week]				Power	1,760	9.0%
		Persons per household	5.0			Shower / Laundry:				Shower	7.0	4.8	5.9	Solid Waste	120	0.6%
		Sampling rate	3.7%			Piped water	5			Laundry	4.2	2.0	3.1	Acceptable Water Charge		
						Well	3								380	1.9%
						Gardening / Livestock										
						Piped water	2									
						Well	1									
	Mrsevci	Village population	700	Household:	4	Drinking:		Low pressure	4	Persons per household			6.0	Income	20,750	100.0%
				Ethnicity:		Piped water	4	Poor quality	3	Water volume [Liter per capita per day]				Expense		
		Interviewed household	4	Macedonian	4	Well	2	Dry well	1		352.1	279.2	315.6	Water	825	4.0%
		Persons of the interviewed households	24			Public fountain	2			Frequency [times per week]				Power	2,750	13.3%
		Persons per household	6.0			Shower / Laundry:				Shower	7.0	7.0	7.0	Solid Waste	146	0.7%
		Sampling rate	3.4%			Piped water	4			Laundry	3.3	3.0	3.1	Acceptable Water Charge		
						Well	2								975	4.7%
						Public fountain	2									
						Gardening / Livestock										
						Piped water	4									
						Well	2									
						Public fountain	2									
	Miladinovci	Village population	1,500	Household:	10	Drinking:		Low pressure	9	Persons per household			5.4	Income	16,000	100.0%
				Ethnicity:		Piped water	9	None	1	Water volume [Liter per capita per day]				Expense		
		Interviewed household	10	Macedonian	9	Well	7				246.3	163.0	204.6	Water	0	0.0%
		Persons of the interviewed households	54	Romany	1	Shower / Laundry:				Frequency [times per week]				Power	2,680	16.8%
		Persons per household	5.4			Piped water	9			Shower	7.0	4.9	5.9	Solid Waste	124	0.8%
		Sampling rate	3.6%			Well	7			Laundry	4.3	2.3	3.3	Acceptable Water Charge		
						Gardening / Livestock									245	1.5%
						Well	9									
						Piped water	7									

*: Plural answers can be chosen

Summary of Interview Survey

ANNEX-3

Municipality	Village	Population		Ethnicity		Type of water source* (households)		Problem of current water supply (households)		Water usage for drinking, shower, laundry			Monthly income and expense (Denar/month)		
											summer	winter	average			
Petrovec	Petrovec	Village population	2,588	Household:	15	Drinking:		Poor quality	15	Persons per household			5.5	Income	8,450	100.0%
				Ethnicity:		Well	9	None	1	Water volume (Liter per capita per day)				Expense		
		Interviewed household	15	Macedonian	12	Public fountain	6				396.3	284.1	340.3	Water	0	0.0%
		Persons of the interviewed households	88	Bosnian	2	Bottled water	1			Frequency (times per week)				Power	2,075	24.6%
		Persons per household	5.5	Serbian	1	Shower / Laundry:				Shower	6.5	4.1	5.3	Solid Waste	0	0.0%
		Sampling rate	3.4%	Romany	1	Well	15			Laundry	4.1	2.8	3.5	Acceptable Water Charge		
						Public fountain	1								213	2.5%
						Gardening / Livestock										
						Well	4									
	Rzanichino	Village population	933	Household:	5	Drinking:		Poor quality	5	Persons per household			4.8	Income	13,250	100.0%
				Ethnicity:		Public fountain	4	None	1	Water volume (Liter per capita per day)				Expense		
		Interviewed household	6	Macedonian	4	Well	2				810.3	627.6	719.0	Water	0	0.0%
		Persons of the interviewed households	29	Serbian	1	Shower / Laundry:				Frequency (times per week)				Power	2,833	21.4%
		Persons per household	4.8	Bosnian	1	Well	6			Shower	7.0	3.5	5.3	Solid Waste	0	0.0%
		Sampling rate	3.1%			Gardening / Livestock				Laundry	4.2	3.5	3.8	Acceptable Water Charge		
						Well	3								500	3.8%
	Kojlja	Village population	369	Household:	5	Drinking:		Poor quality	5	Persons per household			10.0	Income	10,600	100.0%
				Ethnicity:		Fetching to Petrovec	4			Water volume (Liter per capita per day)				Expense		
		Interviewed household	5	Albanian	4	Well	1				326.0	278.0	302.3	Water	0	0.0%
		Persons of the interviewed households	50	Bosnian	1	Shower / Laundry:				Frequency (times per week)				Power	2,020	19.1%
		Persons per household	10.0			Well	5			Shower	7.0	7.0	7.0	Solid Waste	0	0.0%
		Sampling rate	13.6%			Gardening / Livestock				Laundry	6.0	5.2	5.8	Acceptable Water Charge		
						Well	4								400	3.8%
	Ognjanci	Village population	1,255	Household:	8	Drinking:		Poor quality	7	Persons per household			6.5	Income	20,625	100.0%
				Ethnicity:		Well	6	Low pressure	1	Water volume (Liter per capita per day)				Expense		
		Interviewed household	8	Macedonian	3	Public fountain	2				407.7	346.2	376.9	Water	0	0.0%
		Persons of the interviewed households	52	Albanian	3	Shower / Laundry:				Frequency (times per week)				Power	2,088	10.1%
		Persons per household	6.5	Serbian	2	Well	8			Shower	7.0	7.0	7.0	Solid Waste	0	0.0%
		Sampling rate	4.1%			Gardening / Livestock				Laundry	3.9	3.4	3.6	Acceptable Water Charge		
						Well	4								975	4.7%
Studenicani	Ovelovo	Village population	826	Household:	7	Drinking:		None	7	Persons per household			10.6	Income	8,080	100.0%
				Ethnicity:		Public fountain	7			Water volume (Liter per capita per day)				Expense		
		Interviewed household	7	Turkish	7	Shower / Laundry:					29.4	23.6	26.5	Water	0	0.0%
		Persons of the interviewed households	74			Public fountain	7			Frequency (times per week)				Power	1,500	18.6%
		Persons per household	10.6			Gardening / Livestock				Shower	2.9	2.9	2.9	Solid Waste	0	0.0%
		Sampling rate	9.0%			Public fountain	7			Laundry	2.2	2.2	2.2	Acceptable Water Charge		
															393	4.9%

*: Plural answers can be chosen

Summary of Interview Survey

Municipality	Village	Population		Ethnicity		Type of water source* (households)		Problem of current water supply (households)		Water usage for drinking, shower, laund	summer	winter	average	Monthly income and expense (Denar/month)		
Studenicani	Dolna Kolcani	Village population	1,516	Household:	12	Drinking:		Low pressure	10	Persons per household			3.5	Income	10,137	100.0%
				Ethnicity		Public fountain	12	Poor quality	1	Water volume [Liter per capita per day				Expense		
		Interviewed household	12	Turkish	12	Piped water	10	None	1		50.6	34.0	42.3	Water	0	0.0%
		Persons of the interviewed households	78			Well	1			Frequency [times per week]				Power	1,079	10.6%
		Persons per household	6.5			Shower / Laundry:				Shower	4.3	4.3	4.1	Solid Waste	0	0.0%
		Sampling rate	5.1%			Public fountain	12			Laundry	4.9	4.9	4.9	Acceptable Water Charge		
						Piped water	11								388	3.8%
						Well	1									
						Gardening / Livestock										
						Public fountain	5									
						Piped water	4									
						Well	1									
Zelenikovo	Novo Selo	Village population	165	Household:	5	Drinking:		Poor quality	4	Persons per household			4.8	Income	9,740	100.0%
				Ethnicity		Well	5	Dry well	1	Water volume [Liter per capita per day				Expense		
		Interviewed household	5	Macedonian	5	Shower / Laundry:		None	1		97.9	66.9	83.3	Water	0	0.0%
		Persons of the interviewed households	24			Well	5			Frequency [times per week]				Power	900	9.2%
		Persons per household	4.8			Gardening / Livestock				Shower	2.4	2.4	2.4	Solid Waste	120	1.2%
		Sampling rate	14.5%			Well	4			Laundry	2.3	2.0	2.2	Acceptable Water Charge		
															370	3.8%
	Pakosevo	Village population	240	Household:	5	Drinking:		Poor quality	5	Persons per household			4.8	Income	11,200	100.0%
				Ethnicity		Well	5			Water volume [Liter per capita per day				Expense		
		Interviewed household	5	Macedonian	5	Shower / Laundry:					230.0	127.1	153.5	Water	0	0.0%
		Persons of the interviewed households	24			Well	5			Frequency [times per week]				Power	1,440	12.9%
		Persons per household	4.8			Gardening / Livestock				Shower	3.5	3.5	3.5	Solid Waste	120	1.1%
		Sampling rate	9.8%			Well	5			Laundry	2.5	2.5	2.5	Acceptable Water Charge		
															410	3.7%
	Taor	Village population	169	Household:	5	Drinking:		Poor quality	4	Persons per household			5.4	Income	14,000	100.0%
				Ethnicity		Piped water	3	Low pressure	2	Water volume [Liter per capita per day				Expense		
		Interviewed household	5	Macedonian	5	Public fountain	2	None	1		156.3	70.3	113.3	Water	100	0.7%
		Persons of the interviewed households	32			Bottled water	1			Frequency [times per week]				Power	2,400	17.1%
		Persons per household	6.4			Shower / Laundry:				Shower	4.3	4.1	4.2	Solid Waste	120	0.9%
		Sampling rate	18.9%			Piped water	5			Laundry	4.5	4.3	4.3	Acceptable Water Charge		
						Gardening / Livestock									530	3.8%
						Piped water	5									
	Strahojadica	Village population	251	Household:	5	Drinking:		Poor quality	5	Persons per household			9.0	Income	6,200	100.0%
				Ethnicity		Well	5			Water volume [Liter per capita per day				Expense		
		Interviewed household	5	Albanian	5	Public fountain	1				123.6	67.5	95.6	Water	0	0.0%
		Persons of the interviewed households	40			Shower / Laundry:				Frequency [times per week]				Power	930	15.0%
		Persons per household	8.0			Well	5			Shower	3.7	3.7	3.7	Solid Waste	0	0.0%
		Sampling rate	15.9%			Gardening / Livestock				Laundry	5.0	5.0	5.0	Acceptable Water Charge		
						Well	5								470	7.6%

*. Plural answers can be chosen

Appendix 7 Other Donor's Activities

1. Federal Republic of Germany

Social Infrastructure Program, Phase I (up to year 2003)

Water supply project

No.	Municipality	Project Name	Amount (EURO)
1	Prilep	Water supply of inhabited place Galichani, Phase I (well pump station, transmission pipeline and reservoir): Eur.75,365.29, Phase II (water supply network): Eur.55,908.32	131,273.61
2	Pehchevo	Reconstruction of water supply network inhabited place Umlena	59,278.97
3	Radovish	Water supply of Radvish, phase II	172,626.74
4	Ohrid	Water supply of inhabited place Velgoshti	230,602.86
5	Pehchevo	Reconstruction of water supply network inhabited place Chiflik	63,448.80
6	Brvenica	Water supply of inhabited place Dolni Chelopek	56,930.98
7	Bitola	Reconstruction of infrastructure at Bulevard in Bitola including change of sewerage collection and water supply network.	207,314.83
8	Bitola	Reconstruction of secondary network in 9 streets of settlement Bair.	83,555.32
9	Berovo	Reconstruction of water supply network in Marshal Titro street and 23rd August street	152,184.51
10	Radovish	Reconstruction of transmission pipeline in inhabited place Damjan	83,442.89
11	Probishtip	Reconstruction of 2nd network in village Probishtip	227,300.33
12	Resen	Installation of water supply and sewerage in Goce Delcev street	200,282.83
13	Pehchevo	Reconstruction of 2nd network in inhabited place Rohoro and construction of playground in inhabited place Umlena	97,677.59
14	Prilep	Reconstruction of main water supply pipeline in 3 streets, Kej Prvi, Strushka and Antulesk	1,534,078.74
15	Resen	Water supply in Oteshevo	
16	Brvenica	Water supply system in inhabited place Gorni Chelopk	
17		Other inhabited place	
		Total	3,300,000.00
		Total amount in JPY	429,000,000.00

2. Austria

Austrian Technical Cooparation

Water supply and sewerage project

No.	Municipality	Project Name	Amount (EURO)
1	Krivogastani	Krivogastani project (Phase I)	462,654
2	Krivogastani	Ditto (phase II)	772,348
3	Krivogastani	Ditto (Aditional project of Phase II)	397,911
4	Krivogastani	Ditto (Phase III)	683,124
5	Senoko	Senokos (Phase I) Negotino	640,974
6	Cucer Sandevo	Cucer Sndevo (Phase I)	661,823
7	Cucer Sandevo	Ditto (Phase II)	200,000
8		Development and consolidation of water and sewage sector	116,276
9		TBC Hospital Jusenovo	80,000
10	Negotino	Negotino Polog.	300,000
11	Senoko	Senokos (Phase II)	200,000
		Total of water supply project	4,515,110
		Total amont in JPY	586,964,300
1		Makedonsky Brod (Phase I)	53,300
2		Ditto (Phase II)	1,484,000
3		Suto Orizani	433,000
		Total of sewage project	1,970,300
		Total	6,485,410
		Total amont in JPY	843,103,300

3. European Agency for Reconstruction

Community Assistance for Reconstruction, Deviropment and Stabilization Program

Water supply project

No.	Municipality	Project Name	Amount (EUR)
1	Arachinovo	Water supply system for settlement	453,403
2	Dobrushevo	Water supply pipeline from Radobor to Trap and Budakovo, connection to water supply system	199,998
3	Izvor	Water supply system for Omorani and Vasil Antevski	198,517
4	Kriva Palanka	Water supply with Tyrol road from river Staruchka rake to the existing water filter	484,955
5	Orizari	Water supply system for Orizari, connection to the existing water supply system of Kochani	498,406
6	Oslomej	Water supply system for Popovjani, Jagodal-Dolenci connection to existing system	480,507
7	Sopotnica	Water supply system for Zhan (Crna Reka 7km)	188,087
8	Srbinovo	Main water supply pipeline to Bukovik	478,188
9	Tearce	Water supply system (3,920 m length)with intake from Bistrica to Tearce, Prsovce and Glovi	500,000
10	Vevchani	Reconstruction of asbestos cement pipe (10 km)	346,130
		Total	3,832,135
		Total amount in JPY	498,177,550

Appendix 8 Population and Water Demand Forecast

(1) Population Forecast and Population Served

Municipality	Inhabited place	(A) Population in 1994	(B) Population in 2002	(C) Growth rate	(D) Technical Doc		(E) Result after discussion (2002)	Growth rate by village (%)	(F) Population in 2008	(G) Population served
					Population	Year				
Cucer Sandevo	Municipality	8,064	7,493	-1.04%						
	Kuceviste	**1,869**	**2,011**		**2,571**	**2002**	**2,057**	**1.0**	**2,183**	**2,183**
Cair	Municipality	63,375	70,441	1.52%						
	Radisani	**7,579**	**8,424**		**9,600**	**2009**	**8,676**	**1.8**	**9,656**	**9,656**
Gazi Baba	Municipality	67,664	72,780	1.05%						
	Goce Delcev				**1,280**	**2000**	**1,421**	**1.5**	**1,554**	**1,554**
	Jurumleri	**3,326**	**3,577**		**3,383**	**1994**	**3,319**	**1.2**	**3,565**	**3,565**
	Kolonie Idrizovo				**850**	**1981**	**1,288**	**1.2**	**1,384**	**1,384**
	Idrizovo				**1,500**	**1981**	**2,384**	**1.2**	**2,561**	**2,561**
Ilinden	Municipality	14,512	15,823	1.24%						
	Bujkovci	**645**	**703**				**670**	**1.0**	**711**	**711**
	Mrsevci	**650**	**709**				**700**	**1.0**	**743**	**743**
	Miladinovci	**1,429**	**1,558**				**1,500**	**1.0**	**1,592**	**1,592**
	Mralino	**791**	**862**				**830**	**1.0**	**881**	**881**
Petrovec	Municipality	8,123	8,205	1.013%						
	Ognjanci	**1,207**	**1,255**				**1,255**	**1.0**	**1,332**	**1,332**
	Petrovec	**2,490**	**2,588**				**2,588**	**1.0**	**2,748**	**2,748**
	Kjojlija	**354**	**368**				**368**	**1.0**	**391**	**391**
	Rzanicino	**903**	**939**				**939**	**1.0**	**996**	**996**
Studenicani	Municipality	14,747	17,314	2.32%						
	Cvetovo	**847**	**994**		**847**	**1994**	**826**	**1.0**	**877**	**877**
	Dolno Kolicani	**1,395**	**1,638**		**1,500**	**1994**	**1,516**	**1.0**	**1,609**	**335**
Zelenikovo	Municipality	4,236	4,115	-0.41%						
	Taor	**158**	**153**		**158**	**1994**	**169**	**1.0**	**180**	**180**
	Pakosevo	**222**	**216**		**222**	**1994**	**246**	**2.0**	**277**	**277**
	Nova Selo	**149**	**145**		**149**	**1994**	**165**	**2.0**	**186**	**186**
	Strahojadica	**228**	**221**		**250**	**1994**	**251**	**2.0**	**283**	**283**
Total	Municipality	180,721	196,171	1.18%						
	Inhabited place	24,242	26,363				31,168		33,709	32,435

(2) Water Demand and Production Capacity

Municipality	Inhabited place	Population served in 2008	Unit Demand		Water Demand		(E) Daily Ave. (C+D)	(F) +Leakage		L/c/d	(G) Peak Factor	(H) Peak Day Production (m3/d)
			(A) Domestic (L/c/d)	(B) Others (%), (A)x(B)	(C) Domestic (m3/d)	(D) Others		Rate (%)	+Leakage (m3/d)			
Cucer Sandevo	Kuceviste	2,183	100	1,500	1,999	600	2,599	20	3,248	1,488	2	4,873
Cair	Radisani	9,656	150	30	1,448	435	1,883	10	2,092	217	1	2,720
Gazi Baba	Goce Delcev	1,554	145	30	225	68	293	20	366	236	2	549
	Jurumleri	3,565	145	30	517	155	672	20	840	236	2	1,260
	Kolonie Idrizovo	1,384	145	30	201	60	261	20	326	236	2	489
	Idrizovo	2,561	145	30	371	111	483	20	603	236	2	905
Ilinden	Bujkovci	711	145	30	103	31	134	20	168	236	2	251
	Mrsevci	743	145	30	108	32	140	20	175	236	2	263
	Miladinovci	1,592	145	30	231	69	300	20	375	236	2	563
	Mralino	881	145	30	128	38	166	20	208	236	2	311
	Existing area	12,197	145	30	1,769	531	2,299	20	2,874	236	2	4,311
	Future expansion area	1,051	145	30	152	46	198	20	248	236	2	371
Petrovec	Ognjanci	1,332	145	30	193	58	251	20	314	236	2	471
	Petrovec	2,748	145	30	398	120	518	20	647	236	2	971
	Kjojlija	391	145	30	57	17	74	20	92	236	2	138
	Rzanicino	996	145	30	144	43	188	20	235	236	2	352
Studenicani	Cvetovo	877	65	20	57	11	68	10	78	89	1	78
	Dolno Kolicani	335	100	10	34	3	37	20	46	138	2	69
Zelenikovo	Taor	180	150	30	27	8	35	10	39	217	2	59
	Pakosevo	277	150	30	42	12	54	10	60	217	2	90
	Novo Selo	186	150	30	28	8	36	10	40	217	2	60
	Strahojadica	283	150	30	42	13	55	10	61	217	2	92
Total	20	45,683			8,217	2,458	10,607					19,168
		32,435										

Appendix 9 Jurumleri Pump Test Result

Groundwater Potential Analysis for Jurumleri

1) Pumping Test

In Jurumleri, there are already two deep wells drilled in 1983 and they are in operation. The wells are currently operated alternately and their depths and discharge rates are as follows.

B-1・・・22m, 35L/s　B-2・・・28m, 32.5L/s

The diameter of the casing pipe and screen is 600mm. The result of the pumping test conducted for the purpose of assessing the groundwater potential is presented below.

Pumping Test Result for Existing Well　(27 May 2003)

Time	Elapsed time (min)	B - 1		B - 2	
		Water Level (m)	Drawdown (m)	Water Level (m)	Drawdown (m)
10:00	0	0.235		1.870	
10:05	5	0.275	0.045	2.240	0.370
10:15	15	0.275	0.045	2.222	0.350
10:30	30	0.285	0.055	2.250	0.380
10:45	45	0.290	0.060	2.252	0.382
11:00	60	0.280	0.050	2.252	0.382
11:30	90	0.290	0.060	2.262	0.392
12:30	150	0.285	0.055	2.245	0.375
13:30	210	0.290	0.060	2.255	0.385
14:30	270	0.290	0.060	2.252	0.382

Note 1) The water level was measured at a monitoring point (M.P.). If the ground level of B-1 well was fixed at 0 m, the level of each M.P. would be as follows.
B－1：2.265m
B－2：0.550m
Note 2) The water level was measured under the following conditions.
The initial water levels were taken to be those of 30minutes and 12hours after the stop of pump operation for B－1 and B－2 respectively. The test was conducted with B-2 pump operating at a discharge of 32.5L/s while B-1 pump is out of operation.

2) Calculation of Hydraulic Conductivity

The result of the pumping test above indicates that the water levels stabilized within 30 to 45 minutes after the start of pumping. Thus, for the calculation of hydraulic conductivity, the following equation for full-penetrated non-confined water well was adopted.

$K=Q(\ln R-\ln r)/\pi(H^2-h^2)=0.732Q(\log R-\log r)/(H^2-h^2)$

The parameters concerned are as follows.

Q : Discharge rate of B-2: 32.5L/s=1.95m³/min

R : Distance between B-1 and B-2: 83.5 m

r : Radius of B-2: 0.3 m

H and h are calculated as follows (see the figure).

If the ground level of B-1 is taken to be 0m (as reference), the ground level of

B-2 is –0.5m.

If the bottom of B-2 well is assumed to be at the bottom of the permeable layer, the lower limit of the layer will be at –28.50m.

The stabilized water levels of B-1 and B-2 under the operation of B-2 well are as follows.

B-1・・・0.290 m (-2.56 m), B-2・・・2.262 m (-2.81 m)

Therefore

H = 28.50 - 2.56 = 25.94(m), h = 28.50 - 2.81 = 25.69(m)

The hydraulic conductivity (K) of the area is calculated with the above figures to give the result:

K=0.27 m/min=4.5×10⁻³cm/s

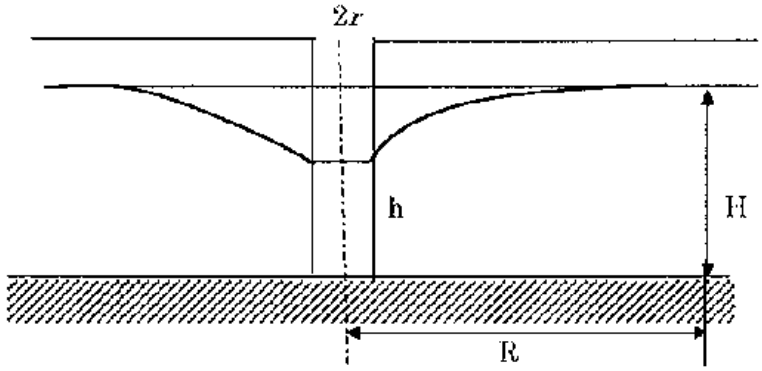


Fig. Pumping in non-confined aquifer, "Chikasui chousahou" new edition, p212)

3) Estimation of groundwater potential

The groundwater potential of the area is estimated using the hydraulic conductivity calculated above.

□ The static water level of the area is considered to be as follows.

The static water levels before the pumping test are as follows.

B-1: - (2.27+0.23) = -2.50 m, B-2: - (0.55 + 1.87) = -2.42 m

The average is taken to be -2.46m.

□ In the area, there are actually two wells operated alternately. For the estimation of groundwater potential, one well is assumed to be planned in the area to lower the dynamic water level up to around the middle of the aquifer. Currently the pump is placed at 16m below the top of the well. The water level is planned to be lowered to three meters above that level (-13.50m) for the calculation.

□ Equation

Discharge by pumping (Q) is calculated with the equation described above

using the hydraulic conductivity (K) of 0.27 m/min = 4.5 x 10 $^{-3}$cm/s.

$Q=K \times (H^2 - h^2)/0.732(\log R - \log r)$

where

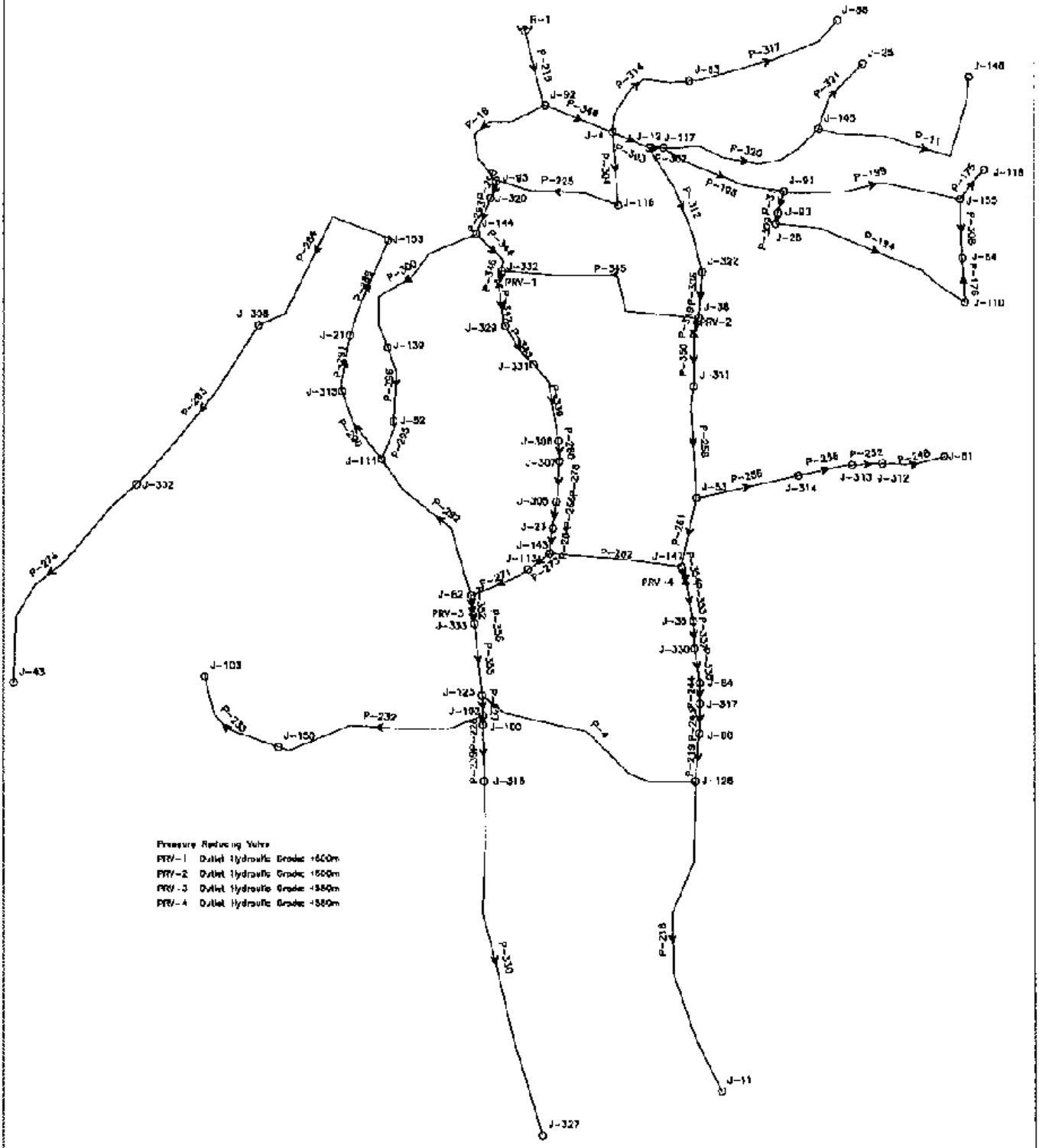
h=28.50 - 13.50=15.00 m, H=28.50 - 2.46=26.04 m

r=0.3 m, R (radius of interference) = 300 m

Q=57.7 m^3/min=3,460 m^3/h=83,000 m^3/d

Appendix 10 Hydraulic Analysis

Kuceviste Network Model



Kuceviste Network Calculation

Junction Report

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-4	610	0,11	634,72	24,70
J-11	520	0,11	580,18	60,10
J-12	610	0,11	634,69	24,60
J-21	630	0,11	599,21	39,10
J-23	570	0,11	599,51	29,50
J-25	620	0,11	634,60	14,60
J-28	590	0,11	634,41	44,30
J-35	550	0,11	580,20	29,20
J-38	580	0,11	634,42	54,30
J-43	550	0,11	599,14	49,00
J-52	570	0,11	634,27	64,20
J-53	570	0,11	599,68	29,60
J-53	620	0,11	634,71	14,70
J-54	590	0,11	634,38	44,30
J-56	580	0,11	580,99	29,10
J-91	570	0,11	599,70	29,70
J-92	580	0,11	599,30	39,30
J-94	560	0,11	580,99	20,10
J-98	630	0,11	634,71	4,70
J-90	590	0,11	634,41	44,30
J-91	590	0,11	634,40	34,40
J-92	515	0,11	634,80	19,80
J-93	500	0,11	634,54	34,50
J-100	550	0,11	579,94	29,90
J-102	550	0,11	579,94	29,90
J-103	540	0,11	579,80	39,80
J-110	590	0,11	634,30	44,30
J-113	560	0,11	599,27	39,20
J-115	560	0,11	599,45	39,40
J-116	590	0,11	634,64	44,60
J-117	610	0,11	634,67	24,60
J-118	560	0,11	634,30	34,30

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-125	550	0,11	579,95	29,90
J-126	550	0,11	580,19	30,10
J-139	580	0,11	634,37	54,20
J-143	510	0,11	609,48	99,40
J-144	580	0,11	634,41	54,30
J-145	610	0,11	634,63	24,60
J-146	620	0,11	634,59	14,60
J-147	560	0,11	599,85	39,80
J-150	540	0,11	579,90	39,80
J-150	560	0,11	599,13	39,10
J-155	580	0,11	634,33	54,30
J-302	550	0,11	599,14	49,00
J-305	570	0,11	599,55	29,50
J-306	570	0,11	599,65	29,60
J-307	570	0,11	599,62	29,60
J-308	550	0,11	599,15	49,10
J-311	580	0,11	599,95	19,90
J-312	570	0,11	599,79	29,70
J-313	570	0,11	599,79	29,70
J-314	570	0,11	599,81	29,80
J-315	560	0,11	599,23	39,20
J-316	560	0,11	579,93	29,90
J-317	560	0,11	580,19	20,20
J-320	590	0,11	634,50	44,40
J-322	580	0,11	634,40	54,40
J-327	520	0,11	579,81	59,80
J-325	560	0,11	599,81	19,90
J-326	560	0,11	580,19	20,20
J-331	560	0,11	599,81	19,80
J-332	580	0,11	634,39	54,20
J-333	560	0,11	580,00	20,00

