

3. REVISED ALTERNATIVE STUDY

3.1 Measure Features of Alternatives

		ALT.R1	ALT.R2	ALT.R3	ALT.R4
RAW WATER TRANSMISSION					
Part 1	Sheeting	L=4.0km	L=3.0km	L=4.0km	L=4.0km
Part 2	Pump + RC Pipe	D 1,600x5.0km	D 1,600x5.0km	D 1,800x8.0km	D 1,600x5.0km + Pump + Steel Pipe D1,800 x 20.5km

CLEAR WATER TRANSMISSION					
Part 1	Pump + Steel Pipe	D 1,800x0.5km	D 1,800x0.2km	D 1,800x0.2km	D 1,800x0.2km
Part 2	Pump + Steel Pipe	D 1,800x20.5km	D 1,800x20.5km	D 1,800x23.0km	-

TREATMENT PLANT					
Part 1	5.0m ³ /sec	Buaran	Bekasi	Buaran	Buaran
Part 2	5.0m ³ /sec	Bekasi	Bekasi	Buaran	Cipayung

WATER TRANSMITTED TO					
Part 1	Surge Tower 1	Surge Tower 2	Surge Tower 1	Surge Tower 1	
Part 2	East Reservoir	East Reservoir	East Reservoir	-	

FINAL CAPACITY OF TREATMENT PLANT					
Buaran	10.0m ³ /sec	5.0m ³ /sec	15.0m ³ /sec	10.0m ³ /sec	
Bekasi	5.0m ³ /sec	10.0m ³ /sec	-	-	
Cipayung	10.0m ³ /sec	10.0m ³ /sec	10.0m ³ /sec	15.0m ³ /sec	
Cisadane	13.0m ³ /sec	13.0m ³ /sec	13.0m ³ /sec	13.0m ³ /sec	

FINAL NUMBER OF TREATMENT PLANT (Cilandak Excuted)					
Existing	3	4	3	3	
Expansion	2	1	2	2	
New	2	2	1	1	
TOTAL	7	7	6	6	

3.2 Estimated Construction Costs for Alternative study

Capacity l/sec	Construction Cost		Construction Period Years
	Foreign million ¥	Local million Rp.	
Water Treatment Plant			
4,000	3,940	88,657	3
5,000	4,687	105,451	3
6,000	5,400	121,508	3
7,000	6,088	136,978	3
7,500	6,423	144,525	3
10,000	8,033	180,747	4
Distribution Center			
500	97	6,859	2
1,200	234	16,462	2
1,500	292	20,577	2
1,600	312	21,949	2
2,000	390	27,436	3
2,400	468	32,923	3
2,500	487	34,295	3
3,000	585	41,154	3
4,000	780	54,872	3
Raw Water Transmission Pump Station			
5,000	974	22,863	3
10,000	1,949	45,727	3

3.3 Hydraulic Calculation for Transmission Pipeline

Alternative R1

2002		R1	WF-1	WF-2	R6	Dia L	
Length	km	16	8	4		1,500	24.0
Flow Rate	m ³ /sec	3.0	2.7	2.1		1,350	4.0
Diameter	mm	1,500	1,500	1,350			
C value		130	130	130			
dh	m	22.2	9.1	4.8			
v	m/sec	1.70	1.53	1.47			
W. level	m	2.0	16.9	7.8	3.0		
Pump H	m	37.1					
Elevation	m	3.0			3.0		

2006		Bekasi	East	R3+1	R5+2	R4+2	R4+1	R4	Dia L	
Length	km	20.5	13.5	12.0	5.5	7.5	1.0		1,800	60.0
Flow Rate	m ³ /sec	5.0	4.2	4.2	2.6	3.8	3.8		1,000	1.5
Diameter	mm	1,800	1,800	1,800	1,800	1,800	1,800			
C value		130	130	130	130	130	130			
dh	m	30.1	14.4	12.8	2.4	6.6	0.9			
v	m/sec	1.96	1.65	1.65	1.02	1.49	1.49			
W. level	m	19.0	57.0	58.0	45.2	42.8	36.2	35.3		
Pump H	m	68.1	15.4							
Elevation	m	20.0	58	58.0				10		

		Cisadane	R5+1	R5	R5+1	R4+2	R5+2	R5
Length	km	14	2		7		1.5	
Flow Rate	m ³ /sec	2.8	1.6		1.2		1.6	
Diameter	mm	1,500	1,200		1,200		1,000	
C value		130	130		130		130	
dh	m	17.1	2.6		5.3		4.7	
v	m/sec	1.58	1.41		1.06		2.04	
W. level	m	65.2	48.1	45.5	48.1	42.8	45.2	40.5
Elevation	m	38		29				29.0

2009		Bekasi	East	R3+1	R5+2	R4+2	R4+1	R6	R3+1	R3	Dia L	
Length	km	20.5	13.5	12.0	5.5	7.5	10.0		2.0		1,600	10.0
Flow Rate	m ³ /sec	5.0	3.9	3.1	2.6	5.7	0.9		0.8		1,500	16.0
Diameter	mm	1,800	1,800	1,800	1,800	1,800	1,600		1,500		1,500	9.0
C value		130	130	130	130	130	130		130		1,200	
dh	m	30.1	12.5	7.3	2.4	14.0	1.1		0.2			
v	m/sec	1.96	1.53	1.22	1.02	2.24	0.45		0.45			
W. level	m	19.0	57.0	58.0	50.7	48.3	34.3	33.2	58.0	57.8		
Pump H	m	68.1	13.5									
Elevation	m	20.0	58	58.0				3		58		

		Cisadane	R5+1	R5	R5+1	R4+2	R5+2	R5	R4+1	R4
Length	km	14.0	2.0		7.0		1.5		1.0	
Flow Rate	m ³ /sec	5.8	2.7		3.1		0.5		4.8	
Diameter	mm	1,952	1,562		1,562		1,000		1,800	
C value		130	130		130		130		130	
dh	m	18.2	1.9		8.5		0.5		1.4	
v	m/sec	1.94	1.41		1.62		0.64		1.89	
W. level	m	75.0	56.8	54.9	56.8	48.3	50.7	50.2	34.3	32.9
Elevation	m	38		29				29.0		10.0

2012		Bekasi	East	R3+1	R5+2	R4+2	R4+1	R6	R3+1	R3		
Length	km	20.5	13.5	12.0	5.5	7.5	10.0			2.0		
Flow Rate	m3/sec	5.0	10.6	8.5	6.9	8.9	2.9			2.1	Dia	L
Diameter	mm	1,800	2,343	2,343	1,800	2,343	1,600			1,500	1800	33.0
C value		130	130	130	130	130	130			130		
dh	m	30.1	22.1	13.0	14.7	8.9	9.5			1.4		
v	m/sec	1.96	2.46	1.97	2.71	2.06	1.44			1.19		
W. level	m	19.0	57.0	58.0	45.0	30.3	21.4	11.9	58.0	56.6		
Pump H		68.1	23.1									
Elevation	m	20.0	58	58.0				3		58		