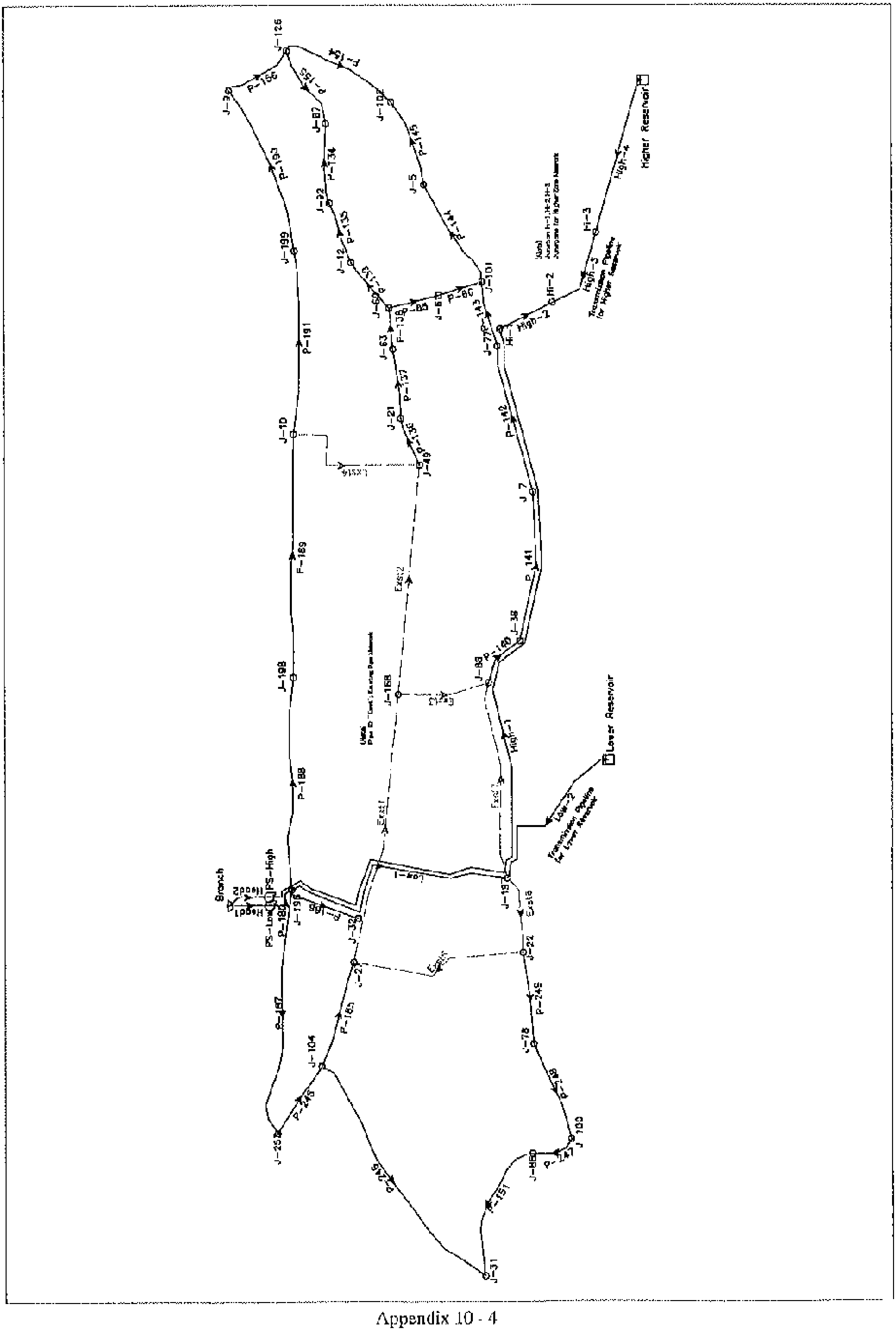
Pipe Report

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-4	J-125	J-126	PE	65	245,00	110	Closed	0,00	0,00	579,95	580,19	0,00	0,00
P-11	J-145	J-146	PE	65	220,00	110	Open	0,11	0,03	634,60	634,59	0,01	0,05
P-18	J-92	J-93	PE	100	134,00	110	Open	2,46	0,31	634,60	634,54	0,26	1,90
P-31	J-90	J-91	PE	65	22,00	110	Open	-0,46	0,12	634,41	634,40	0,01	0,55
P-175	J-155	J-118	PE	50	39,00	110	Open	0,11	0,06	634,38	634,38	0,01	0,18
P-176	J-94	J-110	PE	65	85,00	110	Open	-0,07	0,02	634,38	634,38	0,00	0,02
P-194	J-110	J-28	PE	65	212,00	110	Open	-0,18	0,08	634,38	634,41	0,03	0,13
P-198	J-117	J-91	PE	65	193,00	110	Open	0,77	0,23	634,67	634,43	0,24	1,83
P-199	J-91	J-155	PE	65	182,00	110	Open	0,26	0,08	634,43	634,39	0,04	0,23
P-204	J-143	J-23	PE	100	26,60	110	Open	-1,98	0,25	599,48	599,51	0,03	1,29
P-216	R-1	J-92	PE	140	78,60	110	Open	6,93	0,45	635,00	634,80	0,20	2,55
P-218	J-11	J-126	PE	100	327,60	110	Open	-0,11	0,01	580,18	580,18	0,00	0,01
P-219	J-126	J-96	PE	100	48,00	110	Open	-0,22	0,03	580,19	580,18	0,00	0,02
P-225	J-93	J-116	PE	65	128,00	110	Open	-0,48	0,14	634,54	634,64	0,10	0,75
P-226	J-120	J-302	PE	80	9,00	110	Open	-0,33	0,07	579,94	579,93	0,00	0,10
P-227	J-102	J-125	PE	80	20,00	110	Open	-0,66	0,13	579,94	579,95	0,01	0,50
P-232	J-132	J-150	PE	65	217,00	110	Open	0,22	0,07	579,94	579,90	0,04	0,18
P-233	J-150	J-103	PE	65	114,00	110	Open	0,11	0,03	579,90	579,80	0,01	0,05
P-239	J-316	J-300	PE	65	57,00	110	Open	-0,22	0,07	579,93	579,91	0,01	0,18
P-243	J-65	J-317	PE	100	30,00	110	Open	-0,33	0,04	580,19	580,19	0,00	0,05
P-244	J-317	J-04	PE	100	21,00	110	Open	-0,44	0,06	580,19	580,19	0,00	0,08
P-248	J-312	J-87	PE	65	64,00	110	Open	0,11	0,03	599,79	599,73	0,00	0,05
P-262	J-311	J-312	PE	65	30,00	110	Open	0,22	0,07	599,79	599,79	0,01	0,18
P-255	J-53	J-314	PE	65	190,00	110	Open	0,44	0,13	599,68	599,61	0,07	0,35
P-256	J-314	J-313	PE	65	68,00	110	Open	0,33	0,10	599,61	599,79	0,02	0,38
P-258	J-311	J-53	PE	100	114,00	110	Open	1,43	0,18	599,56	599,68	0,08	0,71
P-261	J-147	J-53	PE	100	72,00	110	Open	-0,88	0,11	599,86	599,68	0,02	0,29
P-262	J-147	J-143	PE	100	135,00	110	Closed	0,00	0,00	599,86	599,48	0,00	0,00
P-266	J-23	J-305	PE	100	27,00	110	Open	-2,09	0,27	599,51	599,55	0,04	1,43
P-271	J-153	J-82	PE	100	64,00	110	Open	1,76	0,22	599,45	599,33	0,07	1,24
P-273	J-313	J-143	PE	100	27,00	110	Open	-1,87	0,24	599,45	599,48	0,03	1,18
P-274	J-43	J-302	PE	80	249,00	110	Open	-0,11	0,02	599,14	599,14	0,00	0,02
P-278	J-305	J-307	PE	100	41,00	110	Open	2,20	0,28	599,55	599,62	0,06	1,57
P-280	J-306	J-307	PE	100	21,00	110	Open	2,31	0,29	599,65	599,62	0,04	1,72
P-283	J-302	J-308	PE	80	205,00	110	Open	-0,22	0,04	599,14	599,15	0,01	0,07
P-284	J-308	J-153	PE	80	701,00	110	Open	-0,33	0,07	599,15	599,18	0,03	0,14
P-286	J-153	J-2	PE	80	104,00	110	Open	-0,44	0,09	599,18	599,21	0,03	0,29
P-289	J-315	J-111	PE	80	84,00	110	Open	0,66	0,13	599,23	599,27	0,04	0,50
P-291	J-21	J-315	PE	80	58,00	110	Open	-0,55	0,11	599,21	599,23	0,02	0,36
P-292	J-111	J-82	PE	80	173,00	110	Open	-0,77	0,15	599,27	599,33	0,12	0,67
P-293	J-154	J-320	PE	100	39,00	110	Open	-2,31	0,35	634,41	634,50	0,09	2,31
P-295	J-52	J-111	PE	65	41,00	110	Closed	0,00	0,00	634,37	599,27	0,00	0,00
P-296	J-62	J-139	PE	65	77,00	110	Open	-0,11	0,03	634,37	634,37	0,00	0,05
P-298	J-320	J-93	PE	100	19,00	110	Open	-2,02	0,36	634,50	634,54	0,05	2,49
P-300	J-144	J-139	PE	65	174,00	110	Open	0,22	0,07	634,41	634,37	0,03	0,18
P-302	J-117	J-12	PE	80	15,00	110	Open	-1,21	0,24	634,67	634,69	0,02	1,54

Kuceviste Network Calculation

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-303	J-12	J-4	PE	140	41.00	110	Open	-5.45	0.22	634.80	634.72	0.08	1.76
P-304	J-4	J-116	PE	65	74.00	110	Open	0.59	0.18	634.72	634.04	0.68	1.80
P-306	J-38	J-322	PE	100	48.00	110	Open	-2.02	0.26	634.42	634.48	0.05	1.34
P-308	J-155	J-84	PE	65	40.00	110	Open	0.04	0.01	634.38	634.38	0.00	0.31
P-309	J-20	J-30	PE	65	12.00	110	Open	-0.29	0.09	634.41	634.41	0.00	0.31
P-312	J-12	J-322	PE	100	135.00	110	Open	2.73	0.27	634.80	634.42	0.20	1.48
P-314	J-4	J-53	PE	80	112.00	110	Open	0.22	0.04	634.72	634.71	0.01	0.07
P-317	J-88	J-53	PE	80	168.00	110	Open	-0.11	0.02	634.71	634.71	0.00	0.02
P-320	J-117	J-145	PE	65	172.00	110	Open	0.33	0.10	634.67	634.67	0.07	0.38
P-321	J-145	J-25	PE	65	91.00	110	Open	0.11	0.03	634.60	634.60	0.00	0.05
P-330	J-327	J-316	PE	63	360.00	110	Open	-0.11	0.03	579.04	579.03	0.02	0.05
P-336	J-84	J-230	PE	100	82.00	110	Open	-0.55	0.07	580.19	580.19	0.00	0.12
P-337	J-333	J-35	PE	100	78.00	110	Open	-0.66	0.08	580.19	580.20	0.00	0.17
P-339	J-305	J-231	PE	100	84.00	110	Open	-2.42	0.31	599.65	599.81	0.16	1.87
P-340	J-331	J-329	PE	100	48.00	110	Open	-2.53	0.32	599.81	599.91	0.10	2.04
P-344	J-332	J-144	PE	100	48.00	110	Open	-2.38	0.30	634.32	634.41	0.09	1.82
P-345	J-332	J-38	PE	65	230.00	110	Open	-0.37	0.11	634.32	634.42	0.11	0.47
P-346	J-92	J-4	PE	140	73.00	110	Open	-4.08	0.28	634.80	634.72	0.08	1.08
P-347	J-329	PRV-1	PE	100	42.00	110	Open	-2.64	0.34	599.91	600.01	0.10	2.20
P-348	PRV-1	J-332	PE	100	13.00	110	Open	-2.64	0.34	634.25	634.32	0.07	2.70
P-349	J-38	PRV-2	PE	100	16.00	110	Open	-1.54	0.20	634.42	634.41	0.01	0.81
P-350	PRV-2	J-311	PE	100	64.00	110	Open	-1.54	0.20	600.01	599.96	0.04	0.81
P-352	PRV-3	J-92	PE	80	16.00	110	Open	-0.86	0.17	599.37	599.28	0.01	0.86
P-353	J-35	PRV-4	PE	100	47.00	110	Open	-0.77	0.10	580.20	580.21	0.01	0.22
P-354	PRV-4	J-147	PE	100	14.00	110	Open	-0.77	0.10	599.86	599.86	0.00	0.22
P-355	J-125	J-333	PE	80	75.00	110	Open	-0.77	0.15	579.95	580.00	0.05	0.67
P-356	J-333	PRV-3	PE	80	13.00	110	Open	-0.86	0.17	580.00	580.01	0.01	0.85

Radisani Lower Zone Network Model



Radisani Lower Zone Network Calculation

Junction Report

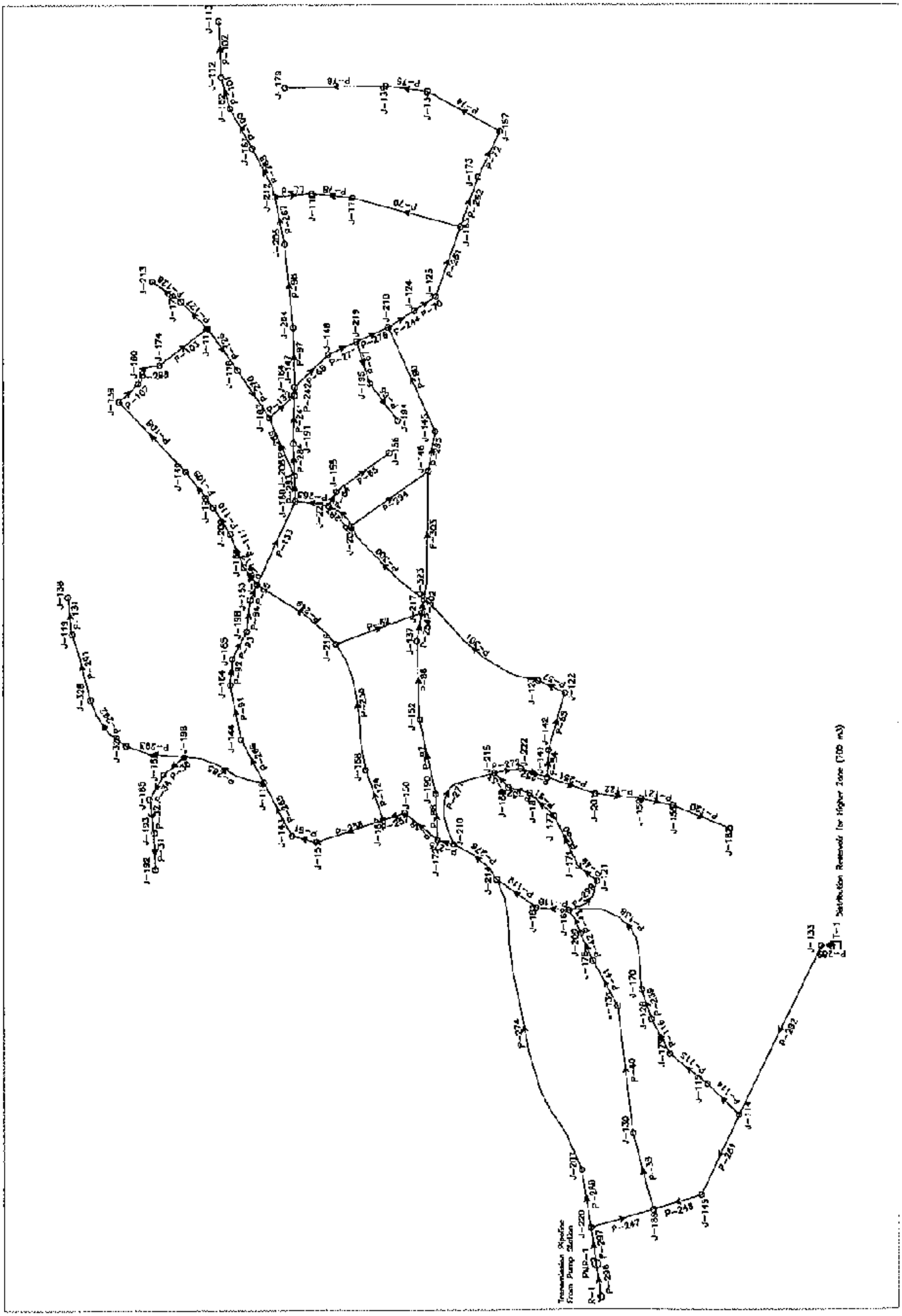
Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
Hi-1	390	9.00	470.35	80.75
Hi-2	400	9.00	470.69	70.55
Hi-3	420	9.00	470.71	50.61
J-5	390	0.90	410.80	20.76
J-7	350	0.90	401.82	51.74
J-9	390	0.90	411.04	21.00
J-10	390	0.90	413.69	23.64
J-12	390	0.90	410.64	20.79
J-21	390	0.90	402.38	12.33
J-22	350	0.90	405.31	45.22
J-27	390	0.90	404.64	74.49
J-31	390	0.90	404.61	74.46
J-32	390	0.90	407.21	67.02
J-36	350	0.90	403.06	42.98
J-40	390	0.90	403.35	23.30
J-60	390	0.90	410.59	20.95
J-61	390	0.90	410.64	20.89
J-63	390	0.90	401.39	21.35

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-77	380	0.90	401.09	21.05
J-73	350	0.90	404.87	54.76
J-85	350	0.90	404.61	54.51
J-87	380	0.90	400.78	20.74
J-83	360	0.90	403.74	43.65
J-92	380	0.90	400.78	20.74
J-100	350	0.90	404.64	54.53
J-101	380	0.90	400.94	20.89
J-102	380	0.90	400.79	20.75
J-124	330	0.90	404.74	74.60
J-126	380	0.90	400.81	20.77
J-168	360	0.90	403.74	43.66
J-196	344	0.90	407.25	67.12
J-197	360	0.90	405.94	45.84
J-198	350	0.90	405.45	55.34
J-199	380	0.90	402.01	21.97
J-253	315	0.90	405.15	89.97

Pipe Report

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
Exst1	J-27	J-168	Ductile Iron	100	540.15	110	Open	2.67	0.34	404.64	403.74	0.90	1.65
Exst2	J-168	J-43	Ductile Iron	100	459.34	110	Open	1.58	0.20	403.74	403.35	0.39	0.85
Exst3	J-86	J-168	Ductile Iron	100	184.40	110	Open	-0.19	0.02	403.74	403.74	0.00	0.02
Exst4	J-10	J-43	Ductile Iron	150	316.77	110	Open	5.19	0.29	403.69	403.35	0.34	1.07
Exst5	J-27	J-22	Ductile Iron	100	356.62	110	Open	-2.43	0.31	404.64	405.31	0.67	1.88
Exst6	J-22	J-197	Ductile Iron	100	156.06	110	Open	-6.10	0.78	405.31	406.94	1.62	10.40
Exst7	J-197	J-36	Ductile Iron	100	397.56	110	Open	5.31	0.68	406.94	403.74	3.20	8.04
Head1	Branch	PS-Low	Ductile Iron	200	78.94	110	Open	24.63	0.78	350.00	349.63	0.37	4.71
Head2	Branch	PS-High	Ductile Iron	200	84.73	110	Open	16.34	0.52	350.00	349.81	0.19	2.20
High-1	PS-High	Hi-1	Ductile Iron	200	1,707.18	110	Open	16.34	0.52	474.69	470.93	3.76	2.20
High-2	Hi-1	Hi-2	Ductile Iron	150	117.96	110	Open	7.34	0.42	470.93	470.69	0.24	2.03
High-3	Hi-2	Hi-3	Ductile Iron	150	177.09	110	Open	-1.66	0.09	470.69	470.71	0.02	0.11
High-4	Higher Reserv	Hi-3	Ductile Iron	150	317.60	110	Open	10.66	0.60	472.00	470.71	1.29	4.05
Low-1	J-195	J-197	Ductile Iron	200	520.50	110	Open	8.14	0.26	407.25	406.94	0.32	0.61
Low-2	J-197	Lower Reserve	Ductile Iron	200	358.14	110	Open	-0.17	0.13	406.94	407.09	0.06	0.15
P-65	J-60	J-61	Ductile Iron	100	102.72	110	Open	1.20	0.15	410.99	410.94	0.05	0.51
P-66	J-61	J-101	Ductile Iron	100	89.31	110	Open	0.30	0.04	410.94	410.93	0.00	0.04
P-134	J-87	J-92	Ductile Iron	100	157.58	110	Open	-0.58	0.07	400.78	400.78	0.00	0.01
P-135	J-92	J-12	Ductile Iron	100	124.66	110	Open	-1.08	0.14	400.78	400.84	0.05	0.42
P-136	J-49	J-21	Ductile Iron	100	100.58	110	Open	5.87	0.75	403.35	402.38	0.97	9.69
P-137	J-21	J-53	Ductile Iron	100	138.60	110	Open	4.97	0.63	402.38	401.39	0.99	7.12
P-138	J-63	J-39	Ductile Iron	100	61.69	110	Open	4.07	0.52	401.39	400.99	0.40	4.92
P-139	J-60	J-12	Ductile Iron	100	117.96	110	Open	1.98	0.25	410.99	410.84	0.15	1.23
P-140	J-88	J-38	Ductile Iron	100	110.34	110	Open	4.61	0.59	403.74	403.06	0.68	6.15
P-141	J-38	J-7	Ductile Iron	100	301.35	110	Open	3.70	0.47	403.06	401.82	1.24	4.11
P-142	J-7	J-77	Ductile Iron	100	300.23	110	Open	2.80	0.36	401.82	401.09	0.74	2.45
P-143	J-77	J-101	Ductile Iron	100	130.76	110	Open	1.90	0.24	401.09	400.93	0.16	1.19
P-144	J-101	J-5	Ductile Iron	100	225.55	110	Open	1.29	0.16	400.93	400.80	0.13	0.59
P-145	J-5	J-102	Ductile Iron	100	177.09	110	Open	0.39	0.05	400.80	400.79	0.01	0.05
P-151	J-31	J-36	Ductile Iron	150.4	284.38	110	Open	-0.00	0.00	404.61	404.61	0.00	0.00
P-154	J-126	J-102	Ductile Iron	100	247.80	110	Open	0.57	0.06	400.87	400.79	0.08	0.13
P-155	J-87	J-126	Ductile Iron	100	166.12	110	Open	-0.72	0.09	400.78	400.81	0.03	0.20
P-156	J-9	J-126	Ductile Iron	100	151.18	110	Open	2.13	0.27	401.04	400.81	0.22	1.43
P-180	PS-Low	J-196	Ductile Iron	200	69.19	110	Open	24.63	0.78	407.50	407.25	0.33	4.71
P-195	J-104	J-27	Ductile Iron	100	215.19	110	Open	1.14	0.15	404.74	404.64	0.10	0.47
P-196	J-196	J-92	Ductile Iron	100	149.96	110	Open	0.90	0.11	407.25	407.21	0.05	0.33
P-197	J-196	J-253	Ductile Iron	100	493.78	110	Open	3.77	0.48	407.25	405.15	2.10	4.25
P-198	J-196	J-198	Ductile Iron	150	425.31	110	Open	10.92	0.62	407.25	405.45	1.81	4.24
P-199	J-199	J-10	Ductile Iron	150	466.18	110	Open	10.92	0.67	405.45	403.69	1.76	3.62
P-190	J-199	J-9	Ductile Iron	100	342.90	110	Open	3.03	0.39	402.01	401.04	0.98	2.85
P-191	J-199	J-10	Ductile Iron	100	363.53	110	Open	-3.93	0.50	402.01	403.69	1.68	4.61
P-245	J-253	J-104	Ductile Iron	100	153.19	110	Open	2.37	0.37	405.15	404.74	0.41	2.67
P-246	J-104	J-31	Ductile Iron	100	536.46	110	Open	0.92	0.10	404.74	404.61	0.14	0.25
P-247	J-86	J-100	Ductile Iron	100	69.51	110	Open	-0.98	0.12	404.87	404.64	0.02	0.35
P-248	J-109	J-78	Ductile Iron	100	201.37	110	Open	-1.38	0.24	404.61	404.87	0.24	1.17
P-249	J-78	J-22	Ductile Iron	100	182.27	110	Open	-2.78	0.35	404.87	405.31	0.44	2.42

Racisani Higer Zone Network Model



Radisani Higher Zone Network Calculation

Junction Report

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-110	430	0.28	459.69	29.60
J-111	430	0.28	459.59	29.60
J-112	440	0.28	459.48	19.40
J-113	440	0.28	459.47	19.40
J-114	440	0.28	469.38	29.90
J-115	440	0.28	469.30	29.50
J-116	410	0.28	460.34	50.20
J-117	420	0.28	460.41	40.30
J-118	400	0.28	461.26	61.10
J-119	410	0.28	460.35	50.80
J-121	400	0.28	464.37	64.20
J-122	410	0.28	461.76	51.60
J-123	400	0.28	461.58	61.50
J-124	430	0.28	459.94	29.90
J-125	430	0.28	459.97	29.80
J-128	420	0.28	467.90	47.20
J-130	400	0.28	468.28	68.10
J-131	400	0.28	468.34	68.20
J-133	470	0.00	471.05	1.60
J-134	440	0.28	459.28	19.20
J-135	440	0.28	459.25	19.20
J-137	400	0.28	461.35	61.20
J-138	410	0.28	460.85	50.70
J-139	420	0.28	460.85	40.50
J-140	410	0.28	460.93	50.60
J-141	400	0.28	462.13	62.00
J-142	400	0.28	461.98	61.50
J-143	400	0.28	461.48	61.20
J-144	400	0.28	461.20	61.10
J-145	410	0.28	460.40	50.40
J-146	400	0.28	460.66	60.50
J-147	410	0.28	460.13	50.00
J-148	410	0.28	460.08	50.60
J-149	420	0.28	469.50	49.60
J-150	400	0.28	462.08	61.90
J-151	400	0.28	461.51	61.40
J-152	400	0.28	461.76	61.60
J-153	400	0.28	461.08	61.60
J-154	400	0.28	461.07	61.60
J-155	400	0.28	460.64	60.50
J-156	400	0.28	460.64	60.50
J-157	440	0.28	459.39	19.40
J-158	430	0.28	461.92	31.90
J-159	410	0.28	461.94	51.60
J-160	400	0.28	460.62	60.50
J-161	440	0.28	459.57	19.50
J-162	440	0.28	459.51	19.50
J-163	430	0.28	459.70	29.60
J-164	400	0.28	461.14	61.00
J-165	400	0.28	461.12	61.00
J-166	400	0.28	461.04	60.90
J-167	400	0.28	461.76	61.60
J-168	400	0.28	461.61	61.50

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-169	400	0.28	464.98	64.80
J-170	420	0.28	460.00	45.80
J-171	400	0.28	464.06	63.90
J-172	380	0.28	462.66	82.40
J-173	440	0.28	459.51	19.50
J-174	420	0.28	460.60	40.50
J-175	420	0.28	460.00	40.00
J-176	400	0.28	465.64	65.50
J-177	400	0.28	463.45	63.30
J-178	430	0.28	460.39	30.30
J-179	440	0.28	459.23	19.20
J-180	420	0.28	460.73	40.60
J-181	380	0.28	464.62	84.50
J-182	430	0.28	461.91	31.80
J-183	410	0.28	460.78	50.70
J-184	410	0.28	460.20	50.10
J-185	410	0.28	460.34	50.20
J-186	410	0.28	460.88	50.80
J-187	400	0.28	463.11	63.00
J-188	400	0.28	462.92	62.80
J-189	400	0.28	462.57	62.40
J-190	400	0.28	462.22	62.10
J-191	400	0.28	460.32	60.20
J-192	410	0.28	460.81	50.70
J-193	410	0.28	460.02	50.70
J-194	410	0.28	460.02	49.90
J-195	410	0.28	460.03	49.90
J-196	410	0.28	460.94	50.80
J-198	400	0.28	461.10	61.00
J-199	410	0.28	460.97	50.90
J-200	410	0.28	461.90	50.90
J-201	410	0.28	462.91	51.90
J-202	400	0.28	460.71	60.60
J-204	410	0.28	459.98	49.90
J-205	430	0.28	459.77	29.70
J-207	380	0.28	468.66	88.50
J-208	400	0.28	460.40	60.30
J-209	400	0.28	465.27	65.10
J-210	380	0.28	462.92	82.70
J-212	430	0.28	459.69	29.60
J-213	430	0.28	460.38	30.30
J-214	380	0.28	464.18	84.00
J-215	400	0.28	462.78	62.60
J-216	400	0.28	461.26	61.10
J-217	400	0.28	461.22	61.10
J-218	410	0.28	460.05	50.00
J-219	410	0.28	460.05	50.01
J-220	380	0.28	469.57	89.45
J-221	400	0.28	460.35	60.50
J-222	400	0.28	462.94	62.30
J-223	400	0.28	461.15	61.05
J-228	410	0.28	460.37	50.80
J-229	410	0.28	460.30	50.80

Pipe Report

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-31	J-192	J-193	Ductile Iron	80	83.84	110	Open	-0.28	0.36	460.81	460.82	0.01	0.10
P-32	J-193	J-185	Ductile Iron	80	60.35	110	Open	-0.56	0.71	460.82	460.84	0.02	0.37
P-34	J-185	J-186	Ductile Iron	80	50.29	110	Open	-0.84	1.07	460.84	460.88	0.04	0.76
P-36	J-186	J-206	Ductile Iron	80	48.77	110	Open	-1.12	1.42	460.88	460.94	0.07	1.34
P-39	J-189	J-130	Ductile Iron	100	138.07	110	Open	5.77	0.73	462.57	468.28	1.29	9.37
P-40	J-130	J-131	Ductile Iron	100	226.77	110	Open	5.49	0.70	468.28	468.34	1.94	8.54
P-41	J-131	J-176	Ductile Iron	100	90.63	110	Open	5.21	0.66	468.34	465.64	0.70	7.75
P-42	J-176	J-209	Ductile Iron	100	52.43	110	Open	4.93	0.63	465.64	465.27	0.37	7.00
P-43	J-209	J-169	Ductile Iron	100	47.24	110	Open	4.65	0.59	465.27	464.98	0.30	6.28
P-45	J-129	J-171	Ductile Iron	100	43.69	110	Open	4.92	0.63	464.37	464.06	0.31	6.97
P-50	J-171	J-177	Ductile Iron	100	98.45	110	Open	4.64	0.59	464.06	463.45	0.62	6.25
P-51	J-177	J-187	Ductile Iron	100	59.74	110	Open	4.36	0.55	463.45	463.11	0.33	5.57
P-52	J-187	J-188	Ductile Iron	100	39.93	110	Open	4.08	0.52	463.11	462.92	0.20	4.93
P-53	J-188	J-216	Ductile Iron	100	35.97	110	Open	3.80	0.48	462.92	462.78	0.15	4.02
P-54	J-141	J-142	Ductile Iron	100	48.77	110	Open	3.18	0.40	462.13	461.98	0.15	3.07
P-55	J-142	J-22	Ductile Iron	100	106.39	110	Open	2.90	0.37	461.98	461.70	0.28	2.59
P-57	J-172	J-174	Ductile Iron	100	53.00	110	Open	2.60	0.33	461.70	461.59	0.11	2.14
P-58	J-172	J-150	Ductile Iron	150	75.50	110	Open	14.71	0.80	462.55	462.03	0.52	6.91
P-61	J-151	J-143	Ductile Iron	150	44.61	110	Open	6.92	0.39	461.51	461.49	0.03	1.57
P-62	J-216	J-217	Ductile Iron	100	163.60	110	Open	0.76	0.10	461.26	461.22	0.04	0.22
P-64	J-221	J-155	Ductile Iron	100	28.56	110	Open	0.56	0.07	460.65	460.64	0.00	0.02
P-65	J-155	J-156	Ductile Iron	100	117.65	110	Open	0.28	0.04	460.64	460.64	0.00	0.03
P-66	J-194	J-195	Ductile Iron	80	82.30	110	Open	-0.28	0.06	460.02	460.03	0.01	0.10

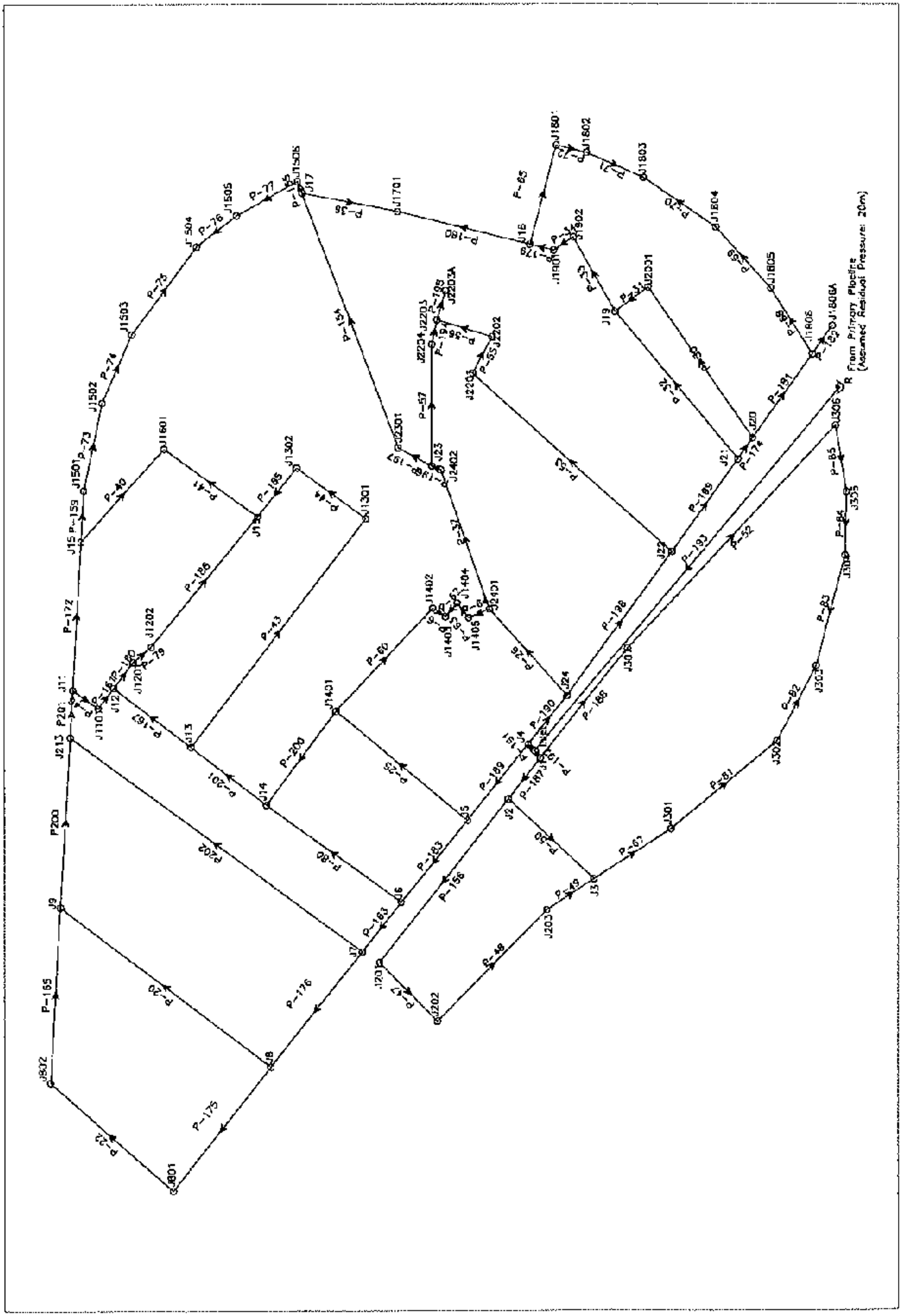
Radisani Higher Zone Network Calculation

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-67	J-135	J-219	Ductile Iron	90	76.33	110	Open	-0.56	0.11	460.03	459.98	0.03	0.37
P-68	J-147	J-148	Ductile Iron	100	82.60	110	Open	1.37	0.17	460.13	459.98	0.05	0.62
P-70	J-124	J-125	Ductile Iron	100	45.72	110	Open	2.25	0.29	459.94	459.87	0.07	1.54
P-72	J-173	J-157	Ductile Iron	90	88.70	110	Open	1.12	0.22	459.51	459.39	0.12	1.34
P-73	J-157	J-134	Ductile Iron	90	146.91	110	Open	0.84	0.17	459.39	459.28	0.12	0.78
P-75	J-134	J-135	Ductile Iron	90	76.20	110	Open	0.56	0.11	459.28	459.25	0.03	0.37
P-76	J-135	J-179	Ductile Iron	90	180.14	110	Open	0.28	0.06	459.25	459.23	0.02	0.10
P-77	J-217	J-110	Ductile Iron	100	66.14	110	Open	0.27	0.03	459.69	459.69	0.00	0.05
P-78	J-110	J-111	Ductile Iron	100	73.15	110	Open	-0.01	0.00	459.69	459.69	0.00	0.00
P-79	J-111	J-163	Ductile Iron	100	169.64	110	Open	-0.29	0.04	459.69	459.70	0.01	0.04
P-80	J-218	J-145	Ductile Iron	100	203.00	110	Open	2.56	0.33	460.05	459.48	0.42	2.08
P-86	J-137	J-152	Ductile Iron	100	140.51	110	Open	-3.07	0.39	461.35	461.76	0.41	2.91
P-87	J-152	J-190	Ductile Iron	100	125.64	110	Open	-3.35	0.43	461.76	462.22	0.45	3.42
P-88	J-190	J-177	Ductile Iron	100	82.60	110	Open	-3.63	0.46	462.22	462.55	0.33	3.97
P-91	J-114	J-164	Ductile Iron	150	99.36	110	Open	3.56	0.20	461.20	461.14	0.05	0.57
P-92	J-164	J-165	Ductile Iron	150	46.94	110	Open	3.28	0.18	461.14	461.12	0.02	0.48
P-93	J-165	J-198	Ductile Iron	150	55.17	110	Open	3.00	0.17	461.12	461.10	0.02	0.39
P-94	J-198	J-153	Ductile Iron	150	57.00	110	Open	2.72	0.15	461.10	461.08	0.02	0.32
P-95	J-153	J-154	Ductile Iron	150	30.18	110	Open	2.44	0.14	461.08	461.07	0.01	0.26
P-97	J-197	J-204	Ductile Iron	100	105.46	110	Open	2.23	0.28	460.13	459.96	0.17	1.61
P-98	J-204	J-205	Ductile Iron	100	148.13	110	Open	1.95	0.25	459.96	459.77	0.19	1.28
P-100	J-151	J-162	Ductile Iron	90	81.08	110	Open	0.84	0.17	459.57	459.51	0.06	0.78
P-101	J-162	J-112	Ductile Iron	90	55.78	110	Open	0.56	0.11	459.51	459.48	0.02	0.37
P-102	J-112	J-113	Ductile Iron	90	56.70	110	Open	0.20	0.06	459.48	459.47	0.01	0.10
P-103	J-117	J-174	Ductile Iron	100	107.59	110	Open	-2.35	0.30	460.41	460.00	0.19	1.76
P-107	J-130	J-119	Ductile Iron	100	46.33	110	Open	-2.91	0.37	460.73	460.85	0.12	2.64
P-108	J-139	J-140	Ductile Iron	150	120.99	110	Open	-3.14	0.18	460.85	460.90	0.07	0.42
P-109	J-140	J-190	Ductile Iron	150	90.77	110	Open	-3.47	0.20	460.93	460.97	0.04	0.51
P-110	J-199	J-200	Ductile Iron	150	55.78	110	Open	-3.75	0.21	460.97	461.00	0.03	0.56
P-111	J-200	J-160	Ductile Iron	150	64.62	110	Open	-4.03	0.23	461.00	461.04	0.04	0.67
P-112	J-156	J-154	Ductile Iron	150	39.01	110	Open	-4.31	0.24	461.04	461.07	0.03	0.76
P-114	J-114	J-115	Ductile Iron	100	79.25	110	Open	6.46	0.82	469.92	469.00	0.92	11.64
P-115	J-115	J-175	Ductile Iron	100	95.65	110	Open	6.20	0.79	469.00	468.08	0.92	10.13
P-116	J-175	J-138	Ductile Iron	100	70.10	110	Open	5.92	0.75	468.08	467.39	0.69	9.85
P-118	J-160	J-161	Ductile Iron	100	50.52	110	Open	4.53	0.58	464.98	464.63	0.35	6.86
P-119	J-161	J-214	Ductile Iron	100	86.67	110	Open	4.25	0.54	464.63	464.16	0.45	5.30
P-120	J-162	J-58	Ductile Iron	90	131.56	110	Open	-0.28	0.06	461.91	461.92	0.01	0.10
P-121	J-158	J-159	Ductile Iron	90	57.61	110	Open	-0.56	0.11	461.92	461.94	0.02	0.37
P-122	J-159	J-201	Ductile Iron	90	89.30	110	Open	-0.84	0.17	461.94	462.01	0.06	0.78
P-124	J-167	J-168	Ductile Iron	150	94.79	110	Open	-6.45	0.37	461.76	461.61	0.15	1.61
P-126	J-116	J-117	Ductile Iron	100	91.14	110	Open	-1.61	0.19	460.34	460.41	0.07	0.78
P-127	J-117	J-178	Ductile Iron	90	67.06	110	Open	0.56	0.11	460.41	460.38	0.02	0.37
P-128	J-178	J-213	Ductile Iron	90	62.46	110	Open	0.28	0.06	460.38	460.38	0.01	0.10
P-131	J-136	J-119	Ductile Iron	100	66.45	110	Open	-0.28	0.04	460.85	460.85	0.00	0.05
P-132	J-183	J-184	Ductile Iron	100	60.05	110	Open	2.05	0.26	460.28	460.20	0.08	1.38
P-133	J-184	J-160	Ductile Iron	100	163.98	110	Open	2.98	0.38	461.07	460.62	0.45	2.75
P-136	J-169	J-170	Ductile Iron	100	232.87	110	Open	-5.08	0.65	464.98	456.88	1.91	8.19
P-239	J-128	J-170	Ductile Iron	100	56.08	110	Open	5.64	0.72	467.39	456.88	0.50	9.00
P-241	J-191	J-184	Ductile Iron	100	65.04	110	Open	2.11	0.27	460.32	460.20	0.12	1.45
P-242	J-184	J-147	Ductile Iron	100	15.54	110	Open	3.88	0.49	460.20	460.13	0.07	4.48
P-244	J-218	J-194	Ductile Iron	100	53.64	110	Open	2.53	0.32	460.05	459.94	0.11	2.04
P-247	J-220	J-189	Ductile Iron	150	115.82	110	Open	11.18	0.01	459.57	459.57	0.00	0.00
P-248	J-189	J-149	Ductile Iron	150	90.22	110	Open	-5.86	0.33	459.57	459.69	0.12	1.34
P-249	J-154	J-216	Ductile Iron	150	177.39	110	Open	-6.14	0.35	461.07	461.26	0.19	1.05
P-250	J-216	J-188	Ductile Iron	150	234.70	110	Open	-6.18	0.35	461.26	461.8*	0.35	1.48
P-251	J-201	J-141	Ductile Iron	90	90.22	110	Open	-1.12	0.22	462.01	462.13	0.12	1.33
P-252	J-141	J-222	Ductile Iron	100	90.90	110	Open	-4.56	0.58	462.13	462.44	0.31	6.06
P-254	J-217	J-137	Ductile Iron	100	241.02	110	Open	-7.79	0.31	461.22	461.35	0.13	2.44
P-257	J-150	J-167	Ductile Iron	150	40.64	110	Open	13.93	0.79	462.03	461.76	0.27	6.66
P-258	J-157	J-151	Ductile Iron	150	125.08	110	Open	7.20	0.41	461.76	461.5*	0.25	1.98
P-260	J-207	J-220	Ductile Iron	150	100.02	110	Open	-16.03	0.91	466.68	459.57	0.80	8.03
P-261	J-125	J-163	Ductile Iron	100	131.37	110	Open	1.97	0.25	459.87	459.70	0.17	1.28
P-262	J-153	J-173	Ductile Iron	90	53.27	110	Open	1.40	0.28	459.70	459.5*	0.19	3.62
P-263	J-150	J-221	Ductile Iron	100	59.13	110	Open	-1.07	0.14	460.62	460.65	0.02	0.3*
P-265	J-149	J-118	Ductile Iron	150	107.69	110	Open	6.64	0.38	461.40	461.25	0.16	1.69
P-266	J-118	J-144	Ductile Iron	150	67.48	110	Open	3.84	0.22	461.25	461.20	0.05	0.8*
P-267	J-235	J-212	Ductile Iron	100	84.73	110	Open	1.67	0.21	459.77	459.69	0.09	0.94
P-268	J-217	J-161	Ductile Iron	90	94.18	110	Open	1.12	0.22	459.69	459.57	0.13	1.34
P-269	J-209	J-183	Ductile Iron	90	119.08	110	Open	1.40	0.22	460.43	460.28	0.15	1.29
P-270	J-133	J-116	Ductile Iron	100	101.80	110	Open	-1.23	0.16	460.28	460.34	0.05	0.54
P-271	J-210	J-215	Ductile Iron	100	150.50	110	Open	1.32	0.17	462.88	462.76	0.12	0.8*
P-272	J-215	J-222	Ductile Iron	100	48.16	110	Open	4.84	0.32	462.76	462.44	0.33	6.77
P-274	J-214	J-207	Ductile Iron	150	541.32	110	Open	-15.75	0.89	464.16	466.68	4.52	8.36
P 275	J-172	J-210	Ductile Iron	150	90.19	110	Open	-18.12	1.03	462.55	462.88	0.33	10.83
P-276	J-210	J-214	Ductile Iron	150	101.19	110	Open	-19.72	1.12	462.88	464.16	1.28	12.68
P-277	J-148	J-219	Ductile Iron	100	55.17	110	Open	1.00	0.14	460.08	460.05	0.02	0.43
P-278	J-219	J-218	Ductile Iron	100	63.09	110	Open	0.25	0.03	460.05	460.05	0.00	0.03
P-281	J-139	J-114	Ductile Iron	150	155.14	110	Open	-6.14	0.35	469.09	469.92	0.23	1.46
P-282	J-114	J-133	Ductile Iron	150	333.45	110	Open	-12.91	0.73	469.92	471.85	1.93	5.78
P-283	J-150	J-208	Ductile Iron	100	44.81	110	Open	3.77	0.48	460.62	460.43	0.19	4.26
P-284	J-208	J-151	Ductile Iron	100	57.91	110	Open	2.39	0.30	460.43	460.32	0.11	1.93
P-285	J-118	J-196	Ductile Iron	100	150.88	110	Open	2.52	0.32	461.25	460.94	0.31	2.02
P-287	J-221	J-202	Ductile Iron	100	56.39	110	Open	-1.91	0.24	460.65	460.71	0.07	1.21

Radisani Higher Zone Network Calculation

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Contro Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grace (+m)	Headloss (m)	Headloss Gradient (m/km)
P-289	R-1	J-133	Ductile Iron	150	26.21	110	Open	12.91	0.73	472.00	471.85	0.15	5.78
P-291	J-119	J-328	Ductile Iron	100	122.50	110	Open	-0.56	0.07	460.85	460.87	0.02	0.12
P-292	J-378	J-379	Ductile Iron	100	106.38	110	Open	-0.84	0.11	460.87	460.90	0.03	0.26
P-293	J-329	J-196	Ductile Iron	100	105.46	110	Open	-1.12	0.14	460.90	460.94	0.05	0.45
P-294	J-202	J-146	Ductile Iron	80	167.64	110	Open	0.52	0.11	460.71	460.65	0.06	0.33
P-295	J-146	J-145	Ductile Iron	100	72.24	110	Open	2.84	0.36	460.66	460.48	0.18	2.53
P-296	R-1	PMP-1	Ductile Iron	150	57.63	110	Open	16.45	0.93	480.00	399.48	0.52	9.10
P-297	PMP-1	J-270	Ductile Iron	150	64.92	110	Open	16.45	0.93	470.17	469.57	0.59	9.10
P-298	J-180	J-174	Ductile Iron	100	58.80	110	Open	2.65	0.34	460.73	460.60	0.13	2.19
P-299	J-169	J-124	Ductile Iron	100	78.64	110	Open	5.20	0.66	464.98	464.37	0.61	7.79
P-300	J-202	J-323	Ductile Iron	100	186.20	110	Open	-2.72	0.35	460.71	461.15	0.40	2.32
P-301	J-323	J-123	Ductile Iron	100	256.00	110	Open	-2.32	0.30	461.15	461.59	0.44	1.73
P-302	J-217	J-323	Ductile Iron	100	23.17	110	Open	3.27	0.42	461.22	461.15	0.08	3.27
P-303	J-323	J-145	Ductile Iron	100	279.21	110	Open	2.56	0.33	461.15	460.66	0.49	2.13

Goce Delcev Network Model



Goce Delcev Network Calculation

Junction Report

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
Inlet	230	0,28	249,6	19,56
J1	230	0,28	249,58	19,54
J11	230	0,28	248,21	18,20
J1101	230	0,28	248,22	18,19
J12	230	0,28	248,22	18,18
J1201	230	0,28	248,20	18,16
J1202	230	0,28	248,19	18,15
J13	230	0,28	248,25	18,22
J1301	230	0,28	248,17	18,13
J1302	230	0,28	248,16	18,13
J14	230	0,28	249,45	18,41
J1401	230	0,28	248,50	18,47
J1402	230	0,28	248,48	18,44
J1403	230	0,28	248,48	18,44
J1404	230	0,28	248,48	18,44
J1405	230	0,28	248,48	18,45
J15	230	0,28	248,16	18,13
J1501	230	0,28	248,15	18,12
J1502	230	0,28	248,14	18,10
J1503	230	0,28	248,13	18,10
J1504	230	0,28	248,13	18,10
J1505	230	0,28	248,13	18,10
J1506	230	0,28	248,14	18,10
J16	230	0,28	248,16	18,13
J1601	230	0,28	248,16	18,12
J17	230	0,28	248,14	18,10
J1701	230	0,28	248,14	18,10
J18	230	0,28	248,14	18,10
J1801	230	0,28	248,10	18,07
J1802	230	0,28	248,10	18,06
J1803	230	0,28	248,10	18,06
J1804	230	0,28	248,10	18,07
J1805	230	0,28	248,12	18,08
J1806	230	0,28	248,16	18,12
J1806A	230	0,28	248,15	18,12
J19	230	0,28	248,21	18,17
J1901	230	0,28	248,14	18,11
J1902	230	0,28	248,15	18,12

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J2	230	0,28	249,52	19,48
J20	230	0,28	248,28	18,22
J2001	230	0,28	248,21	18,17
J201	230	0,28	249,49	19,45
J202	230	0,28	249,48	19,42
J203	230	0,28	249,44	19,41
J21	230	0,28	248,37	18,29
J213	230	0,28	248,29	18,25
J22	230	0,28	248,46	18,42
J2201	230	0,28	248,26	18,23
J2202	230	0,28	248,25	18,21
J2203	230	0,28	248,24	18,20
J2203A	230	0,28	248,24	18,20
J2204	230	0,28	248,24	18,20
J23	230	0,28	248,26	18,23
J2301	230	0,28	248,24	18,21
J24	230	0,28	248,31	18,27
J2401	230	0,28	248,49	19,46
J2402	230	0,28	248,27	18,24
J3	230	0,28	249,44	19,41
J301	230	0,28	249,47	19,37
J302	230	0,28	249,39	19,35
J303	230	0,28	249,39	19,35
J304	230	0,28	249,39	19,35
J305	230	0,28	249,40	19,36
J306	230	0,28	249,43	19,39
J307	230	0,28	249,52	19,48
J4	230	0,28	249,14	19,11
J5	230	0,28	248,79	18,75
J6	230	0,28	248,52	18,56
J7	230	0,28	248,58	18,52
J8	230	0,28	248,52	18,48
J801	230	0,28	248,51	18,47
J802	230	0,28	248,42	18,38
J9	230	0,28	248,39	18,35

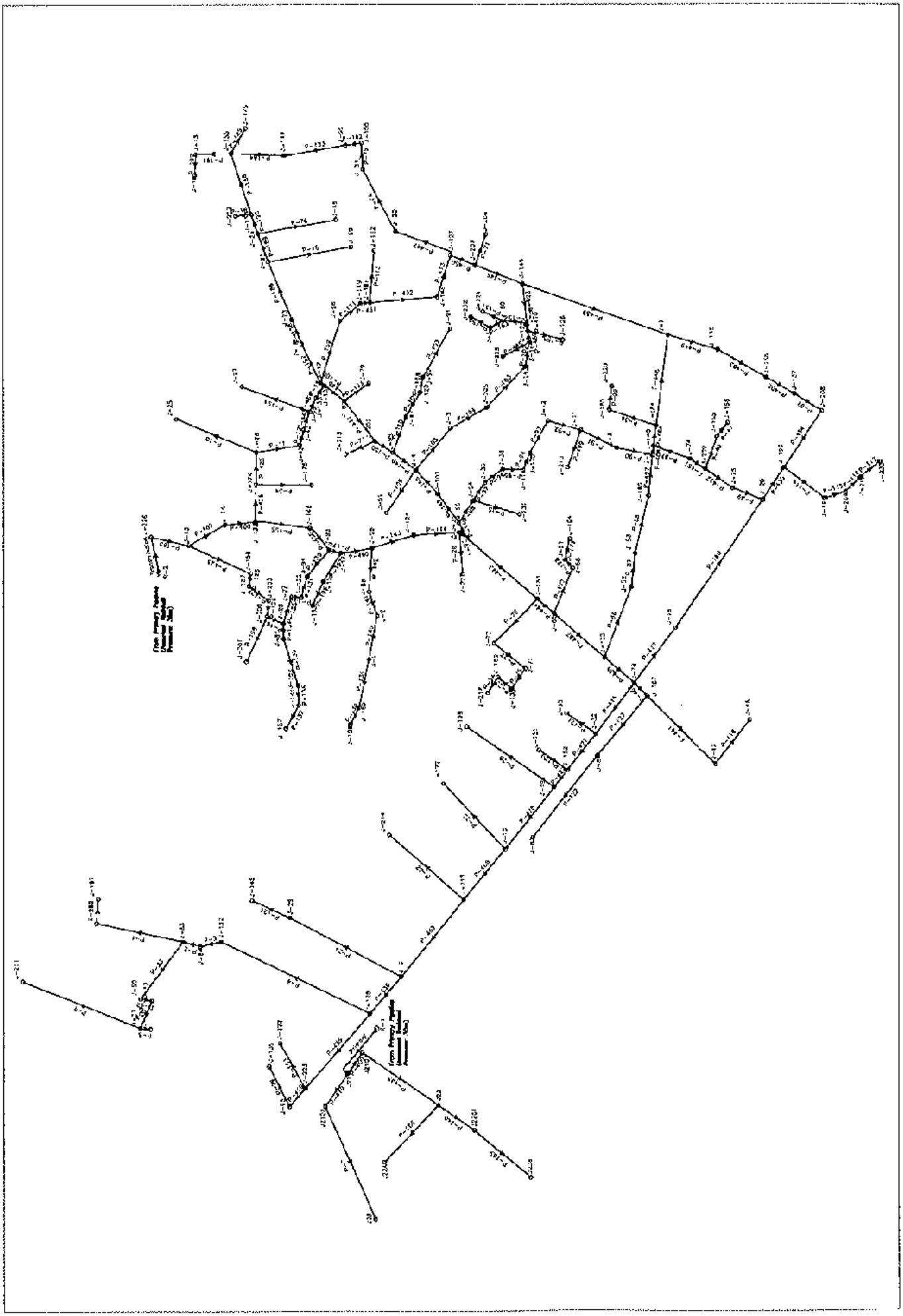
Pipe Report

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-20	J9	J8	PE	90	200,66	110	Open	-0,76	0,15	248,39	248,52	0,13	0,64
P-22	J802	J801	PE	90	123,44	110	Open	-0,79	0,16	248,42	248,51	0,09	0,76
P-25	J1401	J5	PE	90	130,15	110	Open	-1,46	0,29	248,50	248,79	0,29	2,19
P-26	J2401	J24	PE	130	88,70	110	Open	-3,43	0,44	248,49	248,31	0,32	3,57
P-30	J20	J2001	PE	90	138,59	110	Open	0,55	0,11	248,26	248,21	0,05	0,38
P-31	J2001	J19	PE	90	30,70	110	Open	0,28	0,05	248,21	248,21	0,00	0,10
P-32	J21	J19	PE	130	145,69	110	Open	1,53	0,19	248,32	248,21	0,12	0,80
P-33	J19	J1902	PE	130	64,62	110	Open	1,53	0,19	248,21	248,15	0,05	0,80
P-34	J1902	J1901	PE	130	18,29	110	Open	1,25	0,16	248,15	248,14	0,01	0,55
P-36	J1701	J17	PE	130	14,07	110	Open	-0,22	0,03	248,14	248,14	0,00	0,02
P-37	J2401	J2402	PE	130	112,47	110	Open	2,46	0,31	248,49	248,27	0,22	1,94
P-40	J15	J1501	PE	90	94,79	110	Open	0,14	0,03	248,16	248,16	0,00	0,00
P-41	J1601	J16	PE	90	67,40	110	Open	-0,14	0,03	248,16	248,16	0,00	0,00
P-43	J13	J1301	PE	90	219,15	110	Open	0,56	0,11	248,25	248,17	0,09	0,39
P-44	J1301	J1302	PE	90	65,23	110	Open	0,30	0,06	248,17	248,16	0,01	0,12
P-46	J1101	J11	PE	90	24,68	110	Open	-0,74	0,15	248,22	248,21	0,01	0,62
P-47	J201	J202	PE	90	62,46	110	Open	0,61	0,12	249,49	249,46	0,03	0,54
P-48	J2C2	J203	PE	90	118,57	110	Open	0,33	0,07	249,46	249,44	0,02	0,14
P-49	J2C3	J3	PE	90	43,28	110	Open	0,05	0,01	249,44	249,44	0,00	0,01
P-50	J8	J7	PE	90	89,61	110	Open	-0,89	0,18	248,44	248,52	0,08	0,87
P-52	J307	J306	PE	200	232,87	110	Open	1,00	0,13	249,52	249,43	0,08	0,36
P-53	J22	J2201	PE	90	263,61	110	Open	0,54	0,10	248,26	248,26	0,00	0,06
P-55	J2201	J2202	PE	90	31,09	110	Open	0,66	0,13	248,26	248,25	0,02	0,60
P-56	J2202	J2203	PE	90	43,69	110	Open	0,38	0,08	248,25	248,24	0,01	0,10
P-57	J23	J2204	PE	90	97,05	110	Open	0,45	0,09	248,26	248,24	0,02	0,25
P-58	J1401	J1402	PE	90	107,50	110	Open	0,42	0,08	248,50	248,48	0,02	0,22
P-59	J1402	J1403	PE	90	11,50	110	Open	0,16	0,03	248,48	248,48	0,00	0,03
P-60	J1403	J1404	PE	90	10,72	110	Open	-0,13	0,03	248,48	248,48	0,00	0,03
P-63	J1404	J1405	PE	90	14,33	110	Open	-0,41	0,08	248,48	248,48	0,00	0,27
P-64	J1405	J2401	PE	90	17,37	110	Open	-0,69	0,14	248,48	248,49	0,01	0,54
P-65	J16	J1601	PE	90	76,81	110	Open	0,53	0,10	248,16	248,16	0,01	0,46
P-67	J3	J301	PE	90	69,40	110	Open	0,67	0,13	249,44	249,41	0,04	0,52
P-68	J1E06	J1805	PE	90	59,44	110	Open	0,76	0,15	248,16	248,12	0,04	0,64
P-69	J1E05	J1804	PE	90	61,87	110	Open	0,48	0,10	248,12	248,10	0,02	0,28
P-70	J1E04	J1803	PE	90	66,45	110	Open	0,20	0,04	248,10	248,10	0,00	0,05
P-71	J1E03	J1802	PE	90	36,94	110	Open	-0,00	0,00	248,10	248,10	0,00	0,01
P-72	J1C02	J1801	PE	90	24,08	110	Open	-0,36	0,07	248,10	248,10	0,00	0,16
P-73	J1E01	J1502	PE	100	67,97	110	Open	0,70	0,09	248,15	248,14	0,01	0,19

Goce Delcev Network Calculation

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-74	J1502	J1503	PE	100	66.69	110	Open	0.43	0.05	249.14	249.13	0.00	0.08
P-75	J1503	J1504	PE	100	81.95	110	Open	0.15	0.02	249.13	249.13	0.00	0.01
P-76	J1504	J1505	PE	100	38.10	110	Open	-0.13	0.02	249.13	249.13	0.00	0.01
P-77	J1505	J1506	PE	100	53.34	110	Open	-0.41	0.05	249.13	249.13	0.00	0.07
P-79	J1201	J1202	PE	63	17.90	110	Open	0.67	0.13	249.20	249.19	0.01	0.51
P-80	J14	J6	PE	63	126.49	110	Open	-1.13	0.23	249.45	249.62	0.17	1.37
P-81	J301	J302	PE	63	105.16	110	Open	0.39	0.08	249.41	249.39	0.02	0.19
P-82	J102	J303	PE	63	64.92	110	Open	0.11	0.02	249.39	249.39	0.00	0.02
P-83	J303	J304	PE	63	36.87	110	Open	-0.16	0.03	249.39	249.39	0.00	0.03
P-84	J304	J305	PE	63	40.77	110	Open	-0.44	0.09	249.39	249.40	0.01	0.24
P-85	J305	J306	PE	63	51.21	110	Open	-0.72	0.14	249.40	249.43	0.03	0.59
P-154	J2303	317	PE	100	205.74	110	Open	1.18	0.15	248.24	248.14	0.10	0.50
P-155	J17	J1506	PE	100	9.45	110	Open	0.85	0.09	248.14	248.11	0.00	0.18
P-156	J201	J6	PE	100	157.86	110	Open	-0.85	0.11	249.45	249.57	0.13	0.82
P-159	J15	J1501	PE	100	39.01	110	Open	0.98	0.13	248.16	248.15	0.01	0.26
P-160	J12G1	J12	PE	80	24.65	110	Open	-0.95	0.19	248.20	248.22	0.02	0.93
P-161	J12	J1101	PE	80	19.51	110	Open	-0.46	0.09	248.22	248.22	0.01	0.28
P-163	J07	J6	PE	125	97.85	110	Open	-4.09	0.33	248.66	248.62	0.05	1.23
P-165	J802	J6	PE	80	152.89	110	Open	0.51	0.10	248.42	248.39	0.03	0.23
P-167	J12	J13	PE	80	74.37	110	Open	-0.76	0.15	248.22	248.25	0.04	0.44
P-172	J11	J15	PE	100	113.35	110	Open	1.40	0.18	248.24	248.16	0.08	0.68
P-174	J21	J20	PE	80	19.51	110	Open	2.14	0.43	248.32	248.25	0.08	3.28
P-175	J1501	J6	PE	125	116.07	110	Open	-1.07	0.09	248.61	248.62	0.01	0.10
P-176	J8	J7	PE	125	111.25	110	Open	-2.10	0.17	248.62	248.58	0.04	0.33
P-179	J19G1	J18	PE	100	16.90	110	Open	0.97	0.12	248.14	248.14	0.01	0.35
P-180	J18	J1701	PE	100	100.63	110	Open	0.06	0.01	248.14	248.14	0.00	0.00
P-181	J20	J1806	PE	80	78.33	110	Open	1.31	0.26	248.25	248.15	0.10	1.31
P-182	J18G6	J1806A	PE	80	26.52	110	Open	0.26	0.05	248.15	248.15	0.00	0.10
P-183	J6	J5	PE	125	79.86	110	Open	-5.50	0.45	248.62	248.79	0.17	2.12
P-185	J13G2	J15	PE	80	47.85	110	Open	0.02	0.00	248.16	248.15	0.00	0.00
P-186	J16	J1202	PE	80	128.02	110	Open	-0.39	0.08	248.16	248.19	0.02	0.13
P-187	J2	J1	PE	200	39.62	110	Open	-2.06	0.26	249.52	249.58	0.06	1.39
P-188	J1	J207	PE	200	136.58	110	Open	1.27	0.16	249.58	249.52	0.06	0.57
P-189	J5	J4	PE	125	74.07	110	Open	-7.24	0.59	249.79	249.14	0.36	4.91
P-190	J4	J24	PE	125	47.85	110	Open	8.87	0.72	249.14	248.81	0.34	7.02
P-191	J1	Inlet	PE	200	3.32	110	Open	-3.61	0.46	249.58	249.00	0.02	2.09
P-192	Inlet	J2	PE	200	1.07	110	Open	16.39	2.09	249.00	249.14	0.45	64.82
P-193	R	Inlet	PE	250	357.80	110	Open	20.28	0.41	250.00	249.60	0.40	1.11
P-194	J23G4	J2303	PE	80	18.00	110	Open	0.17	0.03	248.24	248.24	0.00	0.04
P-195	J23G3	J2303A	PE	80	22.86	110	Open	0.28	0.06	248.24	248.24	0.00	0.10
P-196	J24G2	J23	PE	160	7.02	110	Open	2.10	0.29	248.27	248.26	0.01	1.55
P-197	J23	J2301	PE	160	28.05	110	Open	1.36	0.19	248.26	248.24	0.02	0.73
P-198	J24	J22	PE	125	135.64	110	Open	5.17	0.42	248.81	248.46	0.35	2.50
P-199	J22	J21	PE	125	96.56	110	Open	3.90	0.32	248.46	248.32	0.14	1.57
P-200	J14G1	J14	PE	80	89.00	110	Open	0.78	0.15	248.50	248.45	0.05	0.65
P-201	J14	J13	PE	80	72.24	110	Open	1.62	0.32	248.45	248.25	0.19	2.64
P200	J9	J213	PE	80	129.54	110	Open	0.99	0.20	248.39	248.29	0.10	0.78
P201	J213	J11	PE	100	26.27	110	Open	2.42	0.31	248.29	248.24	0.05	1.39
P202	J7	J210	PE	100	275.84	110	Open	1.71	0.22	248.58	248.29	0.27	0.90