		Cisadane	R5+1	R5	R5+1	R4+2	R5+2	R5	R4+1	R4
Length	km	14.0	2.0		7.0		1.5			1.0
Flow Rate	m3/sec	3.6	1.6		2.0		1.6			6.0
Diameter	mm	1,952	1,562		1,562		1,000			1,800
C value		130	130		130		130			130
dh	m	7.5	0.7		3.8		4.7			2.1
v	m/sec	1.20	0.83		1.04		2.04			2.36
W. level	m	41.6	34.1	33.4	34.1	30.3	45.0	40.3	21.4	19.4
Elevation	m	38		29				29.0		10.0

2016		Bekasi	East	R3+1	R5+2	R4+2	R4+1	R6	R3+1	R3		
Length	km	20.5	13.5	12.0	5.5	7.5	10.0			2.0		
Flow Rate	m3/sec	5.0	10.2	7.7	7.7	10.8	4.4			2.5	Dia	L
Diameter	mm	1,800	2,343	2,343	2,343	2,343	1,600			1,500	1800	5.5
C value		130	130	130	130	130	130			130		
dh	m	30.1	20.5	10.9	5.0	12.7	20.6			2.0		
v	m/sec	1.96	2.37	1.79	1.79	2.50	2.19			1.41		
W. level	m	19.0	57.0	58.0	47.1	42.2	29.5	8.9	58.0	56.0		
Pump H		68.1	21.5									
Elevation	m	20.0	58	58.0				3		58		

		Cisadane	R5+1	R5	R5+1	R4+2	R5+2	R5	R4+1	R4
Length	km	14.0	2.0		7.0		1.5			1.0
Flow Rate	m3/sec	6.3	3.2		3.1		0.0			6.4
Diameter	mm	1,952	1,562		1,562		1,000			1,800
C value		130	130		130		130			130
dh	m	21.3	2.6		8.5		0.0			2.3
v	m/sec	2.11	1.67		1.62		0.00			2.52
W. level	m	71.9	50.6	48.1	50.6	42.2	47.1	47.1	29.5	27.2
Elevation	m	38		29				29.0		10.0

: New Pipe is required.

Pump H: 3m more is required because WH of Reservoir is HWL

The figure in "Diameter" shows the totally required diameter as shown below.

total
L
163.0

$$D = (D1^{2.63} + D2^{2.63})^{(1/2.63)}$$

D=	D1	+ D2
1,562	1,200	1,200
1,952	1,500	1,500
2,343	1,800	1,800

3.4 Hydraulic Calculation for Transmission Pipeline

Alternative R2

2002		Bekasi	ST2	R1	WF-1	WF-2	R6		
Length	km	1.0		16.0	8.0	4.0			
Flow Rate	m ³ /sec	5.0		3.0	2.7	2.1			
Diameter	mm	1800		1,500	1,500	1,350		Dia	L
C value		130		130	130	130		1,800	1.0
dh	m	1.5		22.2	9.1	4.8		1,500	24.0
v	m/sec	1.96		1.70	1.53	1.47		1,350	4.0
W. level	m	8.0	40.5	2.0	16.9	7.8	3.0		
Pump H	m	34.0		37.1					
Elevation	m	12.0	40.5	3.0			3.0		

2006		Bekasi	East	R3+1	R5+2	R4+2	R4+1	R4		
Length	km	20.5	13.5	12.0	5.5	7.5	1.0		Dia	L
Flow Rate	m ³ /sec	5.0	4.2	4.2	2.6	3.8	3.8		1,800	60.0
Diameter	mm	1,800	1,800	1,800	1,800	1,800	1,800		1,000	1.5
C value		130	130	130	130	130	130			
dh	m	30.1	14.4	12.8	2.4	6.6	0.9			
v	m/sec	1.96	1.65	1.65	1.02	1.49	1.49			
W. level	m	19.0	57.0	58.0	45.2	42.8	36.2	35.3		
Pump H	m	68.1	15.4							
Elevation	m	20.0	58	58.0				10		

		Cisadanc	R5+1	R5	R5+1	R4+2	R5+2	R5
Length	km	14	2		7		1.5	
Flow Rate	m ³ /sec	2.8	1.6		1.2		1.6	
Diameter	mm	1,500	1,200		1,200		1,000	
C value		130	130		130		130	
dh	m	17.1	2.6		5.3		4.7	
v	m/sec	1.58	1.41		1.06		2.04	
W. level	m	65.2	48.1	45.5	48.1	42.8	45.2	40.5
Elevation	m	38		29				29.0

2009		Bekasi	East	R3+1	R5+2	R4+2	R4+1	R6	R3+1	R3
Length	km	20.5	13.5	12.0	5.5	7.5	10.0		2.0	
Flow Rate	m ³ /sec	5.0	3.9	3.1	2.6	5.7	0.9		0.8	
Diameter	mm	1,800	1,800	1,800	1,800	1,800	1,600		1,500	1600 10.0
C value		130	130	130	130	130	130		130	1500 16.0
dh	m	30.1	12.5	7.3	2.4	14.0	1.1		0.2	1200 9.0
v	m/sec	1.96	1.53	1.22	1.02	2.24	0.45		0.45	
W. level	m	19.0	57.0	58.0	50.7	48.3	34.3	33.2	58.0	57.8
Pump H	m	68.1	13.5							
Elevation	m	20.0	58	58.0				3		58

		Cisadanc	R5+1	R5	R5+1	R4+2	R5+2	R5	R4+1	R4
Length	km	14.0	2.0		7.0		1.5		1.0	
Flow Rate	m ³ /sec	5.8	2.7		3.1		0.5		4.8	
Diameter	mm	1,952	1,562		1,562		1,000		1,800	
C value		130	130		130		130		130	
dh	m	18.2	1.9		8.5		0.5		1.4	
v	m/sec	1.94	1.41		1.62		0.64		1.89	
W. level	m	75.0	56.8	54.9	56.8	48.3	50.7	50.2	34.3	32.9
Elevation	m	38		29				29.0		10.0

2012		Bekasi	East	R3+1	R5+2	R4+2	R4+1	R6	R3+1	R3		
Length	km	20.5	13.5	12.0	5.5	7.5	10.0			2.0		
Flow Rate	m ³ /sec	5.0	10.6	8.5	6.9	8.9	2.9			2.1	Dia	L
Diameter	mm	1,800	2,343	2,343	1,800	2,343	1,600			1,500	1800	33.0
C value		130	130	130	130	130	130			130		
dh	m	30.1	22.1	13.0	14.7	8.9	9.5			1.4		
v	m/sec	1.96	2.46	1.97	2.71	2.06	1.44			1.19		
W. level	m	19.0	57.0	58.0	45.0	30.3	21.4	11.9	58.0	56.6		
Pump H		68.1	23.1									
Elevation	m	20.0	58	58.0				3		58		