Jurumleri Network Model



Junction Report

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-1	230	0.19	252.65	22.62
J-2	230	0.19	252.69	22.64
J-3	230	0.19	252.04	21.97
J-4	230	0.19	252.15	22.11
J-5	230	0.19	251.93	21.89
J-6	230	0.19	251.94	21.89
J-7	230	0.19	251.91	21.87
J-9	230	0.19	250.81	20.76
J-10	230	0.19	251.20	21.16
J-11	230	0.19	251.95	21.91
J-12	230	0.19	251.98	21.94
J-13	230	0.19	254.09	24.04
J-14	230	0.19	253.66	23.62
J-15	230	0.19	251.84	21.80
J-16	230	0.19	251.84	21.80
J-17	230	0.19	252.16	22.12
J-18	230	0.19	252.06	22.02
J-19	230	0.19	251.97	21.93
J-20	230	0.19	251.87	21.82
J21	230	0.19	255.00	24.95
J-21	230	0.19	252.44	22.39
J22	230	0.19	254.67	24.62
J-22	230	0.19	252.40	22.36
J22A	230	0.19	254.86	24.81
J22B	230	0.19	254.85	24.80
J23	230	0.19	254.98	24.93
J-23	230	0.19	251.91	21.87
J-24	230	0.19	251.88	21.84
J-25	230	0.19	252.84	22.80
J-26	230	0.19	252.85	22.80
J-27	230	0.19	252.90	22.84
J-28	230	0.19	253.01	22.96
J-29	230	0.19	250.77	20.73
J-30	230	0.19	251.69	21.65
J-31	230	0.19	251.86	21.82
J-32	230	0.19	251.73	21.69
J-33	230	0.19	251.71	21.68
J-36	230	0.19	250.33	20.29
J-37	230	0.19	250.34	20.30
J-38	230	0.19	252.00	22.03
J-39	230	0.19	252.12	22.08
J-42	230	0.19	252.56	22.52
J-43	230	0.19	252.46	22.31
J-45	230	0.19	251.99	21.95
J-47	230	0.19	252.00	21.85
J-48	230	0.19	251.97	21.83
J-49	230	0.19	250.34	20.30
J-50	230	0.19	250.35	20.31
J-51	230	0.19	252.15	22.10
J-52	230	0.19	252.02	21.97
J-53	230	0.19	251.90	21.85
J-54	230	0.19	252.17	22.13
J-55	230	0.19	252.25	22.21
J-56	230	0.19	252.71	22.67
J-59	230	0.19	251.87	21.82
J-60	230	0.19	251.82	21.78
J-63	230	0.19	250.38	20.24
J-64	230	0.19	250.40	20.26
J-65	230	0.19	252.18	22.14
J-66	230	0.19	252.15	22.11
J-69	230	0.19	251.90	21.86
J-71	230	0.19	252.09	22.04
J-72	230	0.19	252.12	22.06
J-73	230	0.19	252.01	21.97
J-74	230	0.19	251.89	21.84
J-75	230	0.19	251.87	21.82
J-78	230	0.19	252.05	22.01
J-79	230	0.19	252.15	22.10
J-80	230	0.19	252.17	22.13
J-81	230	0.19	252.09	22.05
J-82	230	0.19	252.15	22.10
J-83	230	0.19	252.09	21.95
J-84	230	0.19	252.09	21.96
J-87	230	0.19	252.11	22.07
J-88	230	0.19	252.15	22.11
J-89	230	0.19	251.86	21.80
J-90	230	0.19	252.78	22.75
J-91	230	0.19	252.09	22.04
J-92	230	0.19	252.09	22.05
J-93	230	0.19	252.97	22.93
J-94	230	0.19	252.97	22.93
J-95	230	0.19	250.63	20.59
J-96	230	0.19	252.34	22.30

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-97	230	0.19	252.34	22.29
J-98	230	0.19	252.07	22.03
J-99	230	0.19	251.85	21.81
J-100	230	0.19	251.86	21.81
J-101	230	0.19	252.19	22.15
J-103	230	0.19	252.96	22.92
J-104	230	0.19	252.15	22.10
J-107	230	0.19	252.02	21.98
J-115	230	0.19	251.88	21.84
J-116	230	0.19	252.04	22.00
J-119	230	0.19	252.04	22.00
J-120	230	0.19	252.10	22.05
J-122	230	0.19	252.98	22.93
J-123	230	0.19	252.08	22.04
J-124	230	0.19	252.61	22.57
J-125	230	0.19	251.84	21.80
J-126	230	0.19	251.84	21.80
J-127	230	0.19	251.93	21.89
J-128	230	0.19	250.73	20.69
J-130	230	0.19	251.87	21.82
J-131	230	0.19	252.17	22.12
J-132	230	0.19	250.43	20.39
J-133	230	0.19	253.36	23.32
J-135	230	0.19	252.26	22.21
J-136	230	0.19	252.18	22.13
J-137	230	0.19	251.86	21.82
J-138	230	0.19	252.07	22.03
J-139	230	0.19	250.62	20.58
J-140	230	0.19	251.92	21.88
J-141	230	0.19	252.96	22.91
J-145	230	0.19	250.77	20.73
J-146	230	0.19	253.11	23.06
J-147	230	0.19	251.85	21.81
J-148	230	0.19	251.97	21.92
J-149	230	0.19	251.91	21.87
J-151	230	0.19	251.53	21.49
J-152	230	0.19	251.53	21.49
J-153	230	0.19	252.91	22.86
J-154	230	0.19	252.91	22.86
J-155	230	0.19	251.85	21.81
J-157	230	0.19	252.96	22.91
J-158	230	0.19	253.45	23.40
J-161	230	0.19	252.03	21.98
J-162	230	0.19	252.03	21.98
J-164	230	0.19	251.85	21.80
J-165	230	0.19	251.87	21.82
J-166	230	0.19	251.87	21.82
J-168	230	0.19	251.87	21.82
J-170	230	0.19	252.02	21.98
J-172	230	0.19	251.19	21.15
J-173	230	0.19	252.92	22.87
J-174	230	0.19	253.08	23.03
J-175	230	0.19	253.08	23.03
J-176	230	0.19	251.85	21.81
J-182	230	0.19	252.07	22.02
J-183	230	0.19	252.92	22.87
J-184	230	0.19	251.92	21.87
J-185	230	0.19	251.90	21.86
J-186	230	0.19	251.95	21.91
J-187	230	0.19	250.35	20.30
J-188	230	0.19	252.65	22.60
J-189	230	0.19	252.65	22.60
J-190	230	0.19	251.86	21.81
J-191	230	0.19	251.80	21.76
J-193	230	0.19	251.87	21.82
J-196	230	0.19	250.36	20.32
J-197	230	0.19	250.36	20.31
J-198	230	0.19	251.41	21.40
J-199	230	0.19	251.46	21.41
J-200	230	0.19	253.03	23.03
J-201	230	0.19	253.03	23.03
J-202	230	0.19	252.15	22.12
J-203	230	0.19	253.47	23.43
J-204	230	0.19	251.79	21.76
J-205	230	0.19	251.91	21.89
J-206	230	0.19	251.90	21.85
J-207	230	0.19	251.92	21.88
J-208	230	0.19	251.85	21.81
J-209	230	0.19	251.83	21.83
J-210	230	0.19	251.90	21.91
J2101	230	0.19	254.95	24.91
J2102	230	0.19	254.94	24.94
J-211	230	0.19	250.33	20.29

Jurumleri Network Calculation

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-212	230	0.19	251.86	21.81
J-213	230	0.19	251.02	20.99
J-214	230	0.19	251.02	20.98
J-217	230	0.19	252.07	22.02
J-218	230	0.19	252.14	22.09
J-219	230	0.19	251.70	21.74
J-220	230	0.19	251.90	21.86
J220!	230	0.19	254.86	24.81
J-221	230	0.19	251.82	21.78
J-222	230	0.19	250.63	20.59
J 223	230	0.19	250.69	20.59
J-226	230	0.19	254.56	24.51
J-227	230	0.19	252.41	22.36
J-228	230	0.19	251.84	21.80
J-227	230	0.19	251.82	21.77
J-230	230	0.19	251.78	21.74

Pipe Report

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-1	J-196	J-65	PE	89	139.90	110	Open	-0.37	0.07	250.36	250.33	0.02	0.17
P-2	J-63	J-64	PE	109	28.35	110	Open	-0.48	0.10	250.38	250.40	0.02	0.75
P-3	J-161	J-157	PE	109	33.53	110	Open	-0.67	0.21	250.46	250.43	0.03	0.94
P-4	J-132	J-128	PE	109	259.38	110	Open	-0.85	0.24	250.43	250.73	0.30	1.14
P-7	J2102	J23	PE	89	194.72	110	Open	0.19	0.04	254.95	254.93	0.01	0.05
P-8	J-35	J-37	PE	89	15.86	110	Open	-0.19	0.03	250.33	250.33	0.01	0.47
P-9	J-37	J-211	PE	89	199.03	110	Open	0.19	0.04	250.34	250.33	0.01	0.05
P-10	J-25	J-26	PE	89	135.33	110	Open	-0.19	0.04	252.84	252.85	0.01	0.05
P-11	J-26	J-42	PE	149	69.49	110	Open	8.02	0.59	252.85	252.57	0.29	4.17
P-12	J-42	J-43	PE	149	25.60	110	Open	8.04	0.57	252.56	252.45	0.10	4.01
P-15	J-135	J-136	PE	149	23.76	110	Open	8.05	0.58	252.70	252.62	0.08	3.41
P-16	J-69	J-25	PE	89	132.28	110	Open	-0.19	0.04	251.90	251.91	0.01	0.05
P-21	J-29	J-9	PE	89	198.42	110	Open	-0.37	0.07	250.77	250.81	0.03	0.17
P-22	J-210	J-214	PE	89	199.05	110	Open	0.19	0.04	251.02	251.02	0.01	0.05
P-23	J-10	J-172	PE	89	192.04	110	Open	0.19	0.04	251.26	251.13	0.01	0.05
P-24	J-217	J-167	PE	89	28.96	110	Open	-0.19	0.04	252.07	252.07	0.00	0.05
P-25	J-132	J-158	PE	89	28.04	110	Open	-0.37	0.07	252.07	252.07	0.00	0.17
P-26	J-138	J-71	PE	89	36.01	110	Open	-0.56	0.11	252.07	252.04	0.03	0.85
P-27	J-71	J-72	PE	89	62.09	110	Open	-0.74	0.15	252.05	252.12	0.04	0.62
P-28	J-227	J-21	PE	89	66.41	110	Open	-0.19	0.03	252.41	252.44	0.03	0.47
P-29	J-139	J-159	PE	89	187.31	110	Open	-0.19	0.04	251.44	251.45	0.01	0.05
P-31	J-37	J-49	PE	109	46.30	110	Open	-0.56	0.07	250.34	250.34	0.01	0.12
P-32	J-49	J-50	PE	109	17.07	110	Open	-0.74	0.09	250.34	250.35	0.00	0.21
P-33	J-50	J-63	PE	109	111.56	110	Open	-0.93	0.12	250.35	250.39	0.04	0.32
P-34	J-174	J-175	PE	89	82.17	110	Open	0.19	0.04	253.08	253.08	0.00	0.04
P-35	J-131	J-54	PE	89	74.90	110	Open	-0.19	0.04	252.17	252.17	0.00	0.05
P-36	J-134	J-165	PE	89	72.72	110	Open	0.37	0.07	251.92	251.93	0.01	0.17
P-37	J-139	J-74	PE	109	61.57	110	Open	1.22	0.13	251.92	251.93	0.01	0.55
P-39	J-75	J-20	PE	109	57.42	110	Open	0.32	0.04	251.87	251.87	0.00	0.05
P-40	J-209	J-165	PE	89	54.56	110	Open	0.37	0.07	251.86	251.87	0.01	0.17
P-41	J-136	J-166	PE	89	22.43	110	Open	0.19	0.04	251.87	251.87	0.00	0.05
P-71	J-206	J-207	PE	50	50.90	110	Open	-0.19	0.09	251.90	251.92	0.02	0.47
P-74	J-33	J-31	PE	109	105.73	110	Open	0.65	0.11	251.80	251.86	0.03	0.26
P-75	J-31	J-100	PE	109	40.23	110	Open	0.65	0.09	251.86	251.89	0.01	0.16
P-76	J-43	J-24	PE	89	194.36	110	Open	-0.19	0.04	251.87	251.88	0.01	0.05
P-77	J-218	J-202	PE	50	50.90	110	Open	-0.19	0.09	252.14	252.16	0.02	0.47
P-78	J-133	J-72	PE	89	97.64	110	Open	0.93	0.18	252.12	252.12	0.00	0.04
P-79	J-139	J-95	PE	89	69.80	110	Open	-0.19	0.04	250.62	250.63	0.00	0.05
P-82	J-137	J-205	PE	109	50.90	110	Open	0.30	0.05	251.86	251.86	0.00	0.06
P-86	J-123	J-52	PE	140	118.87	110	Open	2.98	0.19	252.06	252.02	0.05	0.54
P-87	J-52	J-53	PE	140	53.34	110	Open	2.79	0.18	252.02	251.99	0.03	0.48
P-89	J-53	J-186	PE	140	93.57	110	Open	2.61	0.17	251.99	251.95	0.04	0.47
P-90	J-5	J-6	PE	109	57.61	110	Open	-0.64	0.08	251.93	251.94	0.01	0.16
P-91	J-6	J-11	PE	109	52.46	110	Open	-0.82	0.10	251.94	251.96	0.02	0.35
P-92	J-11	J-12	PE	109	56.86	110	Open	-1.19	0.15	251.96	251.98	0.02	0.51
P-93	J-12	J-110	PE	109	58.72	110	Open	-1.38	0.16	251.98	252.02	0.04	0.66
P-94	J-170	J-116	PE	109	28.35	110	Open	-1.56	0.20	252.02	252.06	0.03	0.84
P-95	J-116	J-38	PE	109	31.70	110	Open	-1.75	0.22	252.04	252.08	0.03	1.03
P-96	J-38	J-39	PE	109	34.75	110	Open	-1.90	0.25	252.08	252.12	0.04	1.24
P-97	J-39	J-54	PE	109	33.80	110	Open	-2.12	0.27	252.12	252.17	0.05	1.47
P-98	J-54	J-55	PE	109	47.76	110	Open	-2.49	0.32	252.17	252.25	0.08	1.98
P-99	J-185	J-220	PE	89	37.19	110	Open	0.19	0.04	251.90	251.90	0.00	0.05
P-102	J-164	J-193	PE	89	38.10	110	Open	-0.37	0.13	251.85	251.87	0.02	0.52
P-103	J-190	J-205	PE	89	30.39	110	Open	-0.35	0.17	251.87	251.94	0.07	0.91
P-104	J-205	J-9	PE	89	56.45	110	Open	-1.04	0.21	251.94	252.01	0.08	1.16
P-105	J-9	J-5	PE	89	98.26	110	Open	-1.23	0.24	252.01	252.15	0.14	1.38
P-106	J-4	J-51	PE	89	31.38	110	Open	0.19	0.04	252.15	252.15	0.00	0.05
P-107	J-91	J-92	PE	89	86.87	110	Open	-0.19	0.04	252.09	252.09	0.00	0.05
P-108	J-92	J-120	PE	89	24.08	110	Open	-0.37	0.07	252.09	252.10	0.00	0.17
P-109	J-120	J-47	PE	89	44.20	110	Open	-0.56	0.11	252.10	252.11	0.02	0.36
P-110	J-97	J-98	PE	89	60.35	110	Open	-0.74	0.15	252.11	252.15	0.04	0.62

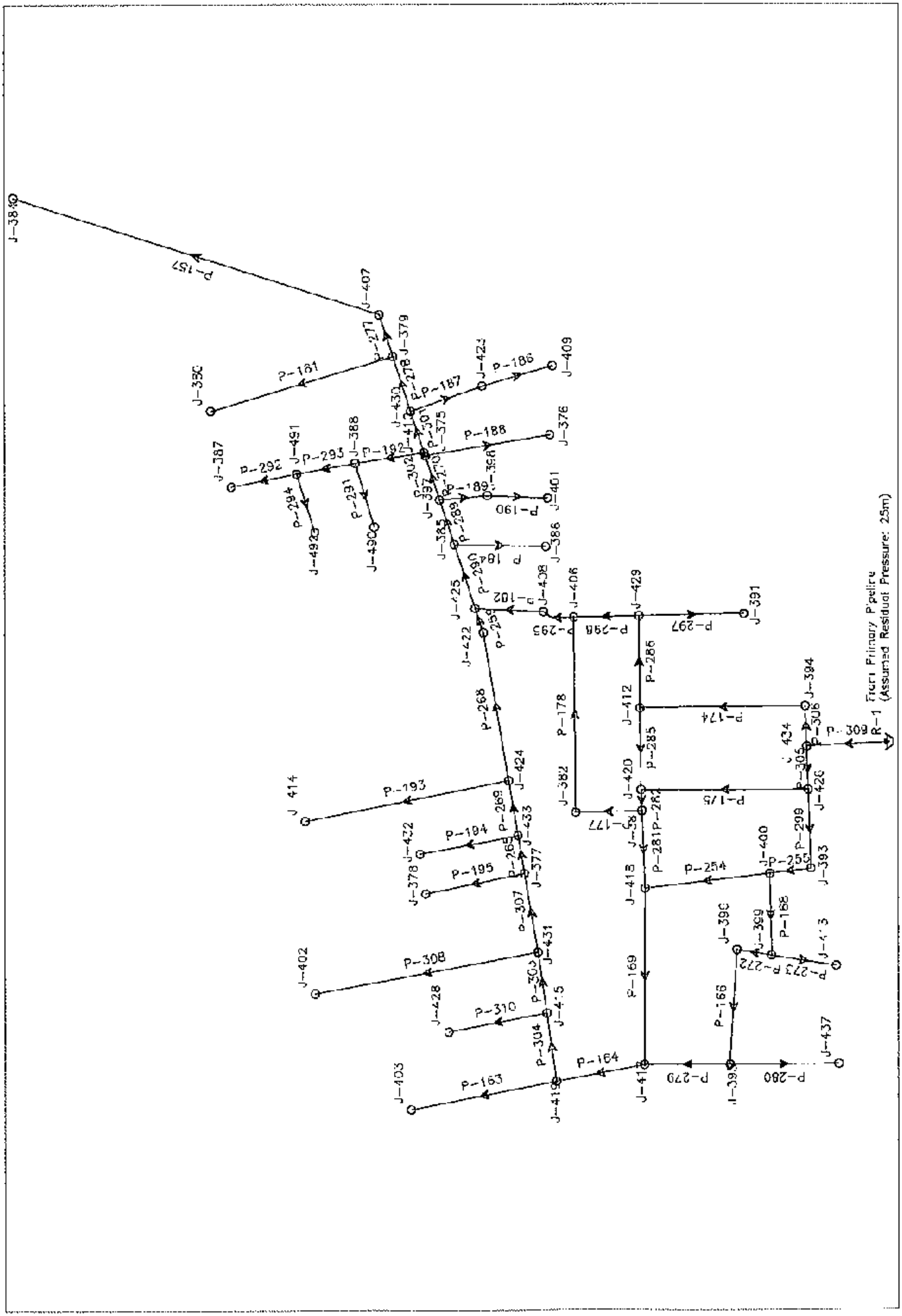
Jurumleri Network Calculation

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-112	J-98	J-119	PE	140	32,90	110	Open	0.74	0.24	252.07	252.04	0.00	0.80
P-113	J-161	J-162	PE	80	31.16	110	Open	0.19	0.04	252.03	252.03	0.00	0.05
P-114	J-190	J-191	PE	80	31.66	110	Open	0.74	0.15	251.86	251.89	0.05	0.62
P-115	J-191	J-204	PE	80	32.52	110	Open	0.56	0.11	251.80	251.79	0.01	0.38
P-116	J-204	J-219	PE	80	32.52	110	Open	0.37	0.07	251.79	251.79	0.01	0.17
P-117	J-219	J-235	PE	80	35.32	110	Open	0.19	0.04	251.79	251.78	0.00	0.05
P-118	J-46	J-47	PE	80	36.70	110	Open	-0.19	0.04	251.99	252.00	0.00	0.05
P-120	J-151	J-155	PE	80	52.17	110	Open	-0.19	0.04	251.53	251.53	0.00	0.05
P-121	J-32	J-33	PE	50	56.35	110	Open	0.19	0.09	251.73	251.71	0.03	0.47
P-122	J-83	J-84	PE	80	468.98	110	Open	0.19	0.04	252.00	252.00	0.01	0.05
P-123	J-84	J-107	PE	80	122.22	110	Open	-0.37	0.07	252.00	252.02	0.02	0.17
P-124	J-29	J-145	PE	80	64.92	110	Open	0.19	0.04	250.77	250.77	0.00	0.05
P-125	J-151	J-156	PE	80	196.07	110	Open	2.53	0.50	254.69	253.45	0.64	3.02
P-126	J-153	J-187	PE	80	20.12	110	Open	2.34	0.47	253.45	253.35	0.11	5.24
P-127	J-187	J-205	PE	80	36.40	110	Open	2.16	0.43	253.35	253.17	0.17	4.50
P-128	J-203	J-200	PE	80	24.65	110	Open	1.97	0.39	253.17	253.08	0.09	3.81
P-130	J-93	J-94	PE	80	54.25	110	Open	-0.12	0.02	252.97	252.97	0.00	0.02
P-131	J-94	J-122	PE	80	34.30	110	Open	-0.31	0.06	252.97	252.98	0.00	0.12
P-132	J-122	J-27	PE	80	15.54	110	Open	-0.49	0.10	252.98	252.98	0.00	0.25
P-133	J-27	J-28	PE	80	44.50	110	Open	-0.68	0.13	252.98	253.01	0.02	0.52
P-134	J-28	J-91	PE	80	24.00	110	Open	0.74	0.15	253.01	252.99	0.01	0.62
P-135	J-91	J-103	PE	80	72.11	110	Open	0.56	0.11	252.99	252.96	0.03	0.38
P-136	J-103	J-141	PE	80	31.09	110	Open	0.37	0.07	252.96	252.96	0.01	0.17
P-137	J-141	J-157	PE	80	42.06	110	Open	0.19	0.04	252.90	252.96	0.00	0.05
P-138	J-189	J-185	PE	80	36.48	110	Open	-0.19	0.04	252.65	252.65	0.00	0.05
P-139	J-183	J-1	PE	80	77.72	110	Open	-0.37	0.07	252.65	252.66	0.01	0.17
P-140	J-1	J-2	PE	80	76.70	110	Open	-0.56	0.11	252.66	252.69	0.03	0.38
P-141	J-2	J-58	PE	80	46.54	110	Open	-0.74	0.15	252.69	252.71	0.03	0.62
P-142	J-58	J-90	PE	80	68.50	110	Open	-0.93	0.18	252.71	252.76	0.06	0.94
P-143	J-90	J-124	PE	200	68.80	110	Open	17.28	0.55	252.76	252.61	0.17	2.44
P-144	J-124	J-21	PE	200	72.54	110	Open	17.09	0.54	252.61	252.44	0.17	2.35
P-145	J-21	J-22	PE	200	14.49	110	Open	16.72	0.53	252.44	252.40	0.03	2.30
P-146	J-22	J-55	PE	100	26.52	110	Open	4.43	0.56	252.40	252.25	0.15	5.74
P-147	J-55	J-101	PE	100	66.39	110	Open	1.75	0.22	252.25	252.19	0.06	1.05
P-148	J-101	J-4	PE	100	51.82	110	Open	1.57	0.20	252.19	252.15	0.04	0.84
P-149	J-4	J-98	PE	100	44.81	110	Open	-0.03	0.00	252.15	252.15	0.00	0.00
P-150	J-98	J-202	PE	100	33.83	110	Open	-0.95	0.12	252.15	252.16	0.01	0.33
P-151	J-221	J-59	PE	80	34.44	110	Open	-0.19	0.04	251.82	251.82	0.00	0.05
P-152	J-232	J-59	PE	80	35.66	110	Open	-0.19	0.04	251.82	251.82	0.00	0.05
P-153	J-60	J-50	PE	80	22.25	110	Open	-0.37	0.07	251.82	251.82	0.00	0.17
P-154	J-60	J-39	PE	80	37.79	110	Open	-0.74	0.15	251.82	251.84	0.02	0.62
P-155	J-125	J-126	PE	80	57.30	110	Open	0.19	0.04	251.84	251.84	0.00	0.05
P-157	J-17	J-18	PE	100	67.97	110	Open	1.13	0.27	252.16	252.26	0.10	1.48
P-158	J-18	J-73	PE	100	40.84	110	Open	1.95	0.25	252.06	252.01	0.05	1.25
P-159	J-17	J-38	PE	140	101.80	110	Open	3.90	0.25	252.16	252.07	0.09	0.88
P-160	J-17	J-136	PE	140	7.01	110	Open	-6.21	0.40	252.16	252.18	0.01	2.05
P-163	J-222	J-233	PE	80	80.47	110	Open	0.19	0.04	250.53	250.53	0.00	0.05
P-165	J220I	J220	PC	80	114.60	110	Open	0.19	0.04	254.86	254.86	0.01	0.05
P-166	J220	J22	PE	80	122.53	110	Open	-0.19	0.04	254.86	254.87	0.01	0.05
P-168	J-226	J-13	PE	200	60.96	110	Open	32.04	1.02	254.56	254.09	0.47	7.67
P-169	J-13	J-14	PE	200	65.53	110	Open	29.12	0.93	254.09	253.66	0.43	6.51
P-174	J-99	J-173	PE	200	19.51	110	Open	18.94	0.60	252.97	252.92	0.05	2.90
P-177	J-65	J-66	PE	80	78.03	110	Open	0.56	0.11	252.18	252.15	0.03	0.38
P-178	J-60	J-32	PE	80	17.27	110	Open	0.37	0.07	252.15	252.15	0.00	0.17
P-179	J-82	J-104	PE	80	33.53	110	Open	0.19	0.04	252.15	252.15	0.00	0.05
P-180	J-19	J-20	PE	80	244.45	110	Open	0.61	0.12	251.97	251.97	0.11	0.43
P-182	J-99	J-180	PE	100	25.30	110	Open	-0.46	0.06	251.05	251.86	0.00	0.09
P-183	J-99	J-147	PE	100	97.54	110	Open	0.28	0.04	251.05	251.85	0.00	0.03
P-184	J-147	J-145	PE	100	83.21	110	Open	0.00	0.01	251.05	251.85	0.00	0.00
P-185	J-155	J-176	PE	80	44.01	110	Open	0.19	0.04	251.05	251.85	0.00	0.05
P-186	J-155	J-130	PE	100	99.36	110	Open	-0.65	0.08	251.05	251.37	0.02	0.16
P-187	J-130	J-212	PE	50	74.38	110	Open	0.19	0.09	251.07	251.36	0.01	0.07
P-188	J-73	J-23	PE	100	97.84	110	Open	1.16	0.27	252.01	251.91	0.10	1.04
P-189	J-23	J-24	PE	100	46.94	110	Open	1.39	0.18	251.91	251.88	0.03	0.67
P-190	J-24	J-130	PE	100	31.00	110	Open	1.02	0.13	251.88	251.87	0.01	0.38
P-191	J-159	J-15	PE	80	54.86	110	Open	0.37	0.07	251.95	251.94	0.01	0.17
P-192	J-15	J-16	PE	80	32.31	110	Open	0.19	0.04	251.94	251.94	0.00	0.05
P-193	J-79	J-10	PE	50	48.76	110	Open	-0.19	0.09	252.15	252.17	0.02	0.47
P-194	J-98	J-97	PE	80	112.47	110	Open	0.19	0.04	252.34	252.34	0.01	0.05
P-195	J-153	J-154	PE	80	41.45	110	Open	-0.19	0.04	252.01	252.01	0.00	0.05
P-197	J-154	J-173	PE	80	53.04	110	Open	-0.37	0.07	252.01	252.02	0.01	0.17
P-198	J-200	J-201	PE	80	78.03	110	Open	0.19	0.04	253.08	253.08	0.00	0.05
P-199	J-11	J-210	PE	80	62.70	110	Open	0.19	0.04	251.95	251.95	0.00	0.05
P-200	J-196	J-197	PE	80	37.80	110	Open	0.19	0.04	250.36	250.36	0.00	0.05
P-400	J-14	J-133	PE	200	46.94	110	Open	29.74	0.93	253.66	253.36	0.30	6.43
P-402	J-137	J-160	PE	100	51.51	110	Open	-0.65	0.07	251.86	251.87	0.01	0.12
P-403	J-188	J-115	PE	100	88.39	110	Open	-0.73	0.09	251.87	251.86	0.02	0.26
P-407	J-186	J-5	PE	140	68.01	110	Open	2.42	0.16	251.96	251.93	0.02	0.37
P-408	J-5	J-140	PE	140	14.63	110	Open	2.88	0.19	251.93	251.92	0.01	0.51
P-409	J2101	J21	PE	80	39.62	110	Open	-0.93	0.18	254.06	255.00	0.04	0.94
P-410	J21	J2102	PE	80	62.48	110	Open	0.37	0.07	255.00	254.99	0.01	0.17
P-412	J-148	J-127	PE	140	68.28	110	Open	2.97	0.19	251.97	251.93	0.04	0.53
P-416	J-32	J-76	PE	125	100.20	110	Open	-5.19	0.46	251.73	252.05	0.32	3.17

Jurumleri Network Calculation

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-417	J-78	J-39	PE	80	108.81	110	Open	0.80	0.16	252.05	251.97	0.08	0.71
P-421	J-32	J-152	PE	120	72.65	110	Open	4.81	0.40	251.70	251.53	0.20	2.76
P-423	J-149	J-09	PE	80	61.57	110	Open	1.00	0.20	251.91	251.84	0.07	1.08
P-425	J-26	J-174	PE	140	51.21	110	Open	-9.39	0.61	252.65	253.06	0.20	4.49
P-426	J-174	J-100	PE	140	58.83	110	Open	-9.78	0.63	253.06	253.36	0.28	4.82
P-427	J-152	J-199	PE	120	34.48	110	Open	2.44	0.30	251.53	251.45	0.08	2.38
P-428	J-199	J-10	PE	120	124.05	110	Open	4.07	0.36	251.45	251.20	0.25	2.00
P-430	J-190	J-20	PE	100	60.96	110	Open	-0.75	0.10	251.05	251.07	0.01	0.21
P-431	J-119	J-161	PE	140	14.94	110	Open	3.53	0.23	252.04	252.03	0.01	0.73
P-432	J-161	J-149	PE	140	106.38	110	Open	3.16	0.21	252.03	251.97	0.06	0.60
P-435	J-239	J-129	PE	80	154.84	110	Open	-0.74	0.15	250.83	250.73	0.10	0.62
P-436	J-128	J-9	PE	120	76.20	110	Open	-2.78	0.26	250.73	250.61	0.08	1.00
P-437	J-05	J-123	PE	200	100.38	110	Open	10.26	0.33	252.18	252.08	0.10	0.93
P-438	J-123	J-78	PE	200	61.20	110	Open	7.05	0.23	252.08	252.05	0.03	0.47
P-439	J2101	J22	PE	80	145.69	110	Open	0.74	0.15	254.96	254.87	0.09	0.62
P-440	J22	J2201	PE	80	70.71	110	Open	0.37	0.07	254.87	254.86	0.01	0.17
P-441	J-202	J-80	PE	140	79.86	110	Open	-2.03	0.09	252.16	252.17	0.01	0.12
P-442	J-96	J-43	PE	140	29.57	110	Open	-8.68	0.56	252.34	252.45	0.11	3.85
P-443	J-22	J-183	PE	200	148.74	110	Open	12.11	0.39	252.49	252.22	0.19	1.26
P-444	J-183	J-65	PE	200	34.75	110	Open	17.90	0.35	252.22	252.18	0.04	1.06
P-445	J-136	J-80	PE	140	35.91	110	Open	-2.70	0.11	252.18	252.17	0.01	0.19
P-446	J-207	J-149	PE	140	79.55	110	Open	-1.47	0.09	251.97	251.91	0.01	0.13
P-447	J-127	J-30	PE	100	99.97	110	Open	-1.62	0.13	251.93	251.89	0.04	0.38
P-448	J-194	J-7	PE	140	142.87	110	Open	0.80	0.03	251.92	251.91	0.01	0.05
P-449	J-7	J-115	PE	100	81.09	110	Open	0.92	0.12	251.01	251.00	0.03	0.31
P-450	J-207	J-127	PE	140	42.67	110	Open	-1.77	0.11	251.52	251.93	0.01	0.20
P-451	J-74	J-209	PE	100	28.65	110	Open	1.06	0.14	251.89	251.83	0.01	0.41
P-452	J-230	J-75	PE	100	51.82	110	Open	0.51	0.03	251.88	251.87	0.01	0.19
P-453	J-7	J-149	PE	140	242.54	110	Open	-0.22	0.01	251.91	251.91	0.00	0.01
P-454	J-190	J-208	PE	100	107.20	110	Open	-0.16	0.02	251.86	251.85	0.00	0.01
P-455	J-133	J-146	PE	200	82.65	110	Open	19.19	0.61	253.36	253.11	0.25	2.97
P-456	J-146	J-83	PE	200	46.33	110	Open	19.01	0.61	253.11	252.97	0.14	2.91
P-459	J-95	J-220	PE	80	37.49	110	Open	-0.37	0.07	250.63	250.63	0.01	0.17
P-460	J-173	J-90	PE	200	55.60	110	Open	18.39	0.54	252.92	252.78	0.14	2.74
P-461	J-47	J-107	PE	80	152.40	110	Open	-0.37	0.07	252.01	252.07	0.02	0.17
P-462	J-197	J-78	PE	80	25.26	110	Open	0.90	0.13	252.02	252.05	0.03	0.99
P-463	J-200	J-20	PE	80	26.04	110	Open	1.60	0.32	253.08	253.01	0.07	2.53
P-464	J-184	J-140	PE	140	31.70	110	Open	-1.44	0.09	251.92	251.92	0.00	0.14
P-465	J-154	J-228	PE	80	46.91	110	Open	0.19	0.04	251.85	251.84	0.00	0.02
P-466	J-196	J-135	PE	140	24.08	110	Open	8.28	0.54	252.34	252.26	0.08	3.55
P-467	J-9	J-213	PE	120	156.36	110	Open	-3.30	0.29	250.81	250.67	0.22	1.41
P-468	J-213	J-10	PE	120	102.30	110	Open	-3.70	0.33	250.92	250.20	0.18	1.73
P-469	J-164	J-125	PE	80	18.29	110	Open	0.30	0.06	251.86	251.84	0.00	0.12
P-470	J-89	J-125	PE	80	12.86	110	Open	0.07	0.01	251.84	251.84	0.00	0.01
Primary	R-1	J21	PE	200	94.18	110	Open	1.48	0.05	255.00	255.00	0.00	0.03
Transmission	R-2	J-226	PE	700	57.60	110	Open	32.22	1.03	255.00	254.56	0.44	7.75

Kolonie Idrizovo Network Model



Kolonie Idrizovo Network Calculation

Junction Report

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-375	230	0.19	252.44	22.39
J-376	230	0.19	252.43	22.39
J-377	230	0.19	252.97	22.92
J-378	230	0.19	252.96	22.92
J-379	230	0.19	252.40	22.35
J-380	230	0.19	252.39	22.34
J-381	230	0.19	253.60	23.55
J-382	230	0.19	253.53	23.48
J-384	230	0.19	252.39	22.34
J-385	230	0.19	252.09	22.04
J-386	230	0.19	252.08	22.04
J-387	230	0.19	252.35	22.30
J-388	230	0.19	252.37	22.33
J-391	230	0.19	253.46	23.41
J-393	230	0.19	253.77	23.72
J-394	230	0.19	254.25	24.20
J-395	230	0.19	253.35	23.30
J-396	230	0.19	253.48	23.40
J-397	230	0.19	252.53	22.49
J-398	230	0.19	252.53	22.49
J-399	230	0.19	253.49	23.44
J-400	230	0.19	253.65	23.61
J-401	230	0.19	252.53	22.48
J-402	230	0.19	253.01	22.96
J-403	230	0.19	253.17	23.12
J-406	230	0.19	253.35	23.30
J-407	230	0.19	252.39	22.35

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-408	230	0.19	253.21	23.16
J-409	230	0.19	252.39	22.35
J-410	230	0.19	252.43	22.39
J-412	230	0.19	253.57	23.62
J-413	230	0.19	253.46	23.44
J-414	230	0.19	252.34	22.09
J-415	230	0.19	253.35	23.00
J-417	230	0.19	253.34	23.29
J-418	230	0.19	253.58	23.53
J-419	230	0.19	253.17	23.12
J-420	230	0.19	253.36	23.01
J-422	230	0.19	252.34	22.89
J-423	230	0.19	252.35	22.05
J-424	230	0.19	252.34	22.90
J-425	230	0.19	252.24	22.89
J-426	230	0.19	254.30	23.95
J-428	230	0.19	253.37	23.03
J-429	230	0.19	253.46	23.41
J-430	230	0.19	252.31	22.06
J-431	230	0.19	253.32	22.07
J-432	230	0.19	252.35	22.90
J-433	230	0.19	252.35	22.91
J-434	230	0.19	254.41	24.36
J-437	230	0.19	253.35	23.30
J-490	230	0.19	252.34	22.32
J-491	230	0.19	252.35	22.31
J-492	230	0.19	252.35	22.30

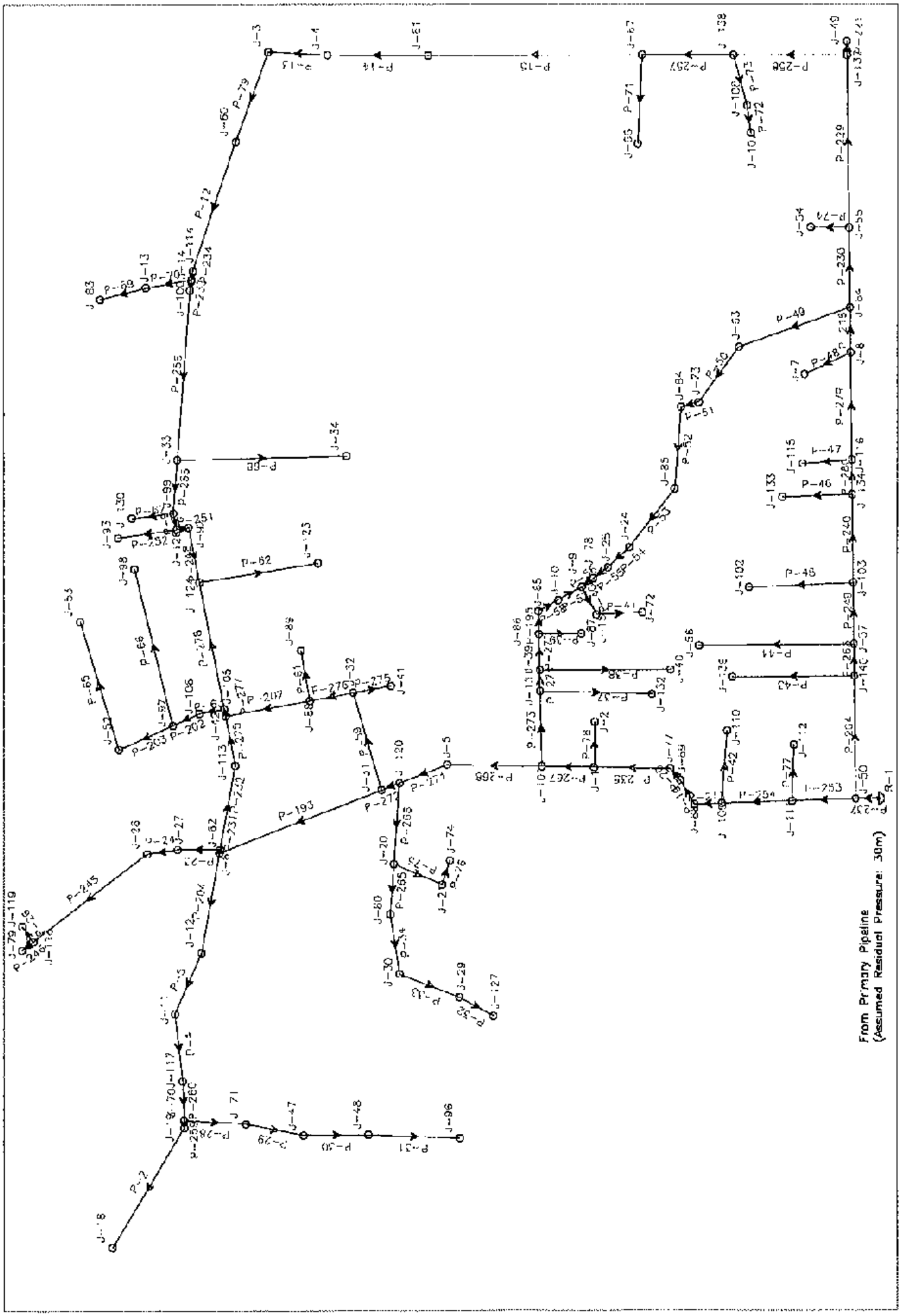
Pipe Report

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-167	J-334	J-407	PE	100	350.82	110	Open	-0.19	0.02	252.39	252.39	0.01	0.02
P-161	J-379	J-380	PE	80	174.04	110	Open	0.19	0.04	252.40	252.39	0.01	0.05
P-163	J-403	J-419	PE	100	135.04	110	Open	-0.19	0.02	253.17	253.17	0.00	0.02
P-164	J-419	J-417	PE	100	82.60	110	Open	-2.62	0.33	253.17	253.34	0.17	2.02
P-166	J-335	J-356	PE	90	160.54	110	Open	-0.93	0.16	253.35	253.44	0.10	0.64
P-168	J-329	J-409	PE	80	74.68	110	Open	-1.48	0.25	253.49	253.65	0.17	2.24
P-169	J-417	J-418	PE	100	160.32	110	Open	-2.15	0.27	253.34	253.58	0.24	1.50
P-174	J-394	J-412	PE	100	157.40	110	Open	3.56	0.45	254.25	253.67	0.59	3.84
P-175	J-420	J-426	PE	100	153.02	110	Open	-2.65	0.34	253.36	253.06	0.30	2.21
P-177	J-331	J-382	PE	100	60.90	110	Open	1.01	0.24	253.60	253.53	0.07	1.21
P-178	J-332	J-409	PE	100	178.52	110	Open	1.73	0.22	253.53	253.35	0.18	1.01
P-182	J-403	J-425	PE	100	60.09	110	Open	3.78	0.48	253.21	252.94	0.27	4.50
P-184	J-335	J-356	PE	80	84.43	110	Open	0.19	0.04	252.09	252.08	0.00	0.05
P-186	J-409	J-423	PE	80	67.36	110	Open	-0.19	0.04	252.39	252.39	0.00	0.05
P 187	J-423	J-450	PE	80	69.19	110	Open	-0.37	0.07	252.39	252.11	0.01	0.17
P-189	J-376	J-378	PE	80	116.13	110	Open	0.19	0.04	252.44	252.43	0.01	0.05
P-189	J-397	J-398	PE	80	44.20	110	Open	0.37	0.07	252.54	252.53	0.01	0.17
P-190	J-338	J-401	PE	80	55.47	110	Open	0.19	0.04	252.53	252.53	0.00	0.05
P-197	J-338	J-410	PE	80	63.70	110	Open	-0.93	0.16	252.37	252.43	0.06	0.94
P-193	J-414	J-424	PE	80	199.20	110	Open	-0.19	0.04	252.94	252.94	0.01	0.05
P-194	J-432	J-425	PE	80	91.74	110	Open	-0.19	0.04	252.95	252.95	0.00	0.05
P-195	J-377	J-378	PE	80	92.66	110	Open	0.19	0.04	252.07	252.96	0.00	0.05
P-254	J-416	J-400	PE	100	115.21	110	Open	-1.38	0.18	253.08	253.65	0.08	0.67
P-255	J-400	J-360	PE	100	38.71	110	Open	-3.05	0.39	253.65	253.77	0.11	2.86
P-259	J-425	J-422	PE	100	23.47	110	Open	-0.11	0.01	252.94	252.94	0.00	0.01
P-265	J-433	J-377	PE	100	35.05	110	Open	-1.04	0.13	252.95	252.97	0.01	0.35
P-268	J-422	J-424	PE	100	137.77	110	Open	-0.30	0.04	252.94	252.94	0.01	0.04
P-269	J-424	J-430	PE	100	51.21	110	Open	-0.67	0.08	252.04	252.35	0.01	0.17
P-270	J-375	J-357	PE	100	42.27	110	Open	-2.78	0.35	252.44	252.54	0.10	2.42
P-272	J-336	J-359	PE	80	32.31	110	Open	-1.11	0.22	253.44	253.48	0.04	1.32
P-273	J-349	J-410	PE	80	60.35	110	Open	0.19	0.04	253.49	253.48	0.00	0.05
P-277	J-407	J-379	PE	100	39.93	110	Open	-0.07	0.01	252.39	252.40	0.00	0.01
P-278	J-379	J-430	PE	100	52.73	110	Open	0.74	0.09	252.40	252.41	0.01	0.21
P-279	J-417	J-355	PE	100	78.83	110	Open	-0.56	0.07	253.34	253.35	0.01	0.12
P-280	J-335	J-437	PE	100	109.29	110	Open	0.19	0.02	253.35	253.35	0.00	0.02
P-781	J-418	J-381	PE	100	78.71	110	Open	-0.55	0.12	253.58	253.56	0.02	0.32
P-282	J-331	J-420	PE	100	19.20	110	Open	-3.05	0.39	253.60	253.56	0.05	2.86
P-285	J-420	J-412	PE	100	74.58	110	Open	0.59	0.07	253.06	253.37	0.01	0.12
P-286	J-412	J-429	PE	100	84.73	110	Open	2.79	0.36	253.67	253.46	0.21	2.44
P-289	J-397	J-365	PE	100	43.20	110	Open	-3.33	0.42	252.54	252.58	0.15	3.39
P-290	J-335	J-425	PE	100	81.57	110	Open	-3.70	0.47	252.69	252.94	0.25	4.13
P-291	J-338	J-450	PE	80	60.86	110	Open	0.19	0.04	252.37	252.37	0.00	0.05
P-292	J-397	J-491	PE	80	61.26	110	Open	0.19	0.04	252.05	252.35	0.00	0.05
P-293	J-431	J-368	PE	80	54.25	110	Open	-0.56	0.11	252.35	252.37	0.02	0.36
P-294	J-431	J-492	PE	80	55.78	110	Open	0.19	0.04	252.35	252.35	0.00	0.05
P-295	J-436	J-409	PE	100	24.57	110	Open	3.56	0.50	253.35	253.21	0.14	4.65
P-207	J-331	J-429	PE	80	96.01	110	Open	-0.19	0.04	253.46	253.46	0.00	0.05
P-298	J-429	J-406	PE	100	60.05	110	Open	2.42	0.31	253.46	253.35	0.11	1.88
P-299	J-393	J-426	PE	100	71.53	110	Open	-3.24	0.41	253.77	254.00	0.23	3.21

Kolonie Idrizovo Network Calculation

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-301	J-430	J-410	PE	100	39,93	110	Open	-1,30	0,17	252,41	252,43	0,02	0,59
P-307	J-410	J-375	PE	100	3,65	110	Open	-2,41	0,31	252,43	252,44	0,01	1,86
P-303	J-431	J-415	PE	100	56,08	110	Open	-1,70	0,22	253,07	253,08	0,05	1,06
P-304	J-415	J-419	PE	100	62,18	110	Open	-2,15	0,27	253,08	253,17	0,09	1,50
P-305	J-426	J-434	PE	100	39,93	110	Open	-6,67	0,77	254,00	254,41	0,41	10,29
P-306	J-434	J-394	PE	100	36,86	110	Open	3,75	0,48	254,41	254,25	0,16	4,22
P-307	J-377	J-431	PE	100	72,54	110	Open	-1,41	0,18	252,97	253,02	0,05	0,69
P-308	J-431	J-402	PE	80	207,87	110	Open	0,19	0,04	253,02	253,01	0,01	0,05
P-309	R 1	J-434	PE	110	20,00	110	Open	10,00	1,05	255,00	254,41	0,33	16,32
P-310	J-429	J-415	PE	80	92,65	110	Open	-0,19	0,04	253,07	253,08	0,09	0,95

Idrizovo Network Model



Idrizovo Network Calculation

Junction Report

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-1	230	0.20	250.69	20.59
J-2	230	0.20	250.69	20.59
J-3	230	0.20	245.06	15.03
J-4	230	0.20	245.22	15.19
J-5	230	0.20	247.42	17.38
J-6	230	0.20	245.43	15.40
J-7	230	0.20	251.65	21.61
J-8	230	0.20	250.68	20.64
J-9	230	0.20	243.92	13.88
J-10	230	0.20	243.92	13.88
J-11	230	0.20	245.22	15.19
J-12	230	0.20	245.79	15.76
J-13	230	0.20	245.55	15.52
J-14	230	0.20	245.56	15.53
J-15	230	0.20	243.91	13.87
J-16	230	0.20	245.12	15.08
J-17	230	0.20	245.13	15.10
J-20	230	0.20	245.33	15.30
J-21	230	0.20	245.32	15.29
J-24	230	0.20	243.96	13.93
J-25	230	0.20	243.93	13.90
J-27	230	0.20	245.30	15.35
J-28	230	0.20	245.36	15.33
J-29	230	0.20	245.25	15.22
J-30	230	0.20	245.27	15.23
J-31	230	0.20	245.27	15.24
J-32	230	0.20	245.76	15.73
J-33	230	0.20	245.43	15.40
J-34	230	0.20	245.42	15.39
J-39	230	0.20	243.95	13.91
J-40	230	0.20	243.94	13.91
J-41	230	0.20	245.76	15.73
J-42	230	0.20	245.42	15.39
J-47	230	0.20	245.05	15.02
J-48	230	0.20	245.04	15.01
J-49	230	0.20	248.27	18.24
J-50	230	0.20	254.97	24.91
J-52	230	0.20	245.35	15.32
J-53	230	0.20	245.34	15.31
J-54	230	0.20	243.98	13.94
J-55	230	0.20	243.98	13.94
J-56	230	0.20	255.10	26.05
J-57	230	0.20	255.11	26.06
J-60	230	0.20	245.85	15.82
J-61	230	0.20	245.52	15.49
J-62	230	0.20	245.43	15.40
J-63	230	0.20	249.51	19.40
J-64	230	0.20	249.98	19.95
J-65	230	0.20	249.92	19.88
J-66	230	0.20	247.25	17.21
J-67	230	0.20	247.25	17.22
J-68	230	0.20	254.22	24.17
J-69	230	0.20	253.34	23.29
J-70	230	0.20	245.13	15.10

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-71	230	0.20	245.38	15.05
J-72	230	0.20	248.31	18.87
J-73	230	0.20	249.29	19.25
J-74	230	0.20	246.32	16.28
J-77	230	0.20	252.38	22.84
J-78	230	0.20	248.92	18.88
J-79	230	0.20	245.29	15.26
J-80	230	0.20	246.29	16.26
J-83	230	0.20	245.55	15.52
J-84	230	0.20	249.24	19.21
J-85	230	0.20	249.08	19.04
J-86	230	0.20	248.92	18.09
J-87	230	0.20	248.97	18.85
J-88	230	0.20	245.31	15.58
J-89	230	0.20	245.30	15.57
J-92	230	0.20	245.40	15.37
J-93	230	0.20	245.40	15.37
J-96	230	0.20	245.24	15.01
J-97	230	0.20	245.16	15.33
J-98	230	0.20	245.35	15.32
J-90	230	0.20	245.41	15.37
J-100	230	0.20	245.55	15.52
J-101	230	0.20	249.20	19.16
J-102	230	0.20	254.77	24.72
J-103	230	0.20	254.78	24.73
J-105	230	0.20	245.41	15.38
J-106	230	0.20	245.38	15.35
J-107	230	0.20	247.32	17.59
J-108	230	0.20	247.32	17.59
J-109	230	0.20	255.11	25.09
J-110	230	0.20	255.11	25.06
J-111	230	0.20	257.56	27.51
J-112	230	0.20	257.56	27.50
J-113	230	0.20	245.42	15.30
J-114	230	0.20	245.56	15.55
J-115	230	0.20	252.40	22.36
J-116	230	0.20	252.41	22.36
J-117	230	0.20	245.16	15.13
J-118	230	0.20	245.26	15.26
J-119	230	0.20	245.26	15.26
J-120	230	0.20	246.50	16.47
J-123	230	0.20	245.40	15.36
J-124	230	0.20	245.40	15.37
J-126	230	0.20	245.40	15.37
J-127	230	0.20	246.25	16.22
J-130	230	0.20	245.40	15.37
J-131	230	0.20	248.99	18.96
J-132	230	0.20	248.98	18.94
J-133	230	0.20	253.22	22.98
J-134	230	0.20	253.33	22.98
J-137	230	0.20	248.27	18.24
J-138	230	0.20	247.53	17.65
J-139	230	0.20	256.35	26.89
J-140	230	0.20	256.36	26.89

Pipe Report

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-2	J-13	J-15	PE	100	142.65	110	Open	0.20	0.03	245.12	245.13	0.00	0.02
P-4	J-117	J-11	PE	100	69.19	110	Open	-1.61	0.21	245.06	245.22	0.06	0.98
P-5	J-11	J-12	PE	100	69.39	110	Open	-1.61	0.20	245.22	245.29	0.08	1.19
P-9	J-126	J-99	PE	100	7.07	110	Open	-0.64	0.08	245.40	245.41	0.00	0.16
P-12	J-114	J-40	PE	100	159.29	110	Open	-2.45	0.31	245.56	245.05	0.27	1.90
P-13	J-3	J-4	PE	100	61.26	110	Open	-2.86	0.36	245.06	245.22	0.16	2.55
P-14	J-4	J-61	PE	100	104.85	110	Open	-3.06	0.39	245.22	245.52	0.30	2.89
P-15	J-61	J-62	PE	100	223.11	110	Open	-3.26	0.42	245.52	247.25	0.73	3.26
P-19	J-63	J-65	PE	100	29.26	110	Open	10.67	1.36	254.22	253.34	0.89	30.30
P-20	J-69	J-17	PE	100	15.54	110	Open	10.67	1.36	253.34	252.88	0.46	29.77
P-23	J-62	J-27	PE	80	44.20	110	Open	1.61	0.20	245.43	245.38	0.05	1.16
P-24	J-27	J-28	PE	80	32.00	110	Open	0.81	0.16	245.38	245.36	0.02	0.73
P-26	J-118	J-119	PE	80	13.51	110	Open	0.20	0.04	245.29	245.29	0.00	0.06
P-28	J-70	J-71	PE	80	64.61	110	Open	0.81	0.16	245.13	245.08	0.05	0.73
P-29	J-71	J-47	PE	80	61.57	110	Open	0.60	0.12	245.08	245.05	0.03	0.53
P-30	J-47	J-48	PE	80	67.36	110	Open	0.40	0.08	245.05	245.04	0.01	0.20
P-31	J-43	J-95	PE	80	95.40	110	Open	0.20	0.04	245.04	245.04	0.01	0.06
P-32	J-127	J-25	PE	80	40.84	110	Open	-0.20	0.04	246.25	246.25	0.00	0.06
P-33	J-29	J-26	PE	80	66.45	110	Open	-0.40	0.08	246.25	245.27	0.01	0.20
P-34	J-33	J-95	PE	80	62.48	110	Open	-0.60	0.12	245.27	245.23	0.03	0.53
P-37	J-131	J-132	PE	80	177.04	110	Open	0.20	0.04	248.99	248.93	0.01	0.06
P-38	J-39	J-40	PE	80	139.60	110	Open	0.20	0.04	248.95	248.94	0.01	0.06

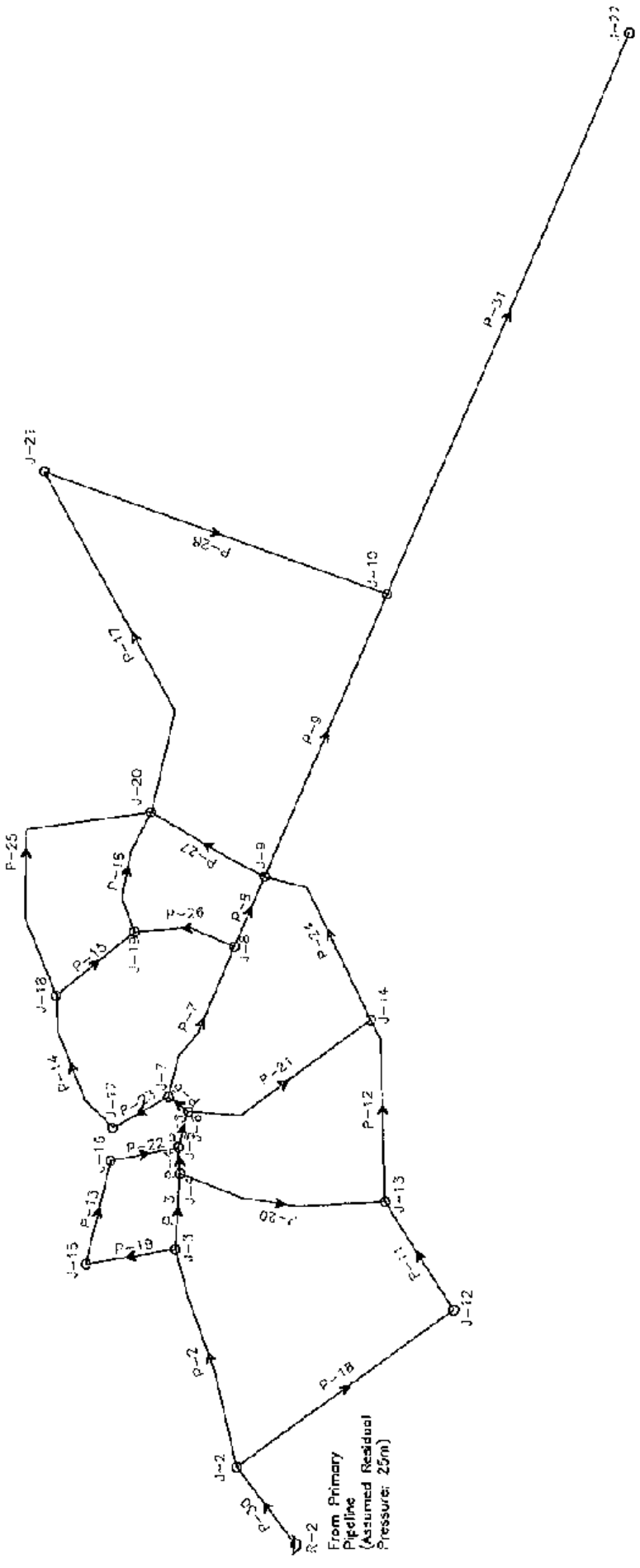
Idrizovo Network Calculation

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-39	J-86	J-87	PE	80	44.81	110	Open	0.23	0.04	248.92	248.92	0.00	0.06
P-40	J-9	J-15	PE	80	32.01	110	Open	0.43	0.08	248.92	248.91	0.01	0.29
P-41	J-15	J-72	PE	80	47.05	110	Open	0.23	0.04	248.91	248.91	0.00	0.06
P-42	J-109	J-110	PE	80	75.59	110	Open	0.23	0.04	255.11	255.11	0.00	0.06
P-43	J-139	J-140	PE	80	127.71	110	Open	0.23	0.04	255.85	255.86	0.01	0.06
P-44	J-56	J-57	PE	80	162.15	110	Open	-0.23	0.04	255.10	256.11	0.01	0.06
P-45	J-102	J-103	PE	80	109.42	110	Open	-0.23	0.04	254.77	254.78	0.01	0.06
P-46	J-133	J-134	PE	80	73.45	110	Open	-0.27	0.04	250.02	250.03	0.00	0.06
P-47	J-115	J-116	PE	80	51.02	110	Open	-0.27	0.04	252.40	252.41	0.00	0.06
P-48	J-7	J-8	PE	80	53.04	110	Open	-0.23	0.04	250.65	250.66	0.00	0.06
P-49	J-63	J-64	PE	80	23.14	110	Open	-1.08	0.39	249.61	249.99	0.47	5.84
P-50	J-63	J-73	PE	80	71.02	110	Open	1.73	0.35	249.61	249.29	0.22	3.15
P-51	J-73	J-84	PE	80	18.59	110	Open	1.53	0.31	249.29	249.24	0.05	2.52
P-52	J-83	J-85	PE	80	85.04	110	Open	1.33	0.27	249.24	249.08	0.17	1.96
P-53	J-85	J-24	PE	80	76.91	110	Open	1.13	0.23	249.08	248.96	0.11	1.46
P-54	J-24	J-25	PE	80	30.48	110	Open	0.97	0.19	248.96	248.93	0.03	1.03
P-55	J-25	J-78	PE	80	18.90	110	Open	0.77	0.15	248.93	248.92	0.01	0.67
P-56	J-78	J-9	PE	80	14.94	110	Open	0.57	0.11	248.92	248.92	0.01	0.38
P-57	J-9	J-10	PE	80	28.35	110	Open	-0.03	0.01	248.92	248.92	0.00	0.00
P-58	J-10	J-65	PE	80	23.77	110	Open	-0.23	0.05	248.92	248.92	0.00	0.07
P-59	J-31	J-32	PE	80	105.15	110	Open	2.25	0.45	249.27	248.76	0.51	4.86
P-61	J-88	J-89	PE	80	53.04	110	Open	0.23	0.04	245.61	245.60	0.00	0.06
P-62	J-122	J-124	PE	80	124.20	110	Open	-0.23	0.04	245.40	245.40	0.01	0.06
P-63	J-105	J-106	PE	80	25.91	110	Open	1.01	0.20	245.41	245.30	0.03	1.10
P-65	J-52	J-53	PE	80	139.23	110	Open	0.23	0.04	245.25	245.24	0.01	0.06
P-66	J-97	J-98	PE	80	167.64	110	Open	0.23	0.04	245.26	245.25	0.01	0.06
P-67	J-99	J-100	PE	80	42.93	110	Open	0.23	0.04	245.41	245.41	0.00	0.06
P-68	J-33	J-34	PE	80	175.25	110	Open	0.23	0.04	245.43	245.42	0.01	0.06
P-69	J-89	J-13	PE	80	46.45	110	Open	-0.23	0.04	245.65	245.65	0.00	0.06
P-70	J-13	J-14	PE	80	47.67	110	Open	-0.40	0.08	245.55	245.56	0.01	0.20
P-71	J-66	J-67	PE	80	90.22	110	Open	-0.23	0.04	247.25	247.25	0.01	0.06
P-72	J-107	J-108	PE	80	28.95	110	Open	-0.23	0.04	247.62	247.62	0.00	0.06
P-73	J-108	J-138	PE	80	52.73	110	Open	-0.40	0.08	247.62	247.63	0.01	0.20
P-74	J-54	J-55	PE	80	40.23	110	Open	-0.23	0.04	249.08	249.08	0.00	0.06
P-75	J-20	J-21	PE	80	54.25	110	Open	0.40	0.08	248.33	248.32	0.01	0.20
P-76	J-21	J-74	PE	80	25.91	110	Open	0.20	0.04	245.32	245.32	0.00	0.06
P-77	J-111	J-112	PE	80	58.22	110	Open	0.20	0.04	257.56	257.56	0.00	0.06
P-78	J-1	J-2	PE	80	47.24	110	Open	0.20	0.04	250.63	250.63	0.00	0.06
P-79	J-60	J-5	PE	100	97.23	110	Open	-2.65	0.34	248.89	248.66	0.22	2.23
P-193	J-31	J-6	PE	100	180.44	110	Open	3.95	0.50	248.27	248.43	0.84	4.66
P-195	J-86	J-65	PE	80	23.77	110	Open	0.44	0.09	248.92	248.92	0.01	0.23
P-202	J-106	J-52	PE	80	30.10	110	Open	0.81	0.16	245.38	245.26	0.02	0.73
P-203	J-97	J-52	PE	80	60.96	110	Open	0.40	0.08	245.36	245.35	0.01	0.20
P-204	J-12	J-6	PE	100	104.85	110	Open	-2.01	0.26	245.29	245.43	0.14	1.33
P-207	J-88	J-62	PE	80	89.00	110	Open	1.45	0.29	245.61	245.42	0.19	2.14
P-213	J-100	J-68	PE	100	28.35	110	Open	11.07	1.41	255.11	254.22	0.89	31.35
P-215	J-64	J-5	PE	100	46.60	110	Open	-7.25	0.92	249.09	250.66	0.57	14.29
P-221	J-49	J-137	PE	80	14.02	110	Open	-0.20	0.04	248.27	248.27	0.00	0.06
P-225	J-113	J-62	PE	100	52.12	110	Open	0.33	0.04	245.42	245.42	0.00	0.05
P-229	J-137	J-55	PE	100	175.26	110	Open	-4.67	0.59	248.27	246.28	1.11	6.34
P-230	J-55	J-54	PE	100	81.69	110	Open	-5.07	0.65	249.08	246.69	0.60	7.39
P-231	J-6	J-62	PE	100	3.35	110	Open	1.71	0.22	245.43	245.43	0.00	1.02
P-232	J-62	J-113	PE	100	98.70	110	Open	0.53	0.07	245.43	245.42	0.01	0.11
P-233	J-100	J-14	PE	100	10.67	110	Open	-1.63	0.21	245.55	245.56	0.01	0.02
P-234	J-14	J-114	PE	100	8.84	110	Open	-2.23	0.28	245.56	245.58	0.01	1.64
P-235	J-77	J-1	PE	100	79.55	110	Open	10.47	1.33	252.80	250.63	2.25	28.26
P-237	J-1	J-50	PE	250	76.57	110	Open	21.75	0.44	250.09	250.07	0.03	1.26
P-240	J-131	J-109	PE	100	91.74	110	Open	-8.45	1.08	253.03	254.78	1.75	19.06
P-245	J-28	J-119	PE	80	148.74	110	Open	0.63	0.12	245.36	245.29	0.06	0.43
P-246	J-110	J-79	PE	80	14.33	110	Open	0.23	0.04	245.29	245.29	0.00	0.06
P-248	J-124	J-92	PE	100	57.91	110	Open	-0.03	0.00	245.40	245.40	0.00	0.00
P-249	J-100	J-57	PE	100	64.01	110	Open	-8.87	1.13	254.78	256.11	1.33	20.78
P-251	J-92	J-126	PE	100	12.50	110	Open	-0.74	0.09	245.40	245.40	0.00	0.03
P-252	J-126	J-93	PE	80	60.93	110	Open	0.20	0.04	245.40	245.40	0.00	0.06
P-253	J-50	J-111	PE	100	67.33	110	Open	11.83	1.51	250.07	257.56	2.41	35.71
P-254	J-111	J-109	PE	100	73.17	110	Open	11.47	1.46	257.56	255.11	2.45	32.50
P-255	J-99	J-53	PE	100	55.47	110	Open	-1.04	0.13	245.41	245.43	0.02	0.40
P-256	J-33	J-109	PE	100	175.56	110	Open	-1.45	0.18	245.43	245.55	0.13	0.72
P-257	J-67	J-108	PE	100	94.79	110	Open	-3.65	0.47	247.25	247.63	0.38	4.04
P-258	J-130	J-107	PE	100	119.18	110	Open	-4.27	0.54	247.63	248.27	0.64	5.36
P-259	J-19	J-70	PE	80	7.02	110	Open	-0.40	0.08	245.13	245.13	0.00	0.20
P-260	J-70	J-117	PE	100	40.29	110	Open	-1.41	0.18	245.13	245.16	0.03	0.69
P-263	J-57	J-140	PE	100	39.27	110	Open	-9.27	1.18	255.11	256.86	0.75	22.59
P-264	J-140	J-50	PE	100	127.41	110	Open	-9.67	1.23	255.86	250.97	3.11	24.41
P-265	J-80	J-20	PE	80	52.12	110	Open	-0.81	0.16	245.29	246.33	0.04	0.73
P-268	J-20	J-120	PE	80	84.12	110	Open	-1.41	0.18	245.33	246.50	0.17	2.04
P-267	J-1	J-101	PE	100	54.55	110	Open	10.05	1.28	250.63	246.20	1.43	26.28
P-268	J-101	J-5	PE	100	98.76	110	Open	8.27	1.05	249.20	247.42	1.73	18.06
P-270	J-30	J-86	PE	80	37.80	110	Open	0.04	0.17	243.95	246.92	0.03	0.38
P-271	J-5	J-120	PE	100	53.04	110	Open	8.02	1.02	247.42	246.50	0.91	17.25
P-272	J-120	J-31	PE	100	20.12	110	Open	6.41	0.82	246.50	246.27	0.23	11.39
P-273	J-101	J-131	PE	80	78.03	110	Open	1.64	0.33	249.20	246.99	0.21	2.72
P-274	J-131	J-39	PE	80	21.95	110	Open	1.24	0.25	243.99	248.95	0.04	1.62