		Cisadane	R5+1	R5	R5+1	R4+2	R5+2	R5	R4+1	R4
Length	km	14.0	2.0		7.0		1.5			1.0
Flow Rate	m ³ /sec	3.6	1.6		2.0		1.6			6.0
Diameter	mm	1,952	1,562		1,562		1,000			1,800
C value		130	130		130		130			130
dh	m	7.5	0.7		3.8		4.7			2.1
v	m/sec	1.20	0.83		1.04		2.04			2.36
W. level	m	41.6	34.1	33.4	34.1	30.3	45.0	40.3	21.4	19.4
Elevation	m	38		29				29.0		10.0

2016		Bekasi	East	R3+1	R5+2	R4+2	R4+1	R6	R3+1	R3		
Length	km	20.5	13.5	12.0	5.5	7.5	10.0			2.0		
Flow Rate	m ³ /sec	5.0	10.2	7.7	7.7	10.8	4.4			2.5	Dia	L
Diameter	mm	1,800	2,343	2,343	2,343	2,343	1,600			1,500	1800	5.5
C value		130	130	130	130	130	130			130		
dh	m	30.1	20.5	10.9	5.0	12.7	20.6			2.0		
v	m/sec	1.96	2.37	1.79	1.79	2.50	2.19			1.41		
W. level	m	19.0	57.0	58.0	47.1	42.2	29.5	8.9	58.0	56.0		
Pump H		68.1	21.5									
Elevation	m	20.0	58	58.0				3		58		

		Cisadane	R5+1	R5	R5+1	R4+2	R5+2	R5	R4+1	R4
Length	km	14.0	2.0		7.0		1.5			1.0
Flow Rate	m ³ /sec	6.3	3.2		3.1		0.0			6.4
Diameter	mm	1,952	1,562		1,562		1,000			1,800
C value		130	130		130		130			130
dh	m	21.3	2.6		8.5		0.0			2.3
v	m/sec	2.11	1.67		1.62		0.00			2.52
W. level	m	71.9	50.6	48.1	50.6	42.2	47.1	47.1	29.5	27.2
Elevation	m	38		29				29.0		10.0

: New Pipe is required.

Pump H : 3m more is required because WH of Reservoir is HWL

The figure in "Diameter" shows the totlally required diameter as shown below.

total

L

164.0

$$D = (D1^{2.63} + D2^{2.63})^{(1/2.63)}$$

D=	D1	+ D2
1,562	1,200	1,200
1,952	1,500	1,500
2,343	1,800	1,800

3.5 Hydraulic Calculation for Transmission Pipeline

Alternative R3

2002		R1	WF-1	WF-2	R6		
Length	km	16.0	8.0	4.0			
Flow Rate	m ³ /sec	3.0	2.7	2.1			
Diameter	mm	1,500	1,500	1,350			Dia L
C value		130	130	130			
dh	m	22.2	9.1	4.8			1,500 24.0
v	m/sec	1.70	1.53	1.47			1,350 4.0
W. level	m	2.0	16.9	7.8	3.0		
Pump H	m	37.1					
Elevation	m	3.0			3.0		

2006		Buaran	East	R3+1	R5+2	R4+2	R4+1	R4		
Length	km	23.0	13.5	12.0	5.5	7.5	1.0			Dia L
Flow Rate	m ³ /sec	5.0	4.2	4.2	2.6	3.8	3.8			1,800 62.5
Diameter	mm	1,800	1,800	1,800	1,800	1,800	1,800			1,000 1.5
C value		130	130	130	130	130	130			
dh	m	33.8	14.4	12.8	2.4	6.6	0.9			
v	m/sec	1.96	1.65	1.65	1.02	1.49	1.49			
W. level	m	19.0	57.0	58.0	45.2	42.8	36.2	35.3		
Pump H	m	71.8	15.4							
Elevation	m	20.0	58	58.0				10		

		Cisadane	R5+1	R5	R5+1	R4+2	R5+2	R5
Length	km	14.0	2.0		7.0		1.5	
Flow Rate	m ³ /sec	2.8	1.6		1.2		1.6	
Diameter	mm	1,500	1,200		1,200		1,000	
C value		130	130		130		130	
dh	m	17.1	2.6		5.3		4.7	
v	m/sec	1.58	1.41		1.06		2.04	
W. level	m	65.2	48.1	45.5	48.1	42.8	45.2	40.5
Elevation	m	38		29				29.0

2009		Buaran	East	R3+1	R5+2	R4+2	R4+1	R6	R3+1	R3		
Length	km	23.0	13.5	12.0	5.5	7.5	10.0			2.0		
Flow Rate	m ³ /sec	5.0	3.9	3.1	2.6	5.7	0.9			0.8		Dia L
Diameter	mm	1,800	1,800	1,800	1,800	1,800	1,600			1,500		1600 10.0
C value		130	130	130	130	130	130			130		1500 16.0
dh	m	33.8	12.5	7.3	2.4	14.0	1.1			0.2		1200 9.0
v	m/sec	1.96	1.53	1.22	1.02	2.24	0.45			0.45		
W. level	m	19.0	57.0	58.0	50.7	48.3	34.3	33.2	58.0	57.8		
Pump H	m	71.8	13.5									
Elevation	m	20.0	58	58.0				3				58

		Cisadane	R5+1	R5	R5+1	R4+2	R5+2	R5	R4+1	R4
Length	km	14.0	2.0		7.0		1.5			1.0
Flow Rate	m ³ /sec	5.8	2.7		3.1		0.5			4.8
Diameter	mm	1,952	1,562		1,562		1,000			1,800
C value		130	130		130		130			130
dh	m	18.2	1.9		8.5		0.5			1.4
v	m/sec	1.94	1.41		1.62		0.64			1.89
W. level	m	75.0	56.8	54.9	56.8	48.3	50.7	50.2	34.3	32.9
Elevation	m	38		29				29.0		10.0

2012		Buaran	East	R3+1	R5+2	R4+2	R4+1	R6	R3+1	R3		
Length	km	23.0	13.5	12.0	5.5	7.5	10.0			2.0		
Flow Rate	m3/sec	5.0	10.6	8.5	6.9	8.9	2.9			2.1	Dia	L
Diameter	mm	1,800	2,343	2,343	1,800	2,343	1,600			1,500	1800	33.0
C value		130	130	130	130	130	130			130		
dh	m	33.8	22.1	13.0	14.7	8.9	9.5			1.4		
v	m/sec	1.96	2.46	1.97	2.71	2.06	1.44			1.19		
W. level	m	19.0	57.0	58.0	45.0	30.3	21.4	11.9	58.0	56.6		
Pump H		71.8	23.1									
Elevation	m	20.0	58	58.0				3		58		

		Cisadane	R5+1	R5	R5+1	R4+2	R5+2	R5	R4+1	R4
Length	km	14.0	2.0		7.0		1.5		1.0	
Flow Rate	m3/sec	3.6	1.6		2.0		1.6		6.0	
Diameter	mm	1,952	1,562		1,562		1,000		1,800	
C value		130	130		130		130		130	
dh	m	7.5	0.7		3.8		4.7		2.1	
v	m/sec	1.20	0.83		1.04		2.04		2.36	
W. level	m	41.6	34.1	33.4	34.1	30.3	45.0	40.3	21.4	19.4
Elevation	m	38		29				29.0		10.0

2016		Buaran	East	R3+1	R5+2	R4+2	R4+1	R6	R3+1	R3		
Length	km	23.0	13.5	12.0	5.5	7.5	10.0			2.0		
Flow Rate	m3/sec	5.0	10.2	7.7	7.7	10.8	4.4			2.5	Dia	L
Diameter	mm	1,800	2,343	2,343	2,343	2,343	1,600			1,500	1800	5.5
C value		130	130	130	130	130	130			130		
dh	m	33.8	20.5	10.9	5.0	12.7	20.6			2.0		
v	m/sec	1.96	2.37	1.79	1.79	2.50	2.19			1.41		
W. level	m	19.0	57.0	58.0	47.1	42.2	29.5	8.9	58.0	56.0		
Pump H		71.8	21.5									
Elevation	m	20.0	58	58.0				3		58		

		Cisadane	R5+1	R5	R5+1	R4+2	R5+2	R5	R4+1	R4
Length	km	14.0	2.0		7.0		1.5		1.0	
Flow Rate	m3/sec	6.3	3.2		3.1		0.0		6.4	
Diameter	mm	1,952	1,562		1,562		1,000		1,800	
C value		130	130		130		130		130	
dh	m	21.3	2.6		8.5		0.0		2.3	
v	m/sec	2.11	1.67		1.62		0.00		2.52	
W. level	m	71.9	50.6	48.1	50.6	42.2	47.1	47.1	29.5	27.2
Elevation	m	38		29				29.0		10.0

: New Pipe is required.
 Pump H : 3m more is required because WH of Reservoir is HWL
 The figure in "Diameter" shows the totlally required diameter as shown below.

total
 L
 165.5

$$D = (D1^{2.63} + D2^{2.63})^{(1/2.63)}$$

D=	D1	+ D2
1,562	1,200	1,200
1,952	1,500	1,500
2,343	1,800	1,800

3.6 Hydraulic Calculation for Transmission Pipeline

Alternative R4

2002		RI	WF-1	WF-2	R6	Dia L	
Length	km	16	8	4		1,500	24.0
Flow Rate	m ³ /sec	3.0	2.7	2.1		1,350	4.0
Diameter	mm	1,500	1,500	1,350			
C value		130	130	130			
dh	m	22.2	9.1	4.8			
v	m/sec	1.70	1.53	1.47			
W. level	m	2.0	16.9	7.8	3.0		
Pump H	m	37.1					
Elevation	m	3.0			3.0		

2006		East	R3+1	R5+2	R4+2	R4+1	R4	Dia L	
Length	km	13.5	12.0	5.5	7.5	1.0		1,800	39.5
Flow Rate	m ³ /sec	4.2	4.2	2.6	3.8	3.8		1,000	1.5
Diameter	mm	1,800	1,800	1,800	1,800	1,800			
C value		130	130	130	130	130			
dh	m	14.4	12.8	2.4	6.6	0.9			
v	m/sec	1.65	1.65	1.02	1.49	1.49			
W. level	m	57.0	58.0	45.2	42.8	36.2	35.3		
Pump H	m	15.4							
Elevation	m	58	58.0				10		

		Cisadane	R5+1	R5	R5+1	R4+2	R5+2	R5
Length	km	14	2		7		1.5	
Flow Rate	m ³ /sec	2.8	1.6		1.2		1.6	
Diameter	mm	1,500	1,200		1,200		1,000	
C value		130	130		130		130	
dh	m	17.1	2.6		5.3		4.7	
v	m/sec	1.58	1.41		1.06		2.04	
W. level	m	65.2	48.1	45.5	48.1	42.8	45.2	40.5
Elevation	m	38		29				29.0

2009		East	R3+1	R5+2	R4+2	R4+1	R6	R3+1	R3	Dia L	
Length	km	13.5	12.0	5.5	7.5	10.0		2.0		1,600	10.0
Flow Rate	m ³ /sec	3.9	3.1	2.6	5.7	0.9		0.8		1,500	16.0
Diameter	mm	1,800	1,800	1,800	1,800	1,600		1,500		1,200	9.0
C value		130	130	130	130	130		130			
dh	m	12.5	7.3	2.4	14.0	1.1		0.2			
v	m/sec	1.53	1.22	1.02	2.24	0.45		0.45			
W. level	m	57.0	58.0	50.7	48.3	34.3	33.2	58.0	57.8		
Pump H		13.5									
Elevation	m	58	58.0				3		58		

		Cisadane	R5+1	R5	R5+1	R4+2	R5+2	R5	R4+1	R4
Length	km	14.0	2.0		7.0		1.5			1.0
Flow Rate	m ³ /sec	5.8	2.7		3.1		0.5			4.8
Diameter	mm	1,952	1,562		1,562		1,000			1,800
C value		130	130		130		130			130
dh	m	18.2	1.9		8.5		0.5			1.4
v	m/sec	1.94	1.41		1.62		0.64			1.89
W. level	m	75.0	56.8	54.9	56.8	48.3	50.7	50.2	34.3	32.9
Elevation	m	38		29				29.0		10.0

2012		East	R3+1	R5+2	R4+2	R4+1	R6	R3+1	R3		
Length	km	13.5	12.0	5.5	7.5	10.0			2.0		
Flow Rate	m3/sec	10.6	8.5	6.9	8.9	2.9			2.1		
Diameter	mm	2,343	2,343	1,800	2,343	1,600			1,500		Dia L 1800 33.0
C value		130	130	130	130	130			130		
dh	m	22.1	13.0	14.7	8.9	9.5			1.4		
v	m/sec	2.46	1.97	2.71	2.06	1.44			1.19		
W. level	m	57.0	58.0	45.0	30.3	21.4	11.9	58.0	56.6		
Pump H		23.1									
Elevation	m	58	58.0				3		58		

		Cisadane	R5+1	R5	R5+1	R4+2	R5+2	R5	R4+1	R4
Length	km	14.0	2.0		7.0		1.5			1.0
Flow Rate	m3/sec	3.6	1.6		2.0		1.6			6.0
Diameter	mm	1,952	1,562		1,562		1,000			1,800
C value		130	130		130		130			130
dh	m	7.5	0.7		3.8		4.7			2.1
v	m/sec	1.20	0.83		1.04		2.04			2.36
W. level	m	41.6	34.1	33.4	34.1	30.3	45.0	40.3	21.4	19.4
Elevation	m	38		29				29.0		10.0

2016		East	R3+1	R5+2	R4+2	R4+1	R6	R3+1	R3		
Length	km	13.5	12.0	5.5	7.5	10.0			2.0		
Flow Rate	m3/sec	10.2	7.7	7.7	10.8	4.4			2.5		
Diameter	mm	2,343	2,343	2,343	2,343	1,600			1,500		Dia L 1800 5.5
C value		130	130	130	130	130			130		
dh	m	20.5	10.9	5.0	12.7	20.6			2.0		
v	m/sec	2.37	1.79	1.79	2.50	2.19			1.41		
W. level	m	57.0	58.0	47.1	42.2	29.5	8.9	58.0	56.0		
Pump H		21.5									
Elevation	m	58	58.0				3		58		

		Cisadane	R5+1	R5	R5+1	R4+2	R5+2	R5	R4+1	R4
Length	km	14.0	2.0		7.0		1.5			1.0
Flow Rate	m3/sec	6.3	3.2		3.1		0.0			6.4
Diameter	mm	1,952	1,562		1,562		1,000			1,800
C value		130	130		130		130			130
dh	m	21.3	2.6		8.5		0.0			2.3
v	m/sec	2.11	1.67		1.62		0.00			2.52
W. level	m	71.9	50.6	48.1	50.6	42.2	47.1	47.1	29.5	27.2
Elevation	m	38		29				29.0		10.0

: New Pipe is required.