Idrizovo Network Calculation

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-275	J-41	J-32	PE	90	39.93	150	Open	-0.20	0.04	245.76	245.76	0.00	0.05
P-276	J-32	J-88	PE	90	45.72	150	Open	1.85	0.37	245.76	245.51	0.15	3.38
P-277	J-42	J-105	PE	100	7.62	150	Open	1.57	0.32	245.42	245.41	0.01	0.85
P-278	J-105	J-124	PE	100	154.42	150	Open	0.36	0.05	245.41	245.40	0.01	0.06
P-279	J-0	J-116	PE	100	110.64	150	Open	-7.66	0.98	260.66	252.41	1.75	15.84
P-280	J-116	J-194	PE	100	35.66	150	Open	-0.00	0.00	252.41	252.33	0.62	17.42

Mralino Network Model



Junction Report

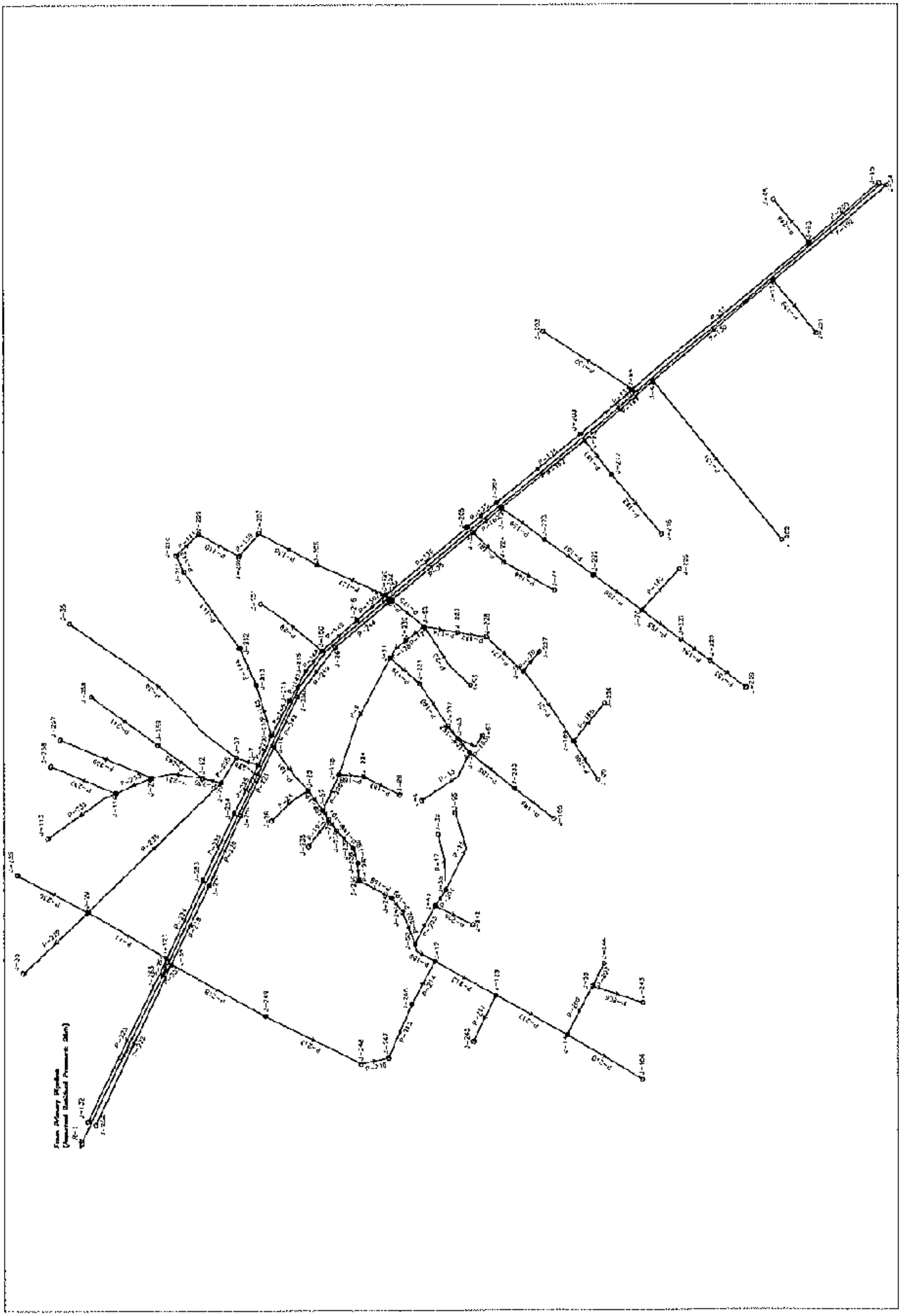
Junction ID	Elevation (m)	Peak Hour Demand (l/s)	Hydraulic Grade (m)	Residual Pressure (m)
J-2	230	0.35	254.73	24.68
J-3	230	0.35	254.18	24.13
J-4	230	0.35	254.01	23.96
J-5	230	0.35	253.95	23.91
J-6	230	0.35	253.87	23.83
J-7	230	0.35	253.82	23.78
J-8	230	0.35	253.53	23.44
J-9	230	0.35	253.40	23.35
J-10	230	0.35	252.86	22.82
J-12	230	0.35	254.15	24.10

Junction ID	Elevation (m)	Peak Hour Demand (l/s)	Hydraulic Grade (m)	Residual Pressure (m)
J-13	230	0.35	253.98	23.93
J-14	230	0.35	253.76	23.72
J-15	230	0.35	254.05	24.00
J-16	230	0.35	253.97	23.92
J-17	230	0.35	253.60	23.63
J-18	230	0.35	253.47	23.43
J-19	230	0.35	253.65	23.42
J-20	230	0.35	253.39	23.05
J-21	230	0.35	253.01	22.67
J-22	230	25.00	251.79	21.74

Pipe Report

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (m)	End Hydraulic Grade (m)	Headloss (m)	Headloss Gradien. (m/km)
P-2	J-2	J-3	PE	250	243.50	110	Open	23.40	0.61	254.73	254.18	0.55	2.28
P-3	J-3	J-4	PE	250	81.50	110	Open	23.43	0.58	254.18	254.01	0.17	2.07
P-4	J-4	J-5	PE	250	28.50	110	Open	27.77	0.57	254.01	253.95	0.06	1.98
P-5	J-5	J-6	PE	250	40.50	110	Open	27.34	0.57	253.95	253.87	0.08	1.99
P-6	J-6	J-7	PE	250	76.50	110	Open	25.36	0.65	253.87	253.82	0.05	1.86
P-7	J-7	J-8	PE	250	180.50	110	Open	25.37	0.51	253.82	253.53	0.30	1.64
P-8	J-8	J-9	PE	250	83.50	110	Open	24.31	0.49	253.53	253.40	0.13	1.52
P-9	J-9	J-10	PE	250	336.50	110	Open	24.78	0.50	253.40	252.86	0.54	1.61
P-11	J-12	J-13	PE	63	138.50	110	Open	1.05	0.21	254.15	253.98	0.16	1.18
P-12	J-13	J-14	PE	63	200.00	110	Open	1.01	0.20	253.98	253.76	0.22	1.09
P-13	J-15	J-15	PE	63	115.50	110	Open	0.77	0.15	254.05	253.97	0.08	0.67
P-14	J-17	J-16	PE	63	167.50	110	Open	1.08	0.22	253.68	253.47	0.20	1.26
P-15	J-18	J-19	PE	63	110.00	110	Open	0.29	0.06	253.47	253.46	0.01	0.11
P-16	J-19	J-20	PE	63	139.50	110	Open	0.65	0.13	253.46	253.39	0.07	0.48
P-17	J-20	J-21	PE	63	411.00	110	Open	0.92	0.18	253.39	253.01	0.38	0.93
P-18	J-2	J-12	PE	63	291.50	110	Open	1.40	0.28	254.73	254.15	0.59	2.01
P-19	J-15	J-3	PE	63	99.00	110	Open	-1.12	0.22	254.05	254.18	0.13	1.33
P-20	J-4	J-13	PE	63	230.00	110	Open	0.31	0.06	254.01	253.98	0.03	0.12
P-21	J-6	J-14	PE	63	233.00	110	Open	0.64	0.13	253.87	253.76	0.11	0.47
P-22	J-16	J-5	PE	63	75.00	110	Open	0.42	0.08	253.97	253.95	0.02	0.22
P-23	J-17	J-7	PE	63	69.00	110	Open	-1.43	0.29	253.68	253.82	0.15	2.11
P-24	J-14	J-9	PE	63	208.00	110	Open	1.29	0.26	253.76	253.40	0.36	1.74
P-25	J-18	J-20	PE	63	326.00	110	Open	0.46	0.09	253.47	253.39	0.08	0.24
P-26	J-8	J-19	PE	63	113.00	110	Open	0.71	0.14	253.53	253.46	0.07	0.66
P-27	J-20	J-9	PE	63	142.50	110	Open	-0.17	0.03	253.39	253.40	0.01	0.04
P-28	J-21	J-10	PE	63	298.00	110	Open	0.57	0.11	253.01	252.86	0.15	0.50
P-30	R-2	J-2	PE	250	105.60	110	Open	31.65	0.64	255.00	254.73	0.27	2.53
P-31	J-10	J-22	PE	250	659.00	110	Open	25.00	0.51	252.86	251.79	1.06	1.63

Petrovec Network Model



Petrovec Network Calculation

Junction Report

Junction ID	Elevation (m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-3	0	0.23	20.6	20.59
J-4	0	0.23	20.51	20.47
J-5	0	0.23	20.38	20.64
J-7	0	0.23	21.59	21.55
J-12	0	0.23	20.47	20.42
J-14	0	0.23	19.33	19.69
J-15	0	0.23	21.53	21.49
J-16	0	0.23	21.40	21.36
J-24	0	0.23	21.35	21.31
J-25	0	0.23	21.20	21.16
J-26	0	0.23	21.14	21.10
J-29	0	0.23	22.19	22.15
J-33	0	0.23	21.29	21.25
J-35	0	0.23	22.08	22.04
J-36	0	0.23	21.57	21.52
J-37	0	0.23	21.59	21.55
J-38	0	0.23	20.18	20.14
J-39	0	0.23	20.10	20.06
J-43	0	0.23	20.36	20.32
J-47	0	0.23	21.13	21.09
J-48	0	0.23	20.60	20.56
J-50	0	0.23	20.47	20.43
J-57	0	0.23	21.27	21.23
J-58	0	0.23	21.26	21.22
J-64	0	0.23	21.51	21.47
J-67	0	0.23	21.13	21.08
J-59	0	0.23	19.80	19.76
J-61	0	0.23	20.59	20.55
J-62	0	0.23	21.48	21.44
J-63	0	0.23	20.47	20.43
J-64	0	0.23	20.70	20.65
J-65	0	0.23	20.46	20.42
J-70	0	0.23	20.54	20.49
J-74	0	0.23	21.26	21.22
J-78	0	0.23	21.04	21.00
J-79	0	0.23	21.60	21.55
J-83	0	0.23	20.53	20.59
J-84	0	0.23	22.78	22.73
J-88	0	0.23	20.96	20.92
J-89	0	0.23	20.79	20.75
J-91	0	0.23	21.16	21.12
J-93	0	0.23	21.13	21.09
J-95	0	0.23	20.07	20.03
J-100	0	0.23	21.53	21.49
J-101	0	0.23	21.52	21.48
J-103	0	0.23	20.56	20.52
J-106	0	0.23	19.92	19.88
J-108	0	0.23	20.56	20.52
J-109	0	0.23	20.09	20.05
J-110	0	0.23	21.55	21.51
J-113	0	0.23	21.21	21.17
J-114	0	0.23	21.22	21.18
J-116	0	0.23	21.31	21.27
J-118	0	0.23	21.13	21.09
J-120	0	0.23	21.53	21.49
J-123	0	0.23	22.58	22.62
J-124	0	0.23	21.16	21.11
J-129	0	0.23	20.13	20.10
J-132	0	0.23	22.54	22.60
J-201	0	0.23	21.14	21.10
J-202	0	0.23	21.10	21.06

Junction ID	Elevation (m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-203	0	0.23	20.87	20.83
J-204	0	0.23	21.25	21.21
J-205	0	0.23	21.31	21.27
J-206	0	0.23	21.42	21.38
J-207	0	0.23	21.36	21.32
J-208	0	0.23	21.35	21.31
J-209	0	0.23	21.35	21.31
J-210	0	0.23	21.35	21.31
J-211	0	0.23	21.35	21.31
J-212	0	0.23	21.41	21.37
J-213	0	0.23	21.10	21.41
J-214	0	0.23	21.54	21.50
J-215	0	0.23	21.53	21.49
J-216	0	0.23	21.53	21.49
J-217	0	0.23	21.11	21.07
J-218	0	0.23	21.10	21.06
J-219	0	0.23	20.46	20.42
J-220	0	0.23	20.47	20.43
J-221	0	0.23	20.45	20.45
J-222	0	0.23	20.50	20.65
J-223	0	0.23	20.90	20.86
J-224	0	0.23	21.27	21.23
J-225	0	0.23	20.46	20.42
J-226	0	0.23	20.73	20.69
J-227	0	0.23	20.65	20.61
J-228	0	0.23	21.01	20.97
J-229	0	0.23	21.11	21.07
J-230	0	0.23	21.22	21.17
J-231	0	0.23	20.93	20.89
J-232	0	0.23	20.58	20.64
J-233	0	0.23	20.57	20.53
J-234	0	0.23	21.01	20.97
J-235	0	0.23	21.00	20.96
J-236	0	0.23	20.96	20.92
J-237	0	0.23	20.84	20.80
J-238	0	0.23	20.77	20.73
J-239	0	0.23	20.71	20.67
J-240	0	0.23	20.59	20.55
J-241	0	0.23	20.54	20.50
J-242	0	0.23	20.31	20.27
J-243	0	0.23	19.30	19.30
J-244	0	0.23	19.37	19.33
J-245	0	0.23	20.57	20.03
J-246	0	0.23	20.53	20.59
J-247	0	0.23	20.39	20.85
J-248	0	0.23	21.05	21.01
J-249	0	0.23	21.33	21.79
J-250	0	0.23	22.21	22.17
J-251	0	0.23	21.76	21.73
J-252	0	0.23	22.75	22.71
J-253	0	0.23	22.18	22.14
J-254	0	0.23	21.82	21.78
J-255	0	0.23	22.09	22.05
J-256	0	0.23	21.22	21.18
J-257	0	0.23	21.22	21.18
J-258	0	0.23	21.44	21.40
J-259	0	0.23	21.46	21.41
J-260	0	0.23	21.43	21.39
J-261	0	0.23	21.47	21.43
J-262	0	0.23	21.53	21.49
J-263	0	0.00	23.04	22.99

Pipe Report

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-9	J-116	J-91	PE	120	228.30	110	Open	-1.01	0.09	21.13	21.16	0.04	0.15
P-11	J-123	J-59	PE	100	164.54	110	Open	-0.46	0.39	22.66	22.19	0.47	2.91
P-13	J-3	J-4	PE	50	125.27	110	Open	0.23	0.12	20.60	20.51	0.09	0.71
P-15	J-38	J-65	PE	50	149.05	110	Open	0.23	0.12	20.18	20.37	0.11	0.71
P-17	J-38	J-39	PE	50	99.07	110	Open	0.23	0.12	20.18	20.10	0.07	0.71
P-21	J-109	J-5	PE	80	155.45	110	Open	-0.69	0.14	20.80	20.38	0.09	0.56
P-23	J-52	J-53	PE	90	135.33	110	Open	0.23	0.05	21.27	21.26	0.01	0.07
P-24	J-25	J-26	PE	50	84.12	110	Open	0.23	0.12	21.20	21.14	0.06	0.71
P-29	J-100	J-101	PE	90	107.46	110	Open	0.23	0.05	21.53	21.52	0.01	0.07
P-30	J-36	J-37	PE	80	381.61	110	Open	-0.23	0.05	21.57	21.59	0.03	0.07
P-38	J-33	J-5	PE	120	189.59	110	Open	-2.77	0.28	21.29	21.53	0.24	1.27
P-31	J-63	J-64	PE	80	408.13	110	Open	-0.69	0.14	20.47	20.70	0.22	0.55
P-129	J-201	J-114	PE	50	119.79	110	Open	-0.23	0.12	21.14	21.22	0.09	0.71
P-130	J-114	J-47	PE	80	279.50	110	Open	0.54	0.11	21.22	21.13	0.10	0.35
P-131	J-47	J-207	PE	80	363.93	110	Open	0.23	0.05	21.13	21.10	0.03	0.07

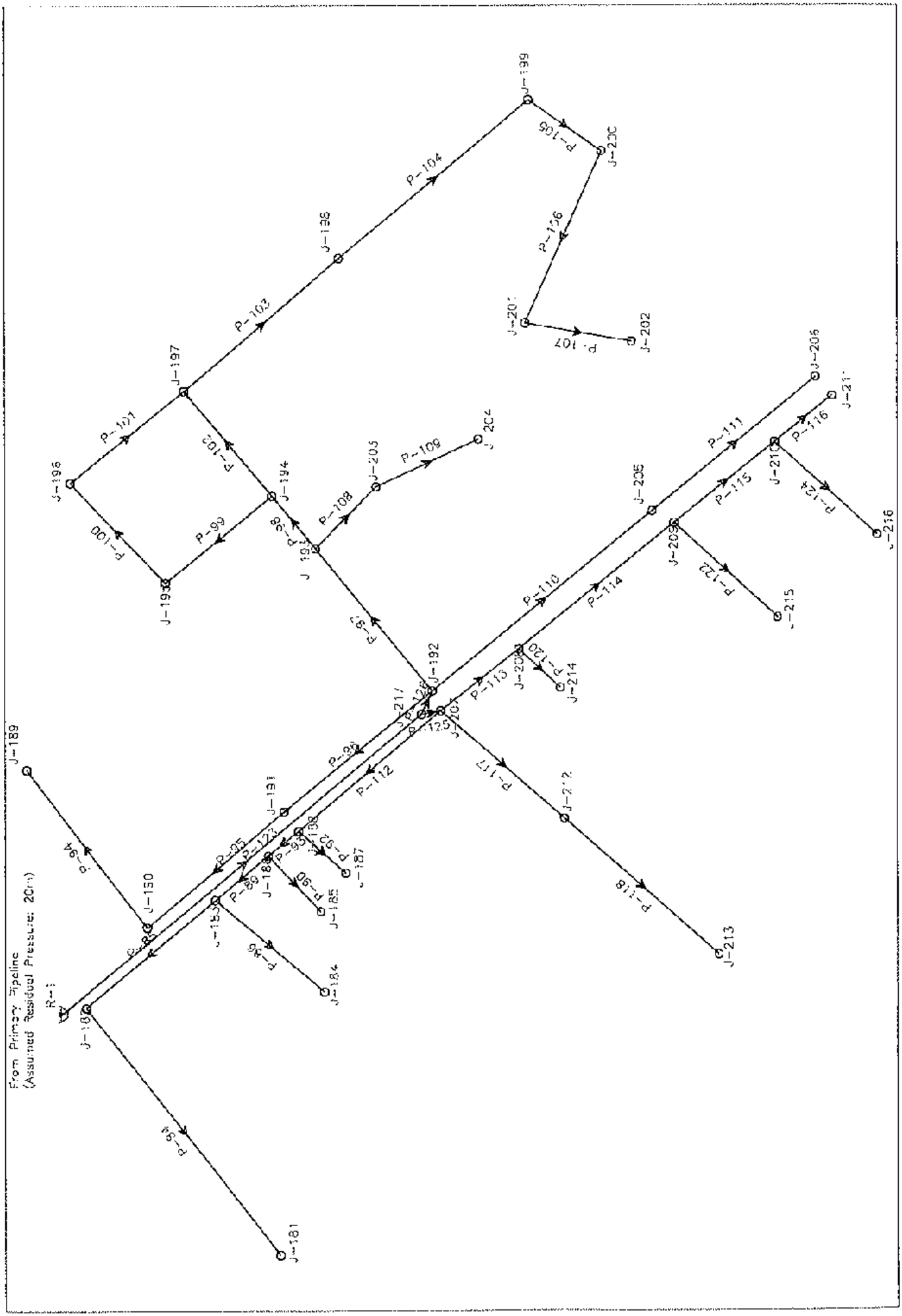
Petrovec Network Calculation

Pipe ID	Start	End	Materia	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-132	J-103	J-64	PE	50	191.11	110	Open	-0.23	0.12	20.56	20.70	0.14	0.71
P-133	J-64	J-203	PE	80	121.92	110	Open	-1.16	0.23	20.70	20.87	0.17	1.42
P-134	J-203	J-204	PE	80	193.55	110	Open	-1.39	0.28	20.87	21.25	0.38	1.98
P-135	J-204	J-205	PE	160	67.33	110	Open	-5.62	0.21	21.25	21.31	0.06	0.83
P-136	J-205	J-120	PE	160	190.20	110	Open	-1.85	0.24	21.31	21.53	0.22	1.14
P-137	J-120	J-206	PE	80	134.72	110	Open	0.87	0.17	21.53	21.42	0.11	0.83
P-138	J-206	J-207	PE	80	117.65	110	Open	3.63	0.13	21.42	21.36	0.05	0.47
P-139	J-207	J-208	PE	80	59.61	110	Open	3.40	0.08	21.36	21.35	0.01	0.23
P-140	J-208	J-209	PE	80	81.69	110	Open	0.17	0.09	21.35	21.35	0.00	0.04
P-141	J-209	J-210	PE	80	50.47	110	Open	-0.06	0.01	21.35	21.35	0.00	0.01
P-142	J-210	J-211	PE	80	32.92	110	Open	-0.23	0.06	21.35	21.35	0.00	0.11
P-143	J-211	J-212	PE	80	169.23	110	Open	-0.52	0.10	21.35	21.41	0.05	0.33
P-144	J-212	J-213	PE	80	71.32	110	Open	-0.75	0.15	21.41	21.45	0.05	0.64
P-145	J-213	J-110	PE	80	94.13	110	Open	-0.99	0.20	21.45	21.55	0.10	1.06
P-146	J-110	J-214	PE	120	69.80	110	Open	1.11	0.10	21.54	21.54	0.01	0.18
P-147	J-214	J-215	PE	120	60.05	110	Open	0.00	0.00	21.54	21.53	0.01	0.12
P-148	J-215	J-103	PE	120	46.02	110	Open	0.65	0.06	21.53	21.53	0.00	0.07
P-149	J-100	J-216	PE	120	102.91	110	Open	0.13	0.02	21.53	21.53	0.00	0.01
P-150	J-216	J-120	PE	120	68.58	110	Open	-0.05	0.00	21.53	21.53	0.00	0.00
P-151	J-30	J-217	PE	80	76.59	110	Open	0.46	0.09	21.11	21.11	0.02	0.26
P-152	J-217	J-218	PE	80	140.21	110	Open	0.23	0.05	21.11	21.10	0.01	0.07
P-153	J-219	J-220	PE	80	80.47	110	Open	-0.23	0.05	20.46	20.47	0.01	0.07
P-154	J-220	J-221	PE	80	64.62	110	Open	-0.46	0.09	20.47	20.49	0.02	0.26
P-155	J-221	J-70	PE	80	97.17	110	Open	-0.69	0.14	20.49	20.54	0.05	0.55
P-156	J-70	J-222	PE	80	107.93	110	Open	-1.16	0.23	21.54	20.69	0.15	1.42
P-157	J-222	J-223	PE	80	107.59	110	Open	-1.39	0.28	20.69	20.90	0.21	1.99
P-159	J-223	J-124	PE	80	96.01	110	Open	-1.62	0.32	20.90	21.16	0.25	2.65
P-160	J-124	J-33	PE	160	67.05	110	Open	-2.47	0.31	21.16	21.29	0.13	1.96
P-161	J-33	J-224	PE	80	76.59	110	Open	0.46	0.09	21.29	21.27	0.02	0.26
P-162	J-33	J-124	PE	160	190.50	110	Open	-0.62	0.08	21.13	21.16	0.03	0.15
P-164	J-224	J-74	PE	80	103.63	110	Open	0.23	0.05	21.27	21.26	0.01	0.07
P-165	J-225	J-70	PE	50	99.67	110	Open	-0.23	0.12	20.68	20.54	0.07	0.71
P-166	J-220	J-103	PE	50	88.39	110	Open	-0.23	0.12	20.73	20.80	0.06	0.71
P-167	J-30	J-47	PE	160	101.54	110	Open	-0.07	0.01	21.13	21.13	0.00	0.00
P-168	J-39	J-103	PE	80	80.16	110	Open	-0.23	0.05	20.79	20.80	0.01	0.07
P-170	J-227	J-5	PE	50	45.72	110	Open	-0.23	0.12	20.85	20.86	0.03	0.71
P-171	J-5	J-223	PE	80	89.61	110	Open	-1.16	0.23	20.68	21.01	0.13	1.42
P-172	J-228	J-223	PE	80	62.43	110	Open	-1.39	0.28	21.01	21.11	0.10	1.99
P-174	J-229	J-52	PE	80	60.65	110	Open	-1.62	0.32	21.11	21.27	0.16	2.65
P-175	J-52	J-15	PE	120	74.63	110	Open	-5.41	0.48	21.27	21.53	0.26	3.49
P-177	J-52	J-230	PE	120	41.15	110	Open	3.93	0.28	21.27	21.22	0.06	1.39
P-178	J-230	J-91	PE	120	43.23	110	Open	3.12	0.27	21.22	21.16	0.05	1.22
P-179	J-31	J-231	PE	80	69.13	110	Open	1.85	0.37	21.16	20.93	0.23	3.39
P-180	J-231	J-232	PE	80	92.05	110	Open	1.62	0.32	20.93	20.68	0.24	2.65
P-181	J-16	J-26	PE	120	98.15	110	Open	4.12	0.36	21.40	21.20	0.20	2.07
P-182	J-232	J-83	PE	80	28.04	110	Open	1.39	0.28	20.68	20.69	0.06	1.99
P-183	J-33	J-61	PE	50	59.44	110	Open	0.23	0.12	20.63	20.89	0.04	0.71
P-184	J-83	J-3	PE	80	33.83	110	Open	0.93	0.18	20.63	20.69	0.03	0.94
P-185	J-3	J-233	PE	80	101.50	110	Open	0.45	0.09	20.69	20.67	0.03	0.26
P-186	J-233	J-105	PE	80	88.70	110	Open	0.21	0.05	20.67	20.66	0.01	0.07
P-187	J-38	J-234	PE	50	72.05	110	Open	-0.23	0.12	20.96	21.14	0.05	0.71
P-188	J-234	J-113	PE	50	44.20	110	Open	-0.46	0.24	21.01	21.13	0.11	2.57
P-189	J-50	J-12	PE	160	51.51	110	Open	0.50	0.06	20.47	20.47	0.01	0.30
P-190	J-25	J-57	PE	120	44.50	110	Open	3.65	0.32	21.20	21.13	0.07	1.66
P-191	J-57	J-78	PE	160	19.01	110	Open	3.74	0.48	21.13	21.09	0.04	4.21
P-192	J-54	J-114	PE	80	253.95	110	Open	1.03	0.20	21.51	21.72	0.29	1.08
P-193	J-78	J-235	PE	50	59.74	110	Open	0.23	0.12	21.04	21.00	0.04	0.71
P-194	J-78	J-236	PE	160	23.77	110	Open	3.28	0.42	21.01	20.96	0.06	3.29
P-195	J-236	J-237	PE	160	43.23	110	Open	3.05	0.39	20.96	20.84	0.12	2.88
P-196	J-237	J-238	PE	160	27.40	110	Open	2.82	0.36	20.84	20.77	0.07	2.40
P-197	J-238	J-239	PE	160	30.75	110	Open	2.59	0.33	20.77	20.71	0.07	2.12
P-198	J-239	J-240	PE	160	55.50	110	Open	2.35	0.30	20.71	20.59	0.12	1.78
P-199	J-240	J-241	PE	160	32.61	110	Open	2.12	0.27	20.59	20.54	0.05	1.47
P-200	J-65	J-63	PE	80	103.98	110	Open	-0.23	0.05	20.48	20.47	0.01	0.07
P-202	J-241	J-60	PE	160	60.05	110	Open	1.89	0.24	20.54	20.47	0.07	1.10
P-203	J-60	J-40	PE	80	76.20	110	Open	1.16	0.23	20.47	20.30	0.17	1.42
P-204	J-40	J-38	PE	50	34.44	110	Open	0.69	0.35	20.33	20.18	0.19	5.44
P-205	J-42	J-242	PE	50	75.29	110	Open	0.23	0.12	20.25	20.31	0.05	0.71
P-206	J-243	J-58	PE	50	95.71	110	Open	-0.23	0.12	19.99	19.92	0.07	0.71
P-207	J-58	J-244	PE	50	45.11	110	Open	0.23	0.12	19.40	19.37	0.03	0.71
P-208	J-110	J-57	PE	120	69.19	110	Open	0.32	0.03	21.13	21.13	0.00	0.02
P-209	J-58	J-14	PE	50	96.93	110	Open	-0.69	0.35	19.40	19.93	0.53	5.44
P-210	J-14	J-106	PE	80	156.97	110	Open	0.23	0.05	19.93	19.92	0.01	0.07
P-211	J-245	J-120	PE	50	90.83	110	Open	-0.23	0.12	20.07	20.14	0.06	0.71
P-212	J-120	J-14	PE	80	145.38	110	Open	1.16	0.23	20.14	19.93	0.21	1.42
P-213	J-106	J-17	PE	80	124.66	110	Open	-1.62	0.32	20.14	20.47	0.33	2.65
P-214	J-12	J-246	PE	80	85.95	110	Open	-1.35	0.27	20.47	20.63	0.16	1.89
P-215	J-246	J-247	PE	80	103.63	110	Open	-1.58	0.31	20.63	20.89	0.26	2.53
P-216	J-247	J-248	PE	80	50.29	110	Open	-1.81	0.36	20.89	21.05	0.16	3.26
P-217	J-248	J-249	PE	80	150.50	110	Open	-2.04	0.41	21.05	21.82	0.78	4.97
P-218	J-245	J-64	PE	80	190.80	110	Open	-2.28	0.45	21.83	22.78	0.95	4.90
P-219	J-84	J-250	PE	160	156.36	110	Open	3.45	0.44	22.78	22.21	0.57	3.62
P-220	J-250	J-251	PE	160	125.64	110	Open	3.22	0.41	22.21	21.78	0.43	3.40