Pump H : 3m more is required because WH of Reservoir is HWL

The figure in "Diameter" shows the totlalty required diameter as shown below.

total
L
142.5

$$D = (D1^{2.63} + D2^{2.63})^{(1/2.63)}$$

D=	D1	+ D2
1,562	1,200	1,200
1,952	1,500	1,500
2,343	1,800	1,800

3.7 Cost for Transmission Pipeline of Alternative R1

Year	dia.	Unit Cost x 1,000 /m		Length km	Cost x 1,000,000	
		Yen	Rp.		Yen	Rp.
2002	1,500	215	955	24.0	5,160	22,920
	1,350	182	888	4.0	728	3,552
				28.0	5,888	26,472
2006	1,800	283	1,082	60.0	16,980	64,920
	1,000	116	721	1.5	174	1,082
				61.5	17,154	66,002
2009	1,600	236	998	10.0	2,360	9,980
	1,500	215	955	16.0	3,440	15,280
	1,200	154	818	9.0	1,386	7,362
				35.0	7,186	32,622
2012	1,800	283	1,082	33.0	9,339	35,706
				33.0	9,339	35,706
2016	1,800	283	1,082	5.5	1,557	5,951
				5.5	1,557	5,951
Total				163.0	41,124	166,753

3.8 Cost for Transmission Pipeline of Alternative R2

Year	dia.	Unit Cost x 1,000 /m		Length km	Cost x 1,000,000	
		Yen	Rp.		Yen	Rp.
2002	1,800	283	1,082	1.0	283	1,082
	1,500	215	955	24.0	5,160	22,920
	1,350	182	888	4.0	728	3,552
				29.0	6,171	27,554
2006	1,800	283	1,082	60.0	16,980	64,920
	1,000	116	721	1.5	174	1,082
				61.5	17,154	66,002
2009	1,600	236	998	10.0	2,360	9,980
	1,500	215	955	16.0	3,440	15,280
	1,200	154	818	9.0	1,386	7,362
				35.0	7,186	32,622
2012	1,800	283	1,082	33.0	9,339	35,706
				33.0	9,339	35,706
2016	1,800	283	1,082	5.5	1,557	5,951
				5.5	1,557	5,951
Total				164.0	41,407	167,835

3.9 Cost for Transmission Pipeline of Alternative R3

Year	dia.	Unit Cost x 1,000 /m		Length km	Cost x 1,000,000	
		Yen	Rp.		Yen	Rp.
2002	1,500	215	955	24.0	5,160	22,920
	1,350	182	888	4.0	728	3,552
				28.0	5,888	26,472
2006	1,800	283	1,082	62.5	17,688	67,625
	1,000	116	721	1.5	174	1,082
				64.0	17,862	68,707
2009	1,600	236	998	10.0	2,360	9,980
	1,500	215	955	16.0	3,440	15,280
	1,200	154	818	9.0	1,386	7,362
				35.0	7,186	32,622
2012	1,800	283	1,082	33.0	9,339	35,706
				33.0	9,339	35,706
2016	1,800	283	1,082	5.5	1,557	5,951
				5.5	1,557	5,951
Total				165.5	41,831	169,458

3.10 Cost for Transmission Pipeline of Alternative R4

Year	dia.	Unit Cost x 1,000 /m		Length km	Cost x 1,000,000	
		Yen	Rp.		Yen	Rp.
2002	1,500	215	955	24.0	5,160	22,920
	1,350	182	888	4.0	728	3,552
				28.0	5,888	26,472
2006	1,800	283	1,082	39.5	11,179	42,739
	1,000	116	721	1.5	174	1,082
				41.0	11,353	43,821
2009	1,600	236	998	10.0	2,360	9,980
	1,500	215	955	16.0	3,440	15,280
	1,200	154	818	9.0	1,386	7,362
				35.0	7,186	32,622
2012	1,800	283	1,082	33.0	9,339	35,706
				33.0	9,339	35,706
2016	2,000	332	1,165		0	0
	1,800	283	1,082		0	0
	1,800	283	1,082	5.5	1,557	5,951
				5.5	1,557	5,951
Total				142.5	35,322	144,572

3.11 Hydraulic Calculation for Raw Water Transmission Pipe to New East TP

Alternative R4		Bekasi	East
2006			
Length	km	20.5	
Flow Rate	m ³ /sec	5.25	
Diameter	mm	1,800	
C value		130	
dh	m	33.0	
v	m/sec	2.06	
W. level	m	19.0	57.0
Pump H	m	71.0	
Elevation	m	20.0	58
Q=5x1.05		C=110	

3.12 Hydraulic Calculation for Raw Water Transmission Pipe along WTC

	2006	Alt.R1/Alt.R2/Alt.R4		Alt.R3	
		Silt Trap	Bekasi	Silt Trap	Buaran
Length	km	5.0		8.0	
Flow Rate	m ³ /sec	5.25		5.25	
Diameter	mm	1,600		1,800	
C value		110		110	
dh	m	19.4		17.5	
v	m/sec	2.61		2.06	
W. level	m	19.0	19.0	19.0	19.0
Pump H	m	19.4		17.5	
Elevation	m	20.0	20.0	20.0	20.0

3.13 Cost for Raw Water Transmission to New East TP (Alternative R4)

Transmission Pipe

Diameter mm	Unit Cost M Yen	M Rp	Length Km	Cost M Yen	M Rp
1800	236	902	20.5	4838	18491

Pump Station (2 times pump up)

Capacity l/sec	Unit Cost M Yen	M Rp	Places	Cost M Yen	M Rp
5250	1023	24006	2	2046	48012

3.14 Cost for Raw Water Transmission along WTC

Year	Alternative	dia.	Unit Cost x 1,000 /m		Length km	Cost x 1,000,000	
			Yen	Rp.		Yen	Rp.
2002 Sheet Pile	R1	-	235	2,510	4.0	940	10,040
	R2	-	235	2,510	3.0	705	7,530
	R3	-	235	2,510	4.0	940	10,040
	R4	-	235	2,510	4.0	940	10,040
2006 RC Pipe	R1	1,600	110	1,470	5.0	550	7,350
	R2	1,600	110	1,470	5.0	550	7,350
	R3	1,800	140	1,790	8.0	1,120	14,320
	R4	1,600	110	1,470	5.0	550	7,350