Petrovec Network Calculation

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-221	J-251	J-16	PE	100	135.33	110	Open	2.99	0.38	21.78	21.40	0.38	2.77
P-222	J-84	J-252	PE	80	312.72	110	Open	0.23	0.05	22.78	22.75	0.02	0.07
P-223	J-132	J-123	PE	80	319.40	110	Open	-0.73	0.05	22.84	22.66	0.02	0.07
P-224	J-123	J-253	PE	100	150.92	110	Open	3.20	0.41	22.66	22.18	0.48	3.15
P-225	J-253	J-254	PE	100	137.37	110	Open	2.97	0.38	22.18	21.82	0.36	2.71
P-226	J-254	J-7	PE	100	95.10	110	Open	2.74	0.35	21.82	21.60	0.22	2.35
P-227	J-7	J-110	PE	120	52.97	110	Open	2.30	0.21	21.60	21.55	0.04	0.72
P-228	J-7	J-37	PE	100	40.54	110	Open	0.18	0.02	21.60	21.60	0.00	0.01
P-229	J-35	J-29	PE	50	157.89	110	Open	-0.23	0.12	22.09	22.19	0.11	0.71
P-230	J-29	J-255	PE	50	147.43	110	Open	0.23	0.12	22.19	22.09	0.10	0.71
P-232	J-113	J-116	PE	50	145.69	110	Open	-0.23	0.12	21.21	21.31	0.10	0.71
P-233	J-116	J-24	PE	80	38.58	110	Open	-0.69	0.14	21.31	21.35	0.04	0.55
P-234	J-24	J-62	PE	80	92.66	110	Open	-1.16	0.23	21.35	21.48	0.13	1.42
P-235	J-62	J-79	PE	80	34.14	110	Open	-1.35	0.27	21.48	21.60	0.12	3.39
P-236	J-79	J-29	PE	100	331.07	110	Open	-2.37	0.30	21.60	22.19	0.60	1.81
P-237	J-116	J-256	PE	50	126.58	110	Open	0.23	0.12	21.31	21.22	0.09	0.71
P-238	J-257	J-24	PE	50	175.07	110	Open	-0.23	0.12	21.22	21.35	0.13	0.71
P-241	J-258	J-259	PE	80	146.09	110	Open	-0.23	0.05	21.44	21.48	0.04	0.02
P-242	J-259	J-62	PE	80	99.67	110	Open	-0.46	0.09	21.48	21.48	0.03	0.26
P-243	J-260	J-16	PE	120	38.76	110	Open	1.26	0.12	21.45	21.40	0.01	0.27
P-244	J-15	J-261	PE	120	132.67	110	Open	1.32	0.16	21.53	21.47	0.06	0.46
P-245	J-261	J-260	PE	120	110.95	110	Open	1.50	0.14	21.47	21.43	0.04	0.36
P-247	J-262	J-120	PE	250	1.62	110	Open	2.99	0.00	21.53	21.53	0.00	0.00
P-248	J-60	J-48	PE	50	39.06	110	Open	0.23	0.12	20.47	20.40	0.07	0.71
P-249	J-15	J-262	PE	250	6.77	110	Open	-10.53	0.22	21.53	21.53	0.00	0.34
P-250	J-262	J-64	PE	200	1,157.33	110	Open	1.23	0.04	21.53	21.51	0.02	0.02
P-251	R-1	J-263	PE	200	327.86	110	Open	28.31	0.89	25.00	23.04	1.96	5.99
P-252	J-263	J-262	PE	200	790.76	110	Open	15.09	0.48	23.04	21.53	1.51	1.90
P-253	J-263	J-84	PE	100	24.09	110	Open	6.19	0.79	23.04	22.78	0.26	10.68
P-254	J-263	J-123	PE	100	30.18	110	Open	6.79	0.86	23.04	22.05	0.30	12.46
P-255	J-79	J-37	PE	100	57.57	110	Open	0.29	0.04	21.60	21.60	0.00	0.04

Rzanicino Network Model



Junction Report

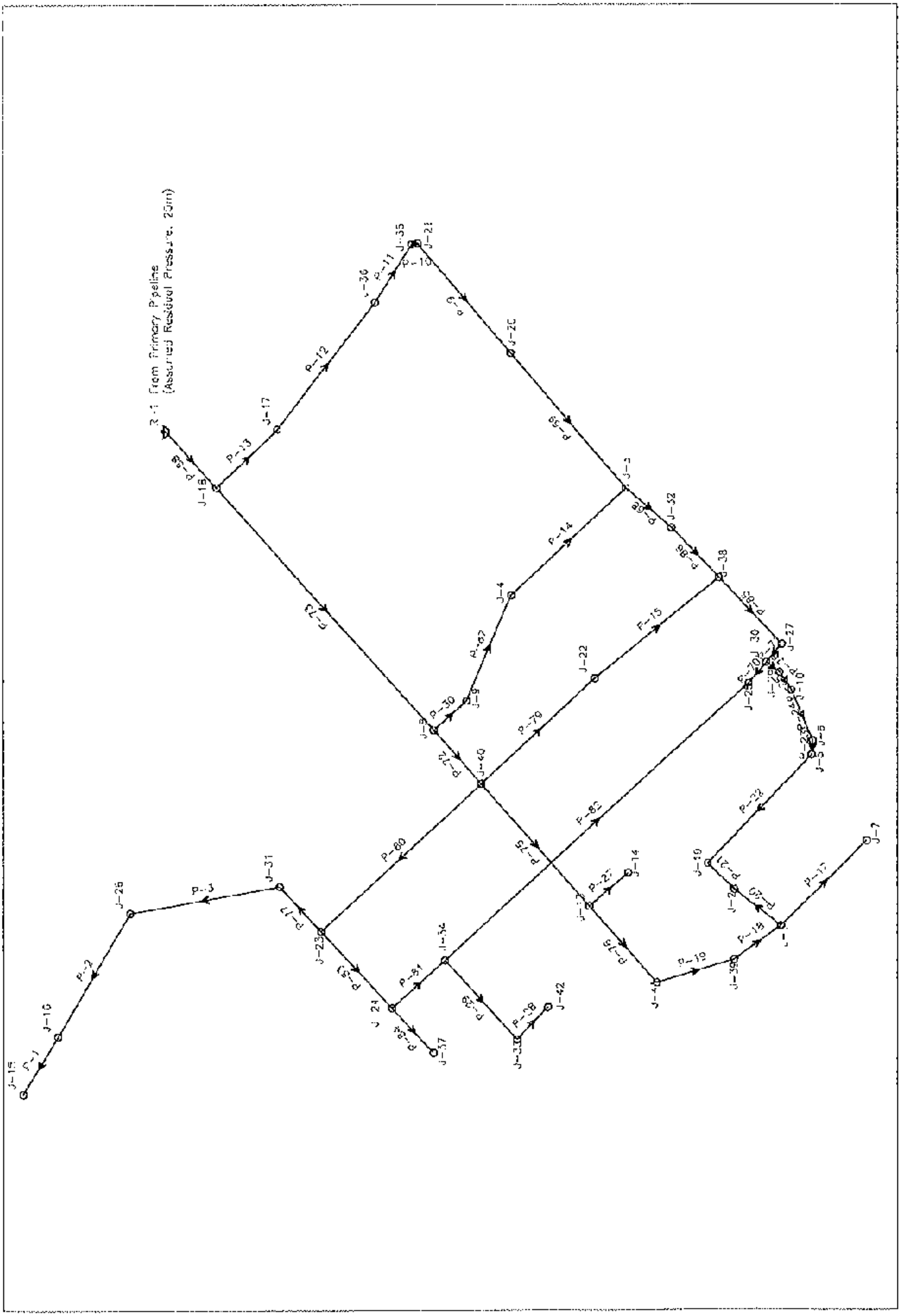
Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-181	0	0.27	19.2	19.17
J-182	0	0.27	19.25	19.21
J-183	0	0.27	19.28	19.24
J-184	0	0.27	19.26	19.22
J-185	0	0.27	19.21	19.17
J-186	0	0.27	19.32	19.28
J-187	0	0.27	19.28	19.24
J-188	0	0.27	19.37	19.33
J-189	0	0.27	19.46	19.42
J-190	0	0.27	19.49	19.45
J-191	0	0.27	19.58	19.54
J-192	0	0.27	19.78	19.75
J-193	0	0.27	18.91	18.87
J-194	0	0.27	18.71	18.68
J-195	0	0.27	18.61	18.57
J-196	0	0.27	18.57	18.53
J-197	0	0.27	18.56	18.52
J-198	0	0.27	17.99	17.95
J-199	0	0.27	17.54	17.50

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-200	0	0.27	17.44	17.41
J-201	0	0.27	17.34	17.31
J-202	0	0.27	17.30	17.26
J-203	0	0.27	18.85	18.82
J-204	0	0.27	18.85	18.81
J-205	0	0.27	19.64	19.60
J-206	0	0.27	19.61	19.57
J-207	0	0.27	19.79	19.75
J-208	0	0.27	19.62	19.58
J-209	0	0.27	19.43	19.39
J-210	0	0.27	19.38	19.34
J-211	0	0.27	19.38	19.34
J-212	0	0.27	19.71	19.67
J-213	0	0.27	19.68	19.64
J-214	0	0.27	19.54	19.50
J-215	0	0.27	19.41	19.37
J-216	0	0.27	19.38	19.34
J-217	0	0.27	19.79	19.75

Pipe Report

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-84	J-181	J-182	PE	80	472.14	110	Open	-0.27	0.05	19.20	19.25	0.04	0.09
P-85	J-182	J-183	PE	100	254.20	110	Open	-0.53	0.07	19.25	19.28	0.03	0.11
P-86	J-183	J-184	PE	80	217.63	110	Open	0.27	0.05	19.26	19.26	0.02	0.09
P-89	J-183	J-186	PE	100	135.16	110	Open	-1.06	0.14	19.28	19.32	0.04	0.41
P-90	J-185	J-186	PE	50	116.10	110	Open	0.27	0.14	19.32	19.21	0.11	0.92
P-92	J-187	J-188	PE	50	30.32	110	Open	-0.27	0.14	19.28	19.37	0.09	0.92
P-93	J-188	J-189	PE	100	50.05	110	Open	1.60	0.20	19.37	19.32	0.05	0.87
P-94	J-189	J-190	PE	80	33.14	110	Open	-0.27	0.05	19.46	19.49	0.03	0.09
P-95	J-190	J-191	PE	80	277.09	110	Open	-0.53	0.11	19.49	19.58	0.09	0.34
P-96	J-191	J-192	PE	80	291.39	110	Open	-0.80	0.16	19.58	19.78	0.21	0.71
P-97	J-192	J-193	PE	100	280.17	110	Open	3.19	0.41	19.78	18.91	0.88	3.14
P-98	J-193	J-194	PE	100	194.55	110	Open	2.40	0.31	18.91	18.71	0.19	1.00
P-99	J-194	J-195	PE	80	230.40	110	Open	0.67	0.13	18.71	18.61	0.11	0.51
P-100	J-195	J-196	PE	80	259.76	110	Open	0.40	0.08	18.61	18.57	0.04	0.20
P-101	J-196	J-197	PE	80	220.68	110	Open	0.13	0.03	18.57	18.56	0.01	0.02
P-102	J-197	J-198	PE	100	208.18	110	Open	-1.06	0.19	18.56	18.71	0.15	0.74
P-103	J-197	J-199	PE	80	309.69	110	Open	1.33	0.25	18.56	17.99	0.57	1.84
P-104	J-198	J-199	PE	80	373.38	110	Open	1.06	0.21	17.99	17.54	0.45	1.22
P-105	J-199	J-200	PE	80	135.03	110	Open	0.80	0.16	17.54	17.44	0.10	0.71
P-106	J-200	J-201	PE	80	282.05	110	Open	0.53	0.11	17.44	17.34	0.10	0.34
P-107	J-201	J-202	PE	80	164.80	110	Open	0.27	0.05	17.34	17.33	0.02	0.09
P-108	J-193	J-203	PE	80	131.98	110	Open	0.53	0.11	18.91	18.86	0.04	0.34
P-109	J-203	J-204	PE	80	170.39	110	Open	0.27	0.05	18.86	18.85	0.01	0.09
P-110	J-192	J-205	PE	80	433.13	110	Open	0.53	0.11	19.78	19.64	0.15	0.34
P-111	J-205	J-206	PE	80	321.56	110	Open	0.27	0.05	19.64	19.61	0.03	0.09
P-112	J-186	J-207	PE	100	283.48	110	Open	-2.13	0.27	19.37	19.79	0.42	1.48
P-113	J-207	J-208	PE	100	152.10	110	Open	1.86	0.24	19.79	19.62	0.18	1.16
P-114	J-208	J-209	PE	100	305.10	110	Open	1.33	0.17	19.62	19.43	0.19	0.62
P-115	J-209	J-210	PE	100	196.29	110	Open	0.80	0.10	19.43	19.38	0.05	0.24
P-116	J-210	J-211	PE	100	112.78	110	Open	0.27	0.03	19.38	19.38	0.00	0.01
P-117	J-207	J-212	PE	80	250.55	110	Open	0.53	0.11	19.79	19.71	0.08	0.34
P-118	J-212	J-213	PE	80	314.26	110	Open	0.27	0.05	19.71	19.68	0.03	0.09
P-120	J-214	J-208	PE	50	86.37	110	Open	-0.27	0.14	19.54	19.62	0.08	0.92
P-122	J-215	J-209	PE	80	283.37	110	Open	-0.27	0.05	19.41	19.43	0.02	0.09
P-123	R-1	J-217	PE	250	708.36	110	Open	9.85	0.20	20.00	19.79	0.21	0.29
P-124	J-216	J-210	PE	80	212.14	110	Open	0.27	0.05	19.36	19.38	0.02	0.09
P-125	J-217	J-207	PE	250	29.57	110	Open	4.79	0.10	19.79	19.79	0.00	0.08
P-126	J-217	J-192	PE	200	39.30	110	Open	4.79	0.15	19.79	19.78	0.01	0.23

Ognanci Network Model



Junction Report

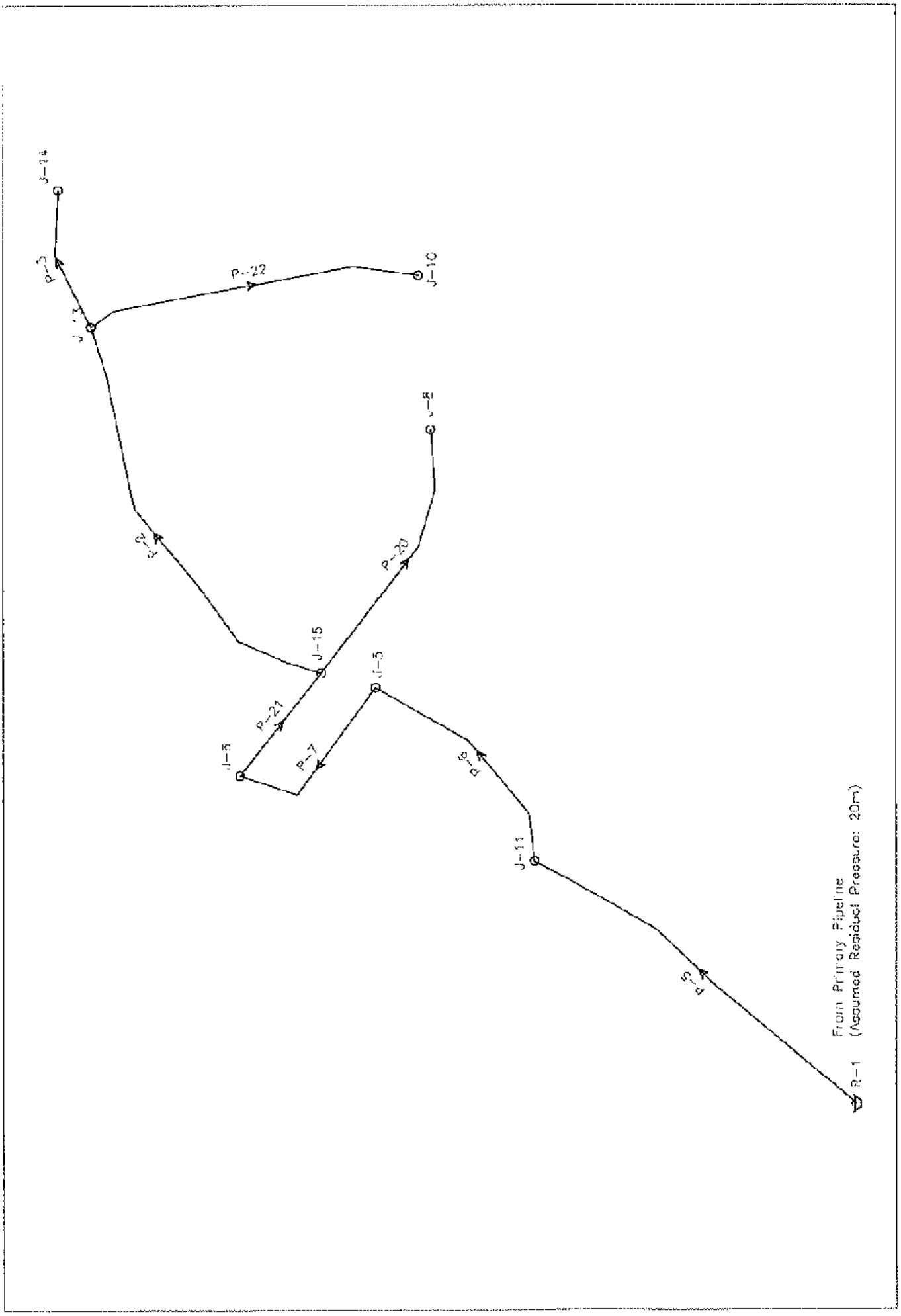
Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-1	225	0.27	248.07	23.02
J-2	225	0.27	248.08	23.01
J-3	225	0.27	248.78	23.74
J-4	225	0.27	248.80	23.65
J-5	225	0.27	248.03	23.03
J-6	225	0.27	248.03	23.03
J-7	225	0.27	248.05	23.01
J-8	225	0.27	249.12	24.07
J-9	225	0.27	249.04	23.99
J-10	225	0.27	248.12	23.06
J-12	225	0.27	248.42	23.37
J-14	225	0.27	248.41	23.37
J-15	225	0.27	248.22	23.17
J-16	225	0.27	248.23	23.18
J-17	225	0.27	249.43	24.43
J-18	225	0.27	249.77	24.72
J-19	225	0.27	248.05	23.01
J-20	225	0.27	249.04	23.79
J-21	225	0.27	249.97	23.68
J-22	225	0.27	248.03	23.78

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-23	225	0.27	248.47	23.43
J-24	225	0.27	248.75	23.20
J-25	225	0.27	248.18	23.14
J-26	225	0.27	248.28	23.23
J-27	225	0.27	248.27	23.22
J-29	225	0.27	248.15	23.10
J-30	225	0.27	248.16	23.14
J-31	225	0.27	248.39	23.05
J-32	225	0.27	248.71	23.67
J-33	225	0.27	248.15	23.10
J-34	225	0.27	248.19	23.14
J-35	225	0.27	248.94	23.89
J-36	225	0.27	249.06	24.02
J-37	225	0.27	248.24	23.20
J-38	225	0.27	248.57	23.63
J-39	225	0.27	248.11	23.07
J-40	225	0.27	249.02	23.97
J-41	225	0.27	248.22	23.17
J-42	225	0.27	248.14	23.10

Pipe Report

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-1	J-15	J-16	PE	90	21.63	110	Open	-0.27	0.35	248.22	248.23	0.01	0.09
P-2	J-15	J-26	PE	90	152.10	110	Open	-0.53	0.17	248.23	248.28	0.05	0.34
P-3	J-25	J-31	PE	90	163.27	110	Open	-0.80	0.16	248.28	248.39	0.12	0.7
P-9	J-20	J-21	PE	90	153.31	110	Open	0.74	0.16	248.84	248.09	0.10	0.63
P-10	J-21	J-35	PE	90	0.40	110	Open	-1.01	0.24	248.53	248.94	0.01	1.10
P-11	J-35	J-36	PE	90	73.15	110	Open	-1.28	0.23	248.94	249.06	0.12	1.70
P-12	J-33	J-17	PE	90	170.59	110	Open	-1.54	0.3	249.06	249.48	0.41	2.42
P-13	J-17	J-18	PE	90	90.22	110	Open	-1.81	0.36	249.48	249.77	0.29	3.25
P-14	J-3	J-4	PE	90	168.86	110	Open	-0.77	0.15	248.78	248.89	0.11	0.66
P-15	J-38	J-22	PE	150	174.81	110	Open	-1.81	0.2	248.67	248.82	0.15	0.89
P-17	J-7	J-1	PE	90	129.84	110	Open	-0.27	0.35	248.05	248.07	0.01	0.09
P-18	J-1	J-35	PE	90	61.87	110	Open	-0.00	0.16	248.07	249.11	0.04	0.71
P-19	J-39	J-41	PE	90	66.87	110	Open	-1.07	0.21	248.11	249.22	0.11	1.22
P-20	J-1	J-7	PE	90	63.70	110	Open	0.27	0.35	248.07	248.05	0.01	0.09
P-21	J-2	J-19	PE	90	39.53	110	Open	0.00	0.39	248.06	248.05	0.00	0.09
P-22	J-10	J-5	PE	90	161.24	110	Open	-0.27	0.35	248.06	248.03	0.01	0.09
P-23	J-5	J-6	PE	90	15.24	110	Open	-0.53	0.17	248.03	248.03	0.01	0.34
P-24	J-6	J-10	PE	90	39.13	110	Open	-0.00	0.16	248.03	249.12	0.04	0.71
P-25	J-10	J-25	PE	90	22.56	110	Open	-1.06	0.2	248.12	248.15	0.03	1.21
P-26	J-24	J-30	PE	90	18.29	110	Open	-1.33	0.26	248.15	248.18	0.03	1.34
P-27	J-13	J-12	PE	90	54.86	110	Open	0.27	0.35	248.42	248.41	0.01	0.09
P-28	J-42	J-32	PE	90	47.65	110	Open	-0.27	0.35	248.14	248.15	0.00	0.09
P-29	J-33	J-34	PE	90	114.60	110	Open	-0.53	0.1	248.15	248.19	0.04	0.34
P-30	J-8	J-9	PE	90	46.54	110	Open	1.30	0.26	249.12	249.04	0.08	1.76
P-68	J-32	J-3	PE	90	85.53	110	Open	-0.58	0.19	248.71	248.78	0.07	1.04
P-69	J-3	J-20	PE	90	190.59	110	Open	-0.48	0.10	248.78	248.84	0.05	0.28
P-70	J-25	J-30	PE	90	28.96	110	Open	-0.00	0.04	248.18	248.18	0.00	0.05
P-71	J-33	J-27	PE	90	25.60	110	Open	-1.09	0.36	248.18	248.27	0.08	3.19
P-72	J-42	J-8	PE	160	77.11	110	Open	-6.74	0.34	248.02	249.12	0.10	1.27
P-73	J-8	J-16	PE	160	349.09	110	Open	-6.31	0.41	249.12	249.77	0.65	1.87
P-75	J-42	J-13	PE	90	175.56	110	Open	1.86	0.37	248.02	248.42	0.00	3.43
P-76	J-13	J-41	PE	90	109.42	110	Open	1.59	0.26	248.42	248.22	0.20	1.84
P-77	J-31	J-23	PE	90	64.92	110	Open	-1.06	0.21	248.39	248.47	0.08	1.22
P-79	J-22	J-40	PE	100	165.73	110	Open	-1.88	0.24	248.62	249.02	0.20	1.18
P-80	J-43	J-23	PE	100	203.17	110	Open	2.73	0.35	248.02	248.47	0.55	2.35
P-81	J-24	J-34	PE	90	75.59	110	Open	0.07	0.17	248.25	248.19	0.06	0.83
P-87	J-34	J-25	PE	90	442.26	110	Open	0.07	0.01	248.19	248.18	0.00	0.01
P-83	J-23	J-24	PE	90	111.56	110	Open	1.40	0.28	248.47	248.25	0.23	2.02
P-84	J-24	J-37	PE	90	64.62	110	Open	0.27	0.05	248.25	248.24	0.01	0.09
P-85	J-27	J-38	PE	90	98.45	110	Open	-2.06	0.41	248.27	248.67	0.41	4.13
P-86	J-39	J-32	PE	90	73.76	110	Open	-0.71	0.14	248.67	248.71	0.04	0.58
P-87	J-9	J-4	PE	90	123.14	110	Open	1.03	0.21	249.04	248.89	0.14	1.16
P-88	R-1	J-18	PE	160	31.69	110	Open	10.38	0.62	250.00	249.77	0.23	2.82

Kjoilija Network Model



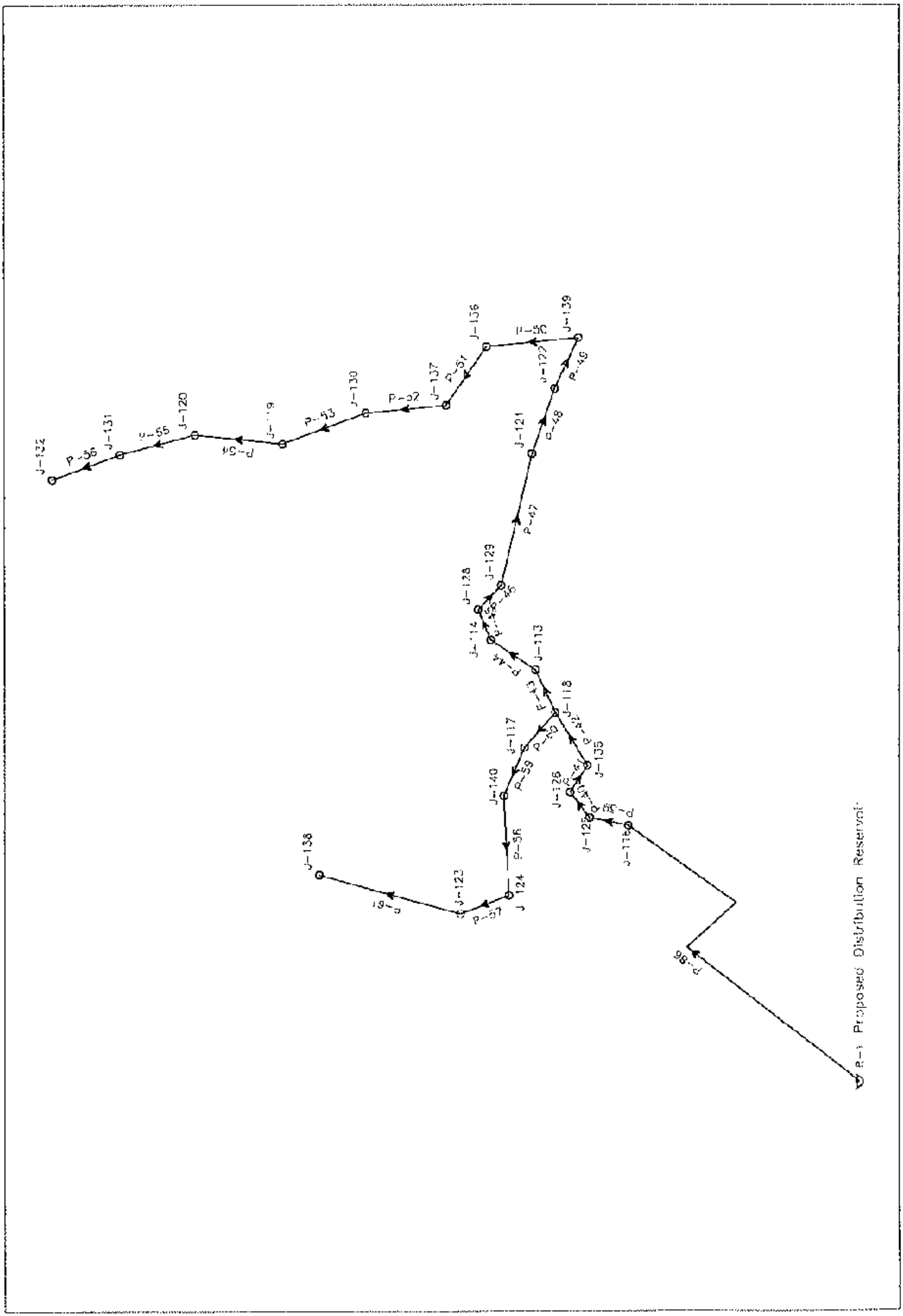
Junction Report

Junction ID	Elevation (m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-5	0	0.44	17.17	17.13
J-6	0	0.44	16.09	16.05
J-9	0	0.44	15.40	15.36
J-10	0	0.44	14.70	14.76
J-11	0	0.44	19.05	19.01
J-13	0	0.44	14.85	14.81
J-14	0	0.44	14.83	14.80
J-15	0	0.44	15.55	15.52

Pipe Report

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-2	J-15	J-13	PE	63	334.66	110	Open	1.32	0.26	15.55	14.85	0.70	1.91
P-3	J-13	J-14	PE	63	122.36	110	Open	0.44	0.09	14.85	14.83	0.03	0.20
P-5	R-1	J-11	PE	140	1,330.00	110	Open	3.52	0.23	20.00	19.05	0.95	0.73
P-6	J-11	J-5	PE	63	217.02	110	Open	3.08	0.61	19.05	17.17	1.89	8.69
P-7	J-5	J-9	PE	63	130.73	110	Open	2.64	0.52	17.17	15.68	1.09	8.53
P-20	J-6	J-15	PE	63	241.71	110	Open	-0.44	0.09	16.49	15.55	0.06	0.24
P-21	J-6	J-15	PE	63	113.35	110	Open	2.20	0.44	16.08	15.55	0.53	4.66
P-22	J-13	J-10	PE	63	230.75	110	Open	0.44	0.09	14.85	14.79	0.07	0.24