3.15 Estimated Payment Condition of Construction Work

	Yen		Rp.			
Advance Payment	10 %			20 %		
Progress Payment	80 %			75 %		
Retention Money	10 %			5 %		
Construction Period	2 years					
1st year	10	40	50	20	35	55
2nd year	10	40	50	5	40	45
Construction Period	3 years					
1st year	10	20	30	20	20	40
2nd year		40	40		35	35
3rd year	10	20	30	5	20	25
Construction Period	4 years					
1st year	10	15	25	20	10	30
2nd year		25	25		25	25
3rd year		25	25		25	25
4th year	10	15	25	5	15	20

3.16 Cost Estimation of Alternative R1, Foreign Portion

Year	Equivalent Yen	Present Cost	Factor 2.055%	Total	Treatment Plant										Distribution Center										Treated Water Transmission Pipeline					Pumps							
					Purran3 I	Hekasi II	Paed II	Ciadane	Est IV	Ciadane V	R1 I	R3 III	R3 IV	R3 V	R4 II	R4 III	R4 IV	N4 V	RS II	R6 I	R6 IV	R6 V	I	II	III	IV	V	II	II								
1996	0	0	1.0000	0																																	
1997	0	0	0.9799	0																																	
1998	0	0	0.9601	0																																	
1999	3,100	3,100	0.9408	3,295																																	
2000	4,230	4,230	0.9219	4,589																																	
2001	3,152	3,152	0.9033	3,490																																	
2002	3,796	3,796	0.8851	4,289																																	
2003	5,324	5,324	0.8673	6,139																																	
2004	6,289	6,289	0.8498	7,400																																	
2005	5,646	5,646	0.8327	6,780																																	
2006	2,906	2,906	0.8159	3,562																																	
2007	3,937	3,937	0.7995	4,924																																	
2008	4,501	4,501	0.7834	5,746																																	
2009	3,692	3,692	0.7676	4,810																																	
2010	4,563	4,563	0.7522	6,066																																	
2011	3,762	3,762	0.7370	5,131																																	
2012	0	0	0.7222	0																																	
2013	1,325	1,325	0.7076	1,873																																	
2014	1,887	1,887	0.6934	2,722																																	
2015	1,424	1,424	0.6794	2,096																																	
2016	0	0	0.6658	0																																	
2017	0	0	0.6523	0																																	
2018	0	0	0.6392	0																																	
2019	0	0	0.6263	0																																	

3.17 Cost Estimation of Alternative R1, Local Portion

Year	Equivalent Yen	Percent Const	Factor	Total	Treatment Plant								Distribution Center										Transmission Pipeline					Pumps							
					Buana III		East II		East III		East IV		R1		R3		R4		R3		R4		R5		R6		R7		R8		R9		R10		
					Rp.	Rd.	Rp.	Rd.	Rp.	Rd.	Rp.	Rd.	Rp.	Rd.	Rp.	Rd.	Rp.	Rd.	Rp.	Rd.	Rp.	Rd.	Rp.	Rd.	Rp.	Rd.	Rp.		Rd.	Rp.	Rd.	Rp.	Rd.	Rp.	Rd.
1996	0	0	1.0000	0																															
1997	0	0	0.9236	0																															
1998	0	0	0.8530	0																															
1999	4,446	93,362	0.7878	119,517	92,780																														
2000	3,894	81,764	0.7275	112,384	81,183																														
2001	2,597	54,545	0.6719	81,177	57,988																														
2002	585	12,287	0.6206	19,800																															
2003	3,547	74,493	0.5731	129,977																															
2004	3,676	77,202	0.5293	145,854																															
2005	2,531	53,147	0.4888	108,719																															
2006	1,961	41,188	0.4515	91,229																															
2007	2,115	44,407	0.4170	106,499																															
2008	3,430	72,037	0.3851	187,065																															
2009	1,769	37,155	0.3557	104,469																															
2010	1,910	40,113	0.3285	122,123																															
2011	1,401	29,421	0.3034	96,983																															
2012	0	0	0.2802	0																															
2013	993	20,845	0.2588	80,560																															
2014	813	17,079	0.2390	71,469																															
2015	538	11,290	0.2207	51,153																															
2016	0	0	0.2038	0																															
2017	0	0	0.1883	0																															
2018	0	0	0.1739	0																															
2019	0	0	0.1606	0																															

3.18 Cost Estimation of Alternative R2, Foreign Portion

Equivalent Yen	Present Cost	Factor	Total	Treatment Plant				Distribution Center										Transmission Pipeline					Pumps II															
				Part I	Part II	Part III	Part IV	Cascade V	R1 I	R3 III	R3 IV	R3 V	R4 II	R4 III	R4 IV	R4 V	R5 II	R6 I	R6 IV	R6 V	I	II		III	IV	V												
59,817	59,817	2.055%	73,195	5,000	5,000	5,000	9,500	5,000	4,687	4,687	4,687	8,053	4,687	300	156	253	28	507	195	234	78	312	409	156	292	6,171	17,154	7,186	9,339	1,557	974							
0	0	1.0000	0																																			
0	0	0.9799	0																																			
0	0	0.9601	0																																			
3,180	3,180	0.9408	3,380	1,406																																		
4,335	4,335	0.9219	4,702	1,875										195																								
3,229	3,229	0.9033	3,575	1,406										195																								
3,796	3,796	0.8851	4,289																																			
5,324	5,324	0.8673	6,139	1,406																																		
6,289	6,289	0.8498	7,400	1,875	487																																	
5,646	5,646	0.8327	6,780	1,406	487																																	
2,906	2,906	0.8159	3,582																																			
3,937	3,937	0.7995	4,924																																			
4,501	4,501	0.7834	5,746	1,406																																		
3,692	3,692	0.7676	4,810	2,008																																		
4,563	4,563	0.7522	6,066	2,068																																		
3,782	3,782	0.7370	5,131	2,009																																		
0	0	0.7222	0																																			
1,325	1,325	0.7076	1,875	1,406																																		
1,887	1,887	0.6934	2,722	1,875																																		
1,424	1,424	0.6794	2,096	1,406																																		
0	0	0.6658	0																																			
0	0	0.6523	0																																			
0	0	0.6392	0																																			
0	0	0.6263	0																																			

3.20 Cost Estimation of Alternative R3, Foreign Portion

Year	Equivalent Yen	Percent Cost	Factor	Total	Treatment Plant								Distribution Center										Transmission Pipeline					Pump's																
					Tuaran31	5000	Buaran411	DC	East1	Chadane	5000	4,687	974	8,033	4,687	9,500	5,000	Chadane V	R1 I	R3 III	R3 IV	R3 V	R4 II	R4 III	R4 IV	R4 V	R5 II		R6 I	R6 IV	R6 V	I	II	III	IV	V								
1996																																												
1997	60,163	60,163	2.05%	73,619	5,000	4,687	5,000	4,687	974	8,033	4,687	9,500	5,000	4,687	300	156	253	78	507	195	234	78	312	400	156	292	5,888	17,862	7,186	9,359	1,557						5,000							
1998	0	0	0	0																																								
1999	3,100	3,100	0.9408	3,295	1,406																			123				1,766																
2000	4,230	4,230	0.9219	4,589	1,875										195								164					2,355																
2001	3,152	3,152	0.9033	3,490	1,406										195								122					1,767																
2002	3,952	3,952	0.8851	4,465																								4,465																
2003	5,477	5,477	0.8673	6,315	1,406														152									4,465																
2004	6,438	6,438	0.8409	7,576	1,875				487										203									4,465																
2005	5,795	5,795	0.8327	6,959	1,406				487										152									4,465																
2006	2,906	2,906	0.8159	3,562						1,406																																		
2007	3,937	3,937	0.7995	4,924						1,875																																		
2008	4,501	4,501	0.7834	5,746						1,406																																		
2009	3,692	3,692	0.7676	4,810																																								
2010	4,563	4,563	0.7522	6,066																																								
2011	3,782	3,782	0.7370	5,131																																								
2012	0	0	0.7222	0																																								
2013	1,325	1,325	0.7076	1,873																																								
2014	1,887	1,887	0.6934	2,722																																								
2015	1,424	1,424	0.6794	2,096																																								
2016	0	0	0.6658	0																																								
2017	0	0	0.6523	0																																								
2018	0	0	0.6392	0																																								
2019	0	0	0.6263	0																																								

3.2.2 Cost Estimation of Alternative R4, Foreign Portion

Year	Equivalent Yon	Present Cost	Factor	Total	Treatment Plant										Distribution Center					Transmission Pipeline					Pumps			
					East II		East III	East IV	East V	R1 I	R3 III	R3 IV	R3 V	R4 II	R4 III	R4 IV	R4 V	R5 II	R6 I	R6 IV	R6 V	I	II	III	IV	V		
					5,000	5,000	DC	5,000	3 years	2 years	3 years	2 years	3 years	3 years	2 years	2 years	2 years	2 years	2 years	4 years	3 years	3 years	4 years	3 years	3 years	3 years	3 years	3 years
1996	0	0	1.0000	0																								
1997	0	0	0.9799	0																								
1998	0	0	0.9601	0																								
1999	3,100	3,100	0.9408	3,295	1,406																							
2000	4,230	4,230	0.9219	4,589	1,875																							
2001	3,152	3,152	0.9033	3,400	1,406					195																		
2002	2,512	2,512	0.8851	2,808						195																		
2003	3,813	3,813	0.8673	4,396																								
2004	4,310	4,310	0.8498	5,072																								
2005	3,790	3,790	0.8327	4,552																								
2006	2,906	2,906	0.8159	3,562																								
2007	3,937	3,937	0.7995	4,924																								
2008	4,501	4,501	0.7834	5,746																								
2009	3,692	3,692	0.7676	4,810																								
2010	4,563	4,563	0.7522	6,066																								
2011	3,782	3,782	0.7370	5,131																								
2012	0	0	0.7222	0																								
2013	1,325	1,325	0.7076	1,873																								
2014	1,887	1,887	0.6934	2,722																								
2015	1,424	1,424	0.6794	2,006																								
2016	0	0	0.6658	0																								
2017	0	0	0.6523	0																								
2018	0	0	0.6392	0																								
2019	0	0	0.6263	0																								

3.2.3 Cost Estimation of Alternative R4, Local Portion

Equivalent Year	Present Cost	Factor	Total	Treatment Plant												Distribution Center											Transmission Pipeline					Pumps							
				Buran 3I	East II	East II DC	Cladane	East IV	Cladane	R1 I	R1 III	R3 III	R3 IV	R3 V	R4 II	R4 III	R4 IV	R4 V	RS II	K6 I	R6 IV	R6 V	I	II	III	IV	V	II											
22.50	Rp.	Rp.	Rp.	5,000	5,000	5,000	5,000	9,700	5,000	195,451	195,451	195,451	360,747	195,451	195,451	15,786	14,239	16,799	17,186	310	35,379	17,458	17,540	310	26,479	37,869	619	1,161	26,472	43,821	39,622	35,706	5,951	5,000					
1996	0	0	0																																				
1997	0	0	0.9236	0																																			
1998	0	0	0.8530	0																																			
1999	4,446	93,362	0.7478	118,517	92,780																																		
2000	3,894	81,764	0.7275	112,984	81,183						8,682																												
2001	2,597	54,545	0.6719	81,177	57,988						7,104																												
2002	388	8,158	0.6206	13,146																																			
2003	2,819	59,196	0.5731	103,287	78,180																																		
2004	2,680	56,271	0.5293	106,310	68,408	0																																	
2005	1,925	38,319	0.4888	76,387	48,863	0																																	
2006	1,961	41,188	0.4515	91,229																																			
2007	2,115	44,407	0.4170	106,499	68,408																																		
2008	3,430	72,037	0.3951	187,065	48,863																																		
2009	1,769	37,155	0.3557	104,469	108,224																																		
2010	1,970	40,113	0.3285	122,123	90,187																																		
2011	1,401	29,421	0.3034	96,993	72,149																																		
2012	0	0	0.2802	0																																			
2013	993	20,845	0.2588	80,560																																			
2014	813	17,079	0.2390	71,469																																			
2015	538	11,290	0.2207	51,153																																			
2016	0	0	0.2038	0																																			
2017	0	0	0.1883	0																																			
2018	0	0	0.1739	0																																			
2019	0	0	0.1606	0																																			

3.2.4 Cost Estimation of Raw Water Transmission (Alternative R1)

FOREIGN PORTION

Year	Equivalent Yen	Present Cost	Factor	Total	To East			WTC	
					Pipe	Pump	Sheet pile	Pipe	WTC
	¥	¥	2.055%	¥	II	II	I	II	¥
	1,334	1,334		1,490	3 years	3 years	3 years	3 years	550
1996	0	0	1.0000	0					
1997	0	0	0.9799	0					
1998	0	0	0.9601	0					
1999	265	265	0.9408	282			282		
2000	347	347	0.9219	376			376		
2001	255	255	0.9033	282			282		
2002	0	0	0.8851	0					
2003	143	143	0.8675	165		0	0		165
2004	187	187	0.8498	220		0	0		220
2005	137	137	0.8327	165		0	0		165
2006	0	0	0.8159	0					
2007	0	0	0.7995	0					
2008	0	0	0.7834	0					
2009	0	0	0.7676	0					
2010	0	0	0.7522	0					
2011	0	0	0.7370	0					
2012	0	0	0.7222	0					
2013	0	0	0.7076	0					
2014	0	0	0.6934	0					
2015	0	0	0.6794	0					
2016	0	0	0.6658	0					
2017	0	0	0.6523	0					
2018	0	0	0.6392	0					
2019	0	0	0.6263	0					