Cvetovo Network Model



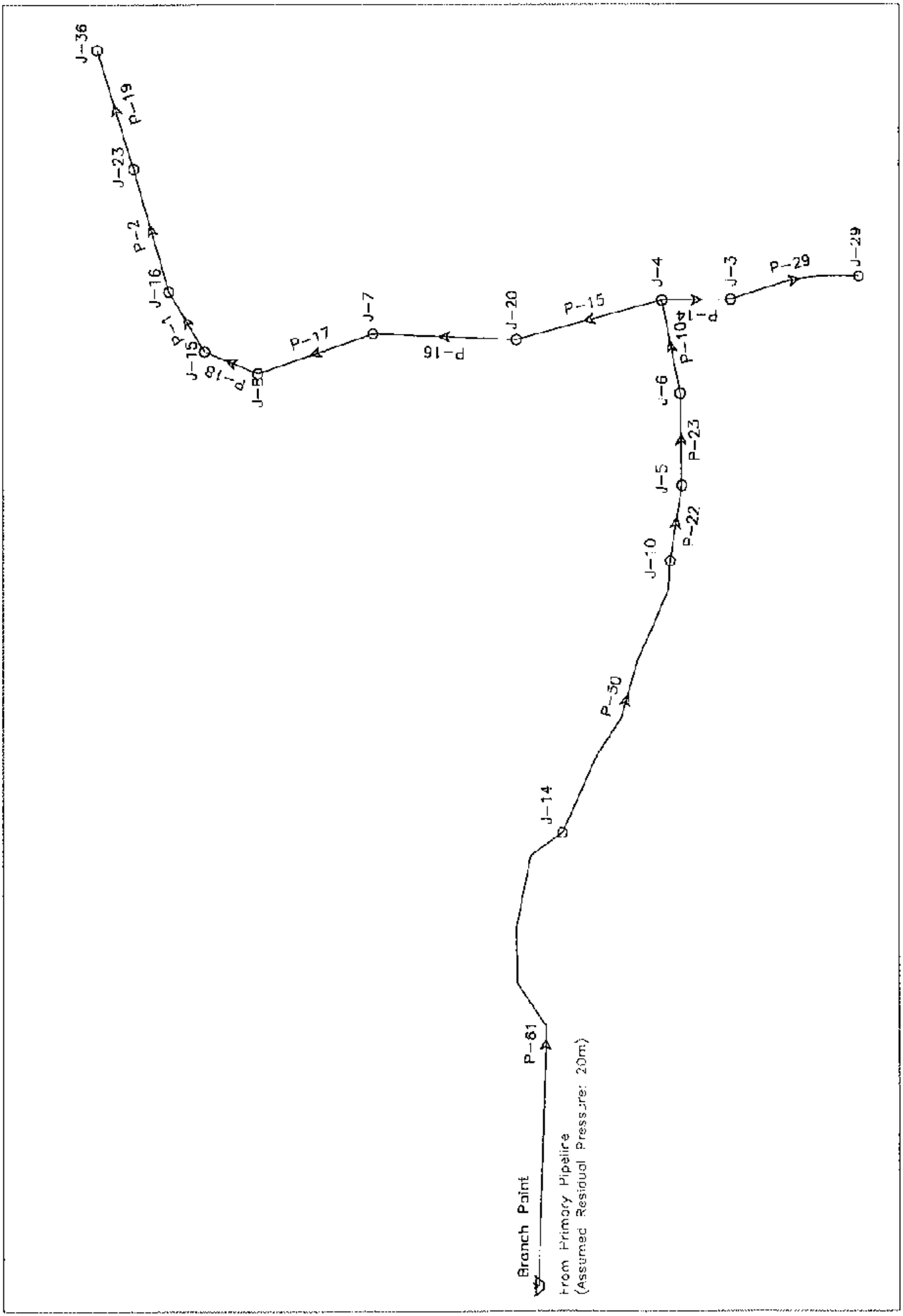
Junction Report

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-113	830	0,20	902,66	72,51
J-114	837	0,20	902,44	65,39
J-116	840	0,20	904,60	64,47
J-117	830	0,20	902,79	72,65
J-118	830	0,20	902,80	72,74
J-119	825	0,20	901,34	76,19
J-120	825	0,20	901,32	76,17
J-121	830	0,20	901,87	71,70
J-122	830	0,20	901,73	71,58
J-123	835	0,20	902,63	67,58
J-124	830	0,20	902,65	72,59
J-125	840	0,20	904,13	64,02
J-126	840	0,20	903,70	63,65
J-128	837	0,20	902,32	65,15
J-129	837	0,20	902,22	65,09
J-130	825	0,20	901,36	76,23
J-131	835	0,20	901,31	66,18
J-132	835	0,20	901,31	66,17
J-135	840	0,20	903,46	63,33
J-136	845	0,20	901,51	56,34
J-137	815	0,20	901,44	86,27
J-138	835	0,20	902,62	67,48
J-139	826	0,20	901,63	75,48
J-140	830	0,20	902,73	72,58

Pipe Report

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-39	J-116	J-125	PE	80	26,52	110	Open	4,55	0,90	904,60	904,13	0,47	17,73
P-40	J-125	J-126	PE	80	21,64	110	Open	4,35	0,86	904,13	903,78	0,35	16,03
P-41	J-126	J-135	PE	80	21,64	110	Open	4,15	0,82	903,78	903,46	0,32	14,93
P-42	J-135	J-118	PE	80	41,76	110	Open	3,94	0,78	903,46	902,88	0,57	13,63
P-43	J-118	J-113	PE	80	31,70	110	Open	2,75	0,55	902,88	902,66	0,22	7,07
P-44	J-113	J-114	PE	90	36,27	110	Open	2,56	0,51	902,66	902,44	0,22	6,15
P-45	J-114	J-128	PE	80	21,95	110	Open	2,36	0,47	902,44	902,32	0,12	5,31
P-46	J-128	J-129	PE	80	22,56	110	Open	2,16	0,43	902,32	902,22	0,10	4,52
P-47	J-129	J-121	PE	80	90,80	110	Open	1,97	0,39	902,22	901,87	0,34	3,79
P-48	J-121	J-122	PE	80	46,33	110	Open	1,77	0,35	901,87	901,73	0,14	3,12
P-49	J-122	J-139	PE	80	37,49	110	Open	1,57	0,31	901,73	901,63	0,09	2,51
P-50	J-139	J-136	PE	80	61,87	110	Open	1,36	0,27	901,63	901,51	0,12	1,95
P-51	J-136	J-137	PE	80	47,85	110	Open	1,16	0,23	901,51	901,44	0,07	1,47
P-52	J-137	J-130	PE	80	54,56	110	Open	0,96	0,20	901,44	901,36	0,08	1,05
P-53	J-130	J-119	PE	80	59,14	110	Open	0,75	0,15	901,36	901,34	0,04	0,69
P-54	J-119	J-120	PE	80	58,83	110	Open	0,59	0,12	901,34	901,32	0,02	0,41
P-55	J-128	J-131	PE	80	51,51	110	Open	0,39	0,08	901,32	901,31	0,01	0,14
P-56	J-131	J-132	PE	80	48,46	110	Open	0,20	0,04	901,31	901,31	0,00	0,05
P-57	J-123	J-124	PE	65	35,05	110	Open	-0,39	0,12	902,63	902,65	0,02	0,53
P-58	J-124	J-140	PE	65	66,75	110	Open	-0,59	0,18	902,65	902,73	0,07	1,12
P-59	J-140	J-117	PE	65	35,30	110	Open	-0,79	0,24	902,73	902,79	0,07	1,91
P-60	J-117	J-118	PE	65	31,39	110	Open	-0,98	0,30	902,79	902,80	0,00	2,89
P-61	J-123	J-138	PE	65	92,45	110	Open	0,20	0,06	902,63	902,62	0,01	0,15
P-86	R-1	J-116	PE	80	281,33	110	Open	4,72	0,94	910,00	904,60	5,40	19,19

Taor Network Model



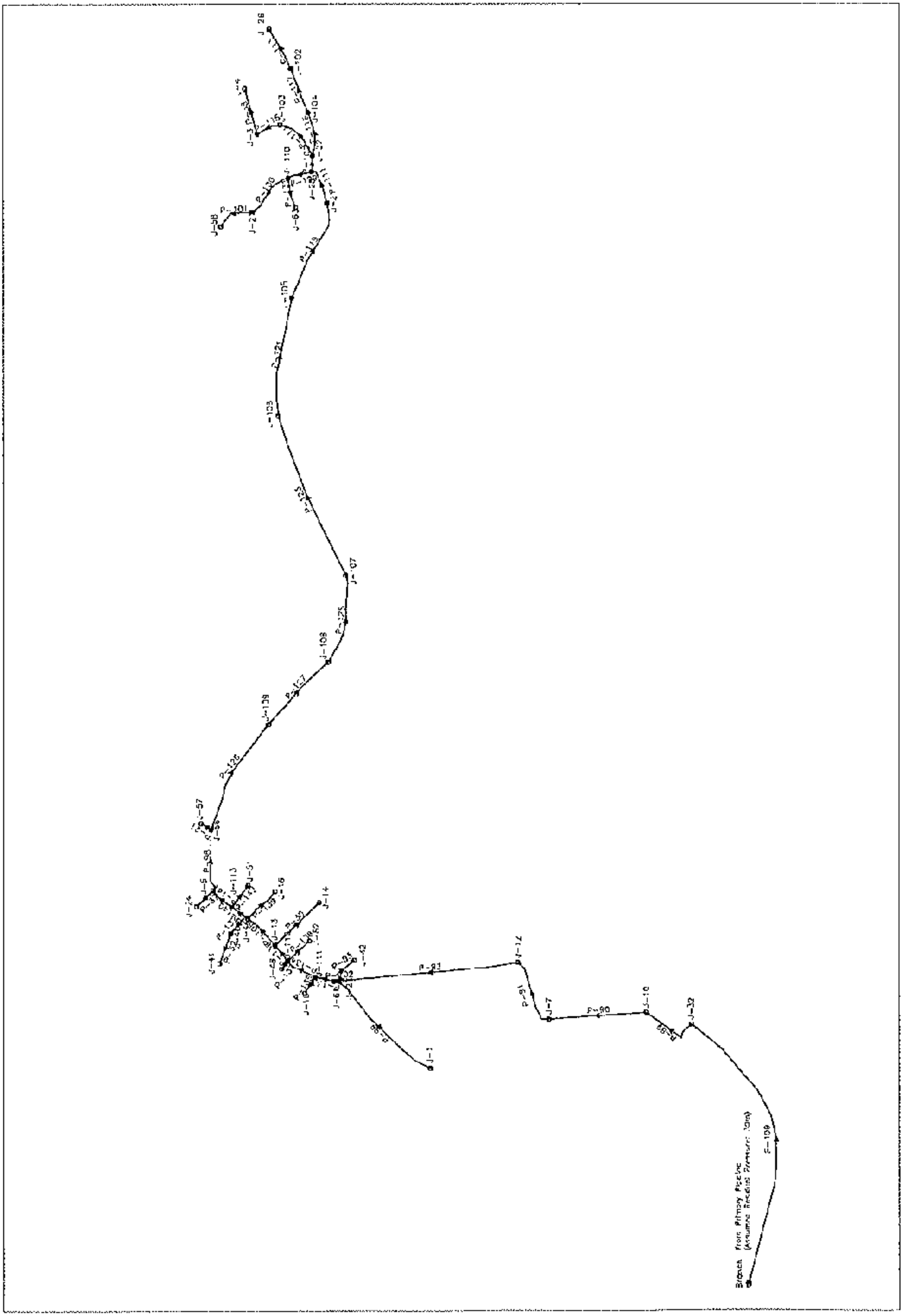
Junction Report

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-3	240	0.15	259.02	18.98
J-4	240	0.15	259.02	18.98
J-5	240	0.15	259.14	19.10
J-6	240	0.15	259.08	19.04
J-7	240	0.15	258.79	18.75
J-8	240	0.15	258.73	18.69
J-10	240	0.15	259.23	19.16
J-14	240	0.15	259.48	19.34
J-15	240	0.15	258.71	18.67
J-16	240	0.15	258.70	18.66
J-20	240	0.15	258.69	18.65
J-22	240	0.15	258.69	18.65
J-26	240	0.15	259.01	18.97
J-28	240	0.15	258.69	18.65

Pipe Report

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-1	J-15	J-16	PE	80	57.43	110	Open	0.45	0.09	258.71	258.70	0.01	0.25
P-2	J-15	J-20	PE	80	95.10	110	Open	0.30	0.06	258.70	258.69	0.01	0.12
P-10	J-6	J-7	PE	100	75.02	110	Open	1.50	0.19	259.08	259.02	0.05	0.77
P-14	J-3	J-4	PE	100	62.12	110	Open	-0.30	0.01	259.02	259.02	0.00	0.01
P-15	J-4	J-20	PE	80	114.30	110	Open	1.65	0.21	259.02	258.88	0.14	1.18
P-16	J-22	J-7	PE	80	107.80	110	Open	0.90	0.18	258.88	258.73	0.10	0.89
P-17	J-7	J-8	PE	80	92.35	110	Open	0.30	0.15	258.79	258.73	0.06	0.64
P-18	J-8	J-16	PE	80	42.90	110	Open	0.60	0.12	258.73	258.71	0.02	0.42
P-19	J-23	J-26	PE	80	92.65	110	Open	0.15	0.03	258.69	258.69	0.00	0.05
P-22	J-10	J-5	PE	100	57.61	110	Open	1.80	0.23	259.20	259.14	0.06	1.03
P-23	J-5	J-6	PE	100	98.49	110	Open	1.65	0.21	259.14	259.08	0.06	0.62
P-29	J-3	J-29	PE	65	99.97	110	Open	0.15	0.05	259.02	259.01	0.01	0.09
P-30	J-14	J-10	PE	100	222.81	110	Open	1.95	0.25	259.48	259.20	0.28	1.25
P-31	Branch Point	J-14	PE	100	359.65	110	Open	2.10	0.27	260.00	259.48	0.52	1.44

Pako Sevo & Novo Selo Network Model



Pako Sevo Novo Selo Network Calculation

Junction Report

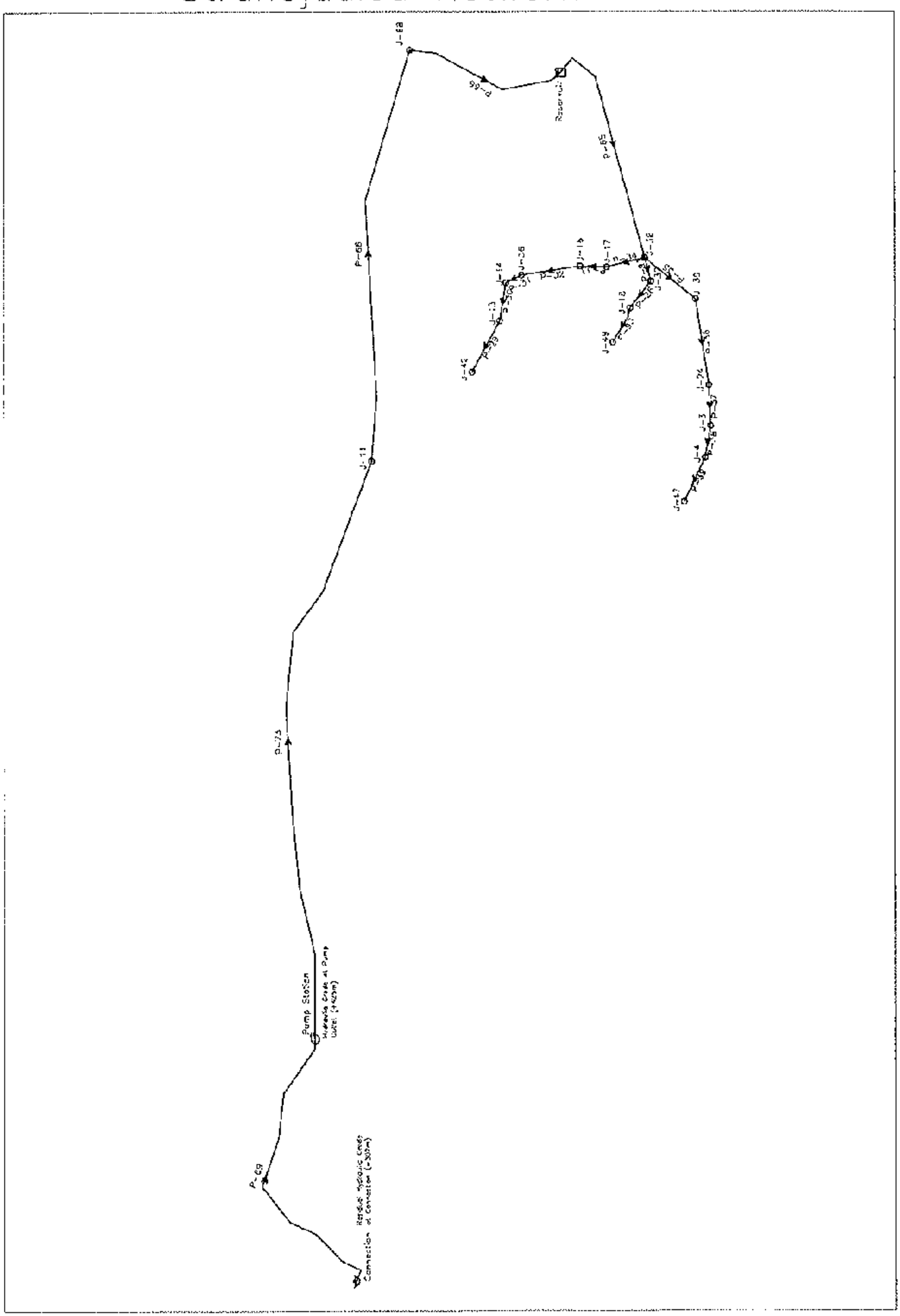
Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-1	225	0,14	267,00	41,95
J-2	225	0,14	263,43	38,35
J-3	241	0,14	262,46	21,41
J-4	241	0,14	262,42	21,37
J-5	225	0,14	266,70	41,62
J-7	225	0,14	266,41	41,32
J-8	225	0,14	268,93	43,85
J-12	225	0,14	268,05	42,95
J-13	225	0,14	266,89	41,80
J-14	225	0,14	266,84	41,75
J-16	225	0,14	266,79	41,70
J-18	225	0,14	267,03	41,97
J-21	241	0,14	263,28	22,33
J-23	225	0,14	267,18	42,09
J-24	225	0,14	260,69	41,69
J-25	225	0,14	263,32	38,24
J-26	235	0,14	262,37	27,32
J-32	225	0,14	269,28	44,19
J-37	225	0,14	262,87	37,75
J-40	246	0,14	266,71	20,67
J-41	246	0,14	266,69	20,65
J-42	225	0,14	267,15	42,07

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-44	225	0,14	266,75	41,70
J-45	225	0,14	266,94	41,85
J-51	225	0,14	266,72	41,64
J-56	225	0,14	266,51	41,53
J-57	225	0,14	266,50	41,52
J-58	241	0,14	263,27	22,23
J-61	225	0,14	267,14	42,06
J-62	225	0,14	266,32	41,24
J-63	235	0,14	263,27	28,21
J-102	235	0,14	262,41	27,35
J-103	235	0,14	262,53	27,40
J-104	235	0,14	262,55	27,49
J-105	225	0,14	263,77	38,69
J-106	225	0,14	264,22	39,14
J-107	225	0,14	264,97	39,88
J-108	225	0,14	265,41	40,23
J-109	225	0,14	265,38	40,80
J-110	235	0,14	263,29	28,23
J-111	225	0,14	267,07	41,98
J-112	225	0,14	266,35	41,86
J-113	225	0,14	266,76	41,66

Pipe Report

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-21	J-58	J-57	PE	50	33,63	110	Open	0,14	0,07	266,61	266,50	0,01	0,28
P-30	J-13	J-14	PE	50	184,40	110	Open	0,14	0,07	266,89	266,84	0,05	0,28
P-32	J-40	J-41	PE	50	94,79	110	Open	0,14	0,07	266,71	266,69	0,03	0,28
P-37	J-24	J-5	PE	50	67,67	110	Open	-0,14	0,07	266,69	266,70	0,02	0,28
P-38	J-3	J-4	PE	50	137,16	110	Open	0,14	0,07	262,46	262,42	0,04	0,28
P-39	J-32	J-10	PE	140	185,01	110	Open	5,88	0,38	269,28	268,93	0,35	1,89
P-90	J-10	J-7	PE	140	291,69	110	Open	5,74	0,37	268,93	268,41	0,53	1,80
P-91	J-7	J-12	PE	140	210,01	110	Open	5,60	0,36	268,41	268,05	0,36	1,72
P-92	J-12	J-22	PE	140	528,63	110	Open	5,46	0,35	268,05	267,18	0,87	1,64
P-93	J-22	J-42	PE	50	90,22	110	Open	0,14	0,07	267,18	267,15	0,03	0,28
P-98	J-5	J-56	PE	140	189,28	110	Open	2,80	0,18	266,70	266,61	0,09	0,48
P-99	J-1	J-61	PE	50	389,24	110	Open	-0,14	0,07	267,03	267,14	0,11	0,28
P-101	J-58	J-21	PE	80	110,55	110	Open	-0,14	0,03	263,27	263,28	0,00	0,03
P-102	J-22	J-61	PE	140	22,75	110	Open	5,18	0,34	267,18	267,14	0,03	1,39
P-103	J-25	J-37	PE	50	47,55	110	Open	0,50	0,50	263,32	262,87	0,49	10,29
P-106	J-13	J-44	PE	140	114,00	110	Open	3,92	0,25	266,89	266,79	0,10	0,89
P-109	Branch	J-32	PE	140	871,73	110	Open	6,02	0,39	271,00	269,28	1,72	1,97
P-111	J-2	J-25	PE	100	112,70	110	Open	1,68	0,21	263,43	263,32	0,11	0,95
P-113	J-102	J-26	PE	50	132,28	110	Open	0,14	0,07	262,41	262,37	0,04	0,28
P-114	J-37	J-103	PE	50	139,29	110	Open	0,42	0,21	262,53	262,53	0,00	0,14
P-115	J-103	J-3	PE	50	74,69	110	Open	0,28	0,14	262,53	262,46	0,08	1,00
P-116	J-37	J-104	PE	50	130,70	110	Open	0,42	0,21	262,53	262,55	0,28	2,14
P-117	J-104	J-102	PE	50	138,59	110	Open	0,28	0,14	262,55	262,41	0,14	1,01
P-119	J-105	J-2	PE	100	307,24	110	Open	1,82	0,23	263,77	263,43	0,34	1,11
P-121	J-106	J-105	PE	100	356,01	110	Open	1,96	0,25	264,22	263,77	0,45	1,27
P-123	J-107	J-106	PE	100	317,55	110	Open	2,10	0,27	264,97	264,22	0,75	1,44
P-125	J-108	J-107	PE	100	272,49	110	Open	2,24	0,29	265,41	264,97	0,44	1,63
P-126	J-56	J-109	PE	100	362,71	110	Open	2,52	0,32	266,61	265,88	0,73	2,02
P-127	J-109	J-108	PE	100	259,69	110	Open	2,38	0,30	265,88	265,41	0,47	1,82
P-129	J-25	J-110	PE	80	74,60	110	Open	0,56	0,11	263,32	263,23	0,09	0,97
P-130	J-110	J-21	PE	80	151,49	110	Open	0,28	0,05	263,23	263,28	0,02	0,10
P-131	J-63	J-110	PE	50	89,31	110	Open	-0,14	0,07	263,27	263,23	0,03	0,28
P-132	J-44	J-45	PE	50	71,93	110	Open	0,28	0,14	266,79	266,71	0,07	1,00
P-133	J-61	J-111	PE	140	57,91	110	Open	4,90	0,32	267,14	267,07	0,08	1,35
P-134	J-111	J-112	PE	140	97,84	110	Open	4,62	0,30	267,07	266,95	0,12	1,21
P-135	J-58	J-113	PE	50	52,00	110	Open	-0,14	0,07	267,05	267,07	0,02	0,28
P-136	J-112	J-63	PE	140	59,13	110	Open	4,20	0,27	266,95	266,94	0,01	1,01
P-137	J-58	J-113	PE	50	30,70	110	Open	-0,14	0,07	266,94	266,95	0,01	0,28
P-138	J-112	J-62	PE	50	09,70	110	Open	0,14	0,07	266,95	266,92	0,02	0,28
P-139	J-44	J-46	PE	100	116,43	110	Open	0,14	0,02	266,79	266,79	0,00	0,31
P-140	J-44	J-113	PE	140	55,73	110	Open	3,36	0,22	266,79	266,75	0,04	0,37
P-141	J-113	J-5	PE	140	75,29	110	Open	3,08	0,20	266,75	266,70	0,04	0,57
P-142	J-61	J-113	PE	50	86,47	110	Open	-0,14	0,07	266,72	266,75	0,02	0,24

Strahojacica Network Model



Junction Report

Junction ID	Elevation (+m)	Peak Hour Demand (l/s)	Hydraulic Grade (+m)	Residual Pressure (m)
J-3	359	0.20	410.98	51.97
J-4	359	0.20	410.91	51.90
J-11	352	0.60	412.50	60.30
J-13	359	0.20	411.07	51.97
J-14	359	0.20	411.15	52.05
J-16	359	0.20	411.21	52.10
J-17	359	0.20	411.24	52.13
J-18	359	0.20	411.28	52.18
J-24	359	0.20	411.16	52.05
J-35	359	0.20	411.16	52.05
J-37	359	0.20	411.29	52.18
J-38	359	0.20	411.30	52.19
J-39	359	0.20	411.22	52.12
J-42	359	0.20	411.04	51.93
J-47	359	0.20	410.68	51.78
J-49	359	0.20	411.28	52.17
J-68	358	0.00	412.43	54.32

Pipe Report

Pipe ID	Start	End	Material	Inner Diameter (mm)	Length (m)	Hazen-Williams C	Control Status	Discharge (l/s)	Velocity (m/s)	Start Hydraulic Grade (+m)	End Hydraulic Grade (+m)	Headloss (m)	Headloss Gradient (m/km)
P-26	J-37	J-18	PE	80	36.58	110	Open	0.40	0.08	411.29	411.28	0.01	0.20
P-29	J-42	J-13	PE	50	62.79	110	Open	-0.20	0.10	411.04	411.07	0.03	0.54
P-30	J-13	J-14	PE	50	41.15	110	Open	-0.40	0.20	411.07	411.15	0.08	1.96
P-31	J-14	J-35	PE	80	18.30	110	Open	-0.60	0.12	411.15	411.16	0.01	0.42
P-32	J-35	J-16	PE	80	64.91	110	Open	-0.80	0.16	411.16	411.21	0.05	0.72
P-33	J-16	J-17	PE	80	28.35	110	Open	-1.00	0.20	411.21	411.24	0.03	1.08
P-34	J-17	J-39	PE	80	42.37	110	Open	-1.20	0.24	411.24	411.30	0.06	1.52
P-35	J-18	J-39	PE	80	70.71	110	Open	1.00	0.20	411.30	411.22	0.08	1.08
P-36	J-39	J-24	PE	80	93.57	110	Open	0.60	0.16	411.22	411.16	0.07	0.72
P-37	J-24	J-3	PE	50	43.78	110	Open	0.60	0.31	411.16	410.98	0.18	4.15
P-38	J-3	J-4	PE	50	34.75	110	Open	0.40	0.20	410.98	410.91	0.07	1.96
P-39	J-4	J-47	PE	50	52.73	110	Open	0.20	0.10	410.91	410.88	0.03	0.54
P-65	Reservoir	J-33	PE	100	259.55	110	Open	3.00	0.38	412.00	411.00	0.70	2.79
P-66	J-11	J-65	PE	50	445.92	110	Open	1.54	0.31	413.50	412.43	1.07	2.41
P-68	J-60	Reservoir	PE	50	178.00	110	Open	1.54	0.31	412.43	412.00	0.43	2.41
P-69	Connection	Pump Station	PE	80	221.71	110	Open	1.54	0.31	307.00	306.22	0.78	2.41
P-73	Pump Station	J-11	PE	80	643.18	110	Open	1.54	0.31	415.06	413.50	1.56	2.41
P-91	J-38	J-37	PE	80	25.91	110	Open	0.60	0.12	411.30	411.29	0.01	0.42
P-93	J-49	J-13	PE	50	41.15	110	Open	-0.20	0.04	411.28	411.28	0.00	0.08

Appendix 11 Operation and Maintenance Cost

(1) Operation and Maintenance Cost

1. Electric

PE	System	Equipment				Cost	
		Transmission pump (kW)	Intake pump (kW)	Chlorinator (kW)	Calculation	Unit cost/ (MKD/kwh)	MKD/year
Cucer Sandevo	Kuceviste			0.4	6.44x0.4x24x365	6.44	22,568
Ilinden	Ilinden	18.5kWx3sets= 72kW ,18hr	37x3=111kW , 14.9hr	1	6.44x365((72x18)+(111x14.9)+(1x24))	6.44	6,990,449
Studenicani	DolnoKolicani	2.2 kW x 1 set x 13.3hr	-	-	6.44x2.2x13.3x365	6.44	68,779
Zelenikovo	Strahojadica	4kW x 1 set x 13.3hr	-	-	6.44x4x13.3x365	6.44	125,052
Skopje (Cair)	Radisani	18.5kWx2sets=37kW 15.4hr 15kWx2sets=30kW, 15.4hr	-	-	6.44x365((37+30)x15.4)	6.44	2,425,349

2.Chemical

PE	System		Ave. water capacity (m3/d)	Dosing rate (mg/l)	Dosing capacity (kg/d)	Unit cost (MKD/kg)	MKD /year
Cucer Sandevo	Kuceviste		355	0.5	1.48	23.6	12,742
Ilinden	Ilinden		7470	0.5	31.13	23.6	268,111
Studenicani	DolnoKo icani		46	0.5	0.19	23.6	1,651
	Cvetovo		76	0.5	0.32	23.6	2,728

Note: Effective chlorine in the chemical is to be 12%.

3. Personel expenses

PE	Unit cost (MKD/month)	Labor 15,000	Technician 19,000	Engineer 23,000			MKD/year
Cucer Sandevo		1	1				408,000
Ilinden		3	1				768,000
Studenicani		1	1				408,000
Zelenikovo		1					180,000
Skopje (Cair)	Radisani	1					180,000

(2) Annual O & M Cost

PE	Water purchase from Skopje city	①Electric	②Chemical	③Personnel expenses	④ Maintenance fee ④=(①+②)XO.5	Total
Cucer Sandevo	-	22,566	12,742	408,000	1,766	445,073
Ilinden	-	6,990,449	268,111	768,000	362,928	8,389,488
Studenicani	-	68,779	4,379	408,000	3,658	484,815
Zelenikovo	586,920	125,052	-	180,000	6,253	898,225
Skopje (Cair)	3,590,542	2,425,349	-	180,000	121,267	6,317,158

Water purchase from Skopje city

Zelenikovo	201	m3/d	73,365	m3/yr	8	586,920	MKD/Y
Skopje (Cair)	2,093	m3/d	763,945	m3/yr	4.7	3,590,542	MKD/Y

Note: The cost of Chair is production cost of Skopje city water.

(3) Production Cost and Water Charge

PE	Production Cost (MKD/yr)	Production water #1 (m3/yr)	Unit Cost (MKD/m3)	Water charge		Water Tariff #3 (MKD/m3)	Consumption (m3/month)	affordable payment (MKD/m3)
				Rate of Revenue Water #2(%)	Water Charge (MKD/yr)			
Cucer Sandevo	445,073	129,575	3	80%	1,554,900	15	22	18
Ilinden	8,389,488	2,726,550	3	70%	20,040,143	10.5	22	18
Studenicani	484,815	44,530	11	70%	498,736	16	20	20
Zelenikovo	898,225	73,365	12	75%	990,428	18	20	19
Skopje (Cair)	6,317,158	763,945	8	78%	7,842,934	Domes.8.71, Others: 23.55#4	20	20

Note)

#1 Production water includes leakage.

#2 Rate of accounted-for water stands for the present value of each PE, except Studenicani PE
As for Studenicani PE, 70% is employed as the reasonable value to manage the waterworks.

#3 Current water tariff collected by each PE are employed for water tariff.

#4 Domes.: Tariff for domestic customers, Others. Tarif for large consumers.

(4) Case study for Cvetovo in Studenicani municipality

Alternative system (In case of water source from No.1 to No.4)

O & M cost

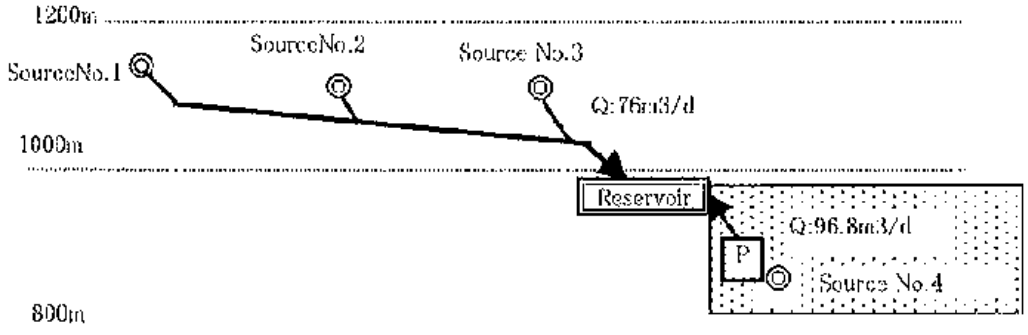
PE	Water Purchase	① Electric	② Chemical	③Personnel	④ Maintenance ④= (①+②) X0.05	Total
Studenicani	–	193,830	4,924	588,000	9,938	796,693

Production Cost and Water tariff

PE	Production Cost#1 (MKD/yr)	Production water(m3/yr)	Unit cost (MKD/m3)	Water charge (70%)	Water tariff (MKD/m3)	affordable payment (MKD/m3)
Studenicani	**796,693**	53,241	15	596,303	16	20
				633,572	17	20
				670,841	18	20
				708,110	19	20
				745,379	20	20
				782,648	21	20
				819,917	**22**	20

Note:

#1 Aditional production cost is Electrical, chemical charge and labor fee.



Water supply system of Cvetovo in Studenicani