LOCAL PORTION

Year	Equivalent Yen	Present Cost	Factor	Total	To East			WTC	
					Pipe	Pump	Sheet pile	Pipe	WTC
	¥	Rp.	8.277%	Rp.	II	II	I	II	Rp.
	505	11,352		17,390	3 years	3 years	3 years	3 years	7,350
1996	0	0	1.0000	0					
1997	0	0	0.9236	0					
1998	0	0	0.8530	0					
1999	141	3,164	0.7878	4,016			4,016		
2000	114	2,557	0.7275	3,514			3,514		
2001	75	1,687	0.6719	2,510			2,510		
2002	0	0	0.6206	0					
2003	75	1,685	0.5731	2,940		0	0		2,940
2004	61	1,362	0.5293	2,573		0	0		2,573
2005	40	898	0.4888	1,837		0	0		1,837
2006	0	0	0.4515	0					
2007	0	0	0.4170	0					
2008	0	0	0.3851	0					
2009	0	0	0.3557	0					
2010	0	0	0.3285	0					
2011	0	0	0.3034	0					
2012	0	0	0.2802	0					
2013	0	0	0.2588	0					
2014	0	0	0.2390	0					
2015	0	0	0.2207	0					
2016	0	0	0.2038	0					
2017	0	0	0.1883	0					
2018	0	0	0.1739	0					
2019	0	0	0.1606	0					

3.25 Cost Estimation of Raw Water Transmission (Alternative R2)

LOCAL PORTION

LOCAL PORTION

Year	Equivalent Ycn	Present Cost	Factor	Total	To East		WTC	
					Pipe	Pump	Sheet pile	Pipe
	22.50		8.277%		II	II	I	II
	Y	Rp.		Rp.	Rp.	Rp.	Rp.	Rp.
	422	9,500		14,880			7,530	7,350
					3 years	3 years	3 years	3 years
1996	0	0	1.0000	0				
1997	0	0	0.9236	0				
1998	0	0	0.8530	0				
1999	105	2,373	0.7878	3,012			3,012	
2000	85	1,918	0.7275	2,636			2,636	
2001	56	1,265	0.6719	1,882			1,882	
2002	0	0	0.6206	0				
2003	75	1,685	0.5731	2,940	0	0	0	2,940
2004	61	1,362	0.5293	2,573	0	0	0	2,573
2005	40	898	0.4888	1,837	0	0	0	1,837
2006	0	0	0.4515	0				
2007	0	0	0.4170	0				
2008	0	0	0.3851	0				
2009	0	0	0.3557	0				
2010	0	0	0.3285	0				
2011	0	0	0.3034	0				
2012	0	0	0.2802	0				
2013	0	0	0.2588	0				
2014	0	0	0.2390	0				
2015	0	0	0.2207	0				
2016	0	0	0.2038	0				
2017	0	0	0.1883	0				
2018	0	0	0.1739	0				
2019	0	0	0.1606	0				

FOREIGN PORTION

Year	Equivalent Ycn	Present Cost	Factor	Total	To East		WTC	
					Pipe	Pump	Sheet pile	Pipe
	Y	Y	2.055%	Y	II	II	I	II
	1,117	1,117		1,255	Y	Y	Y	Y
					3 years	3 years	3 years	3 years
1996	0	0	1.0000	0			705	550
1997	0	0	0.9799	0				
1998	0	0	0.9601	0				
1999	199	199	0.9408	212			212	
2000	260	260	0.9219	282			282	
2001	191	191	0.9033	211			211	
2002	0	0	0.8851	0				
2003	143	143	0.8673	165	0	0	0	165
2004	187	187	0.8498	220	0	0	0	220
2005	137	137	0.8327	165	0	0	0	165
2006	0	0	0.8159	0				
2007	0	0	0.7995	0				
2008	0	0	0.7834	0				
2009	0	0	0.7676	0				
2010	0	0	0.7522	0				
2011	0	0	0.7370	0				
2012	0	0	0.7222	0				
2013	0	0	0.7076	0				
2014	0	0	0.6934	0				
2015	0	0	0.6794	0				
2016	0	0	0.6658	0				
2017	0	0	0.6523	0				
2018	0	0	0.6392	0				
2019	0	0	0.6263	0				

3.26 Cost Estimation of Raw Water Transmission (Alternative R3)

LOCAL PORTION

LOCAL PORTION

Year	Equivalent Ycn	Present Cost	Factor	Total	To East		WTC	
					Pipe	Pump	Sheet pile	Pipe
	Y	Rp.	8.277%	Rp.	Rp.	Rp.	Rp.	Rp.
	671	15,093		24,360			10,040	14,320
1996	0	0	1.0000	0				
1997	0	0	0.9236	0				
1998	0	0	0.8530	0				
1999	141	3,164	0.7878	4,016			4,016	
2000	114	2,557	0.7275	3,514			3,514	
2001	75	1,687	0.6719	2,510			2,510	
2002	0	0	0.6206	0				
2003	146	3,283	0.5731	5,728	0	0	0	5,728
2004	118	2,653	0.5293	5,012	0	0	0	5,012
2005	78	1,750	0.4888	3,580	0	0	0	3,580
2006	0	0	0.4515	0				
2007	0	0	0.4170	0				
2008	0	0	0.3851	0				
2009	0	0	0.3557	0				
2010	0	0	0.3285	0				
2011	0	0	0.3034	0				
2012	0	0	0.2802	0				
2013	0	0	0.2588	0				
2014	0	0	0.2390	0				
2015	0	0	0.2207	0				
2016	0	0	0.2038	0				
2017	0	0	0.1883	0				
2018	0	0	0.1739	0				
2019	0	0	0.1606	0				

FOREIGN PORTION

Year	Equivalent Ycn	Present Cost	Factor	Total	To East		WTC	
					Pipe	Pump	Sheet pile	Pipe
	Y	Y	2.055%	Y	Y	Y	Y	Y
	1,819	1,819		2,060			940	1,120
1996	0	0	1.0000	0				
1997	0	0	0.9799	0				
1998	0	0	0.9601	0				
1999	265	265	0.9408	282			282	
2000	347	347	0.9219	376			376	
2001	255	255	0.9033	282			282	
2002	0	0	0.8851	0				
2003	291	291	0.8673	336	0	0	0	336
2004	381	381	0.8498	448	0	0	0	448
2005	280	280	0.8327	336	0	0	0	336
2006	0	0	0.8159	0				
2007	0	0	0.7995	0				
2008	0	0	0.7834	0				
2009	0	0	0.7676	0				
2010	0	0	0.7522	0				
2011	0	0	0.7370	0				
2012	0	0	0.7222	0				
2013	0	0	0.7076	0				
2014	0	0	0.6934	0				
2015	0	0	0.6794	0				
2016	0	0	0.6658	0				
2017	0	0	0.6523	0				
2018	0	0	0.6392	0				
2019	0	0	0.6263	0				

3.27 Cost Estimation of Raw Water Transmission (Alternative R4)

LOCAL PORTION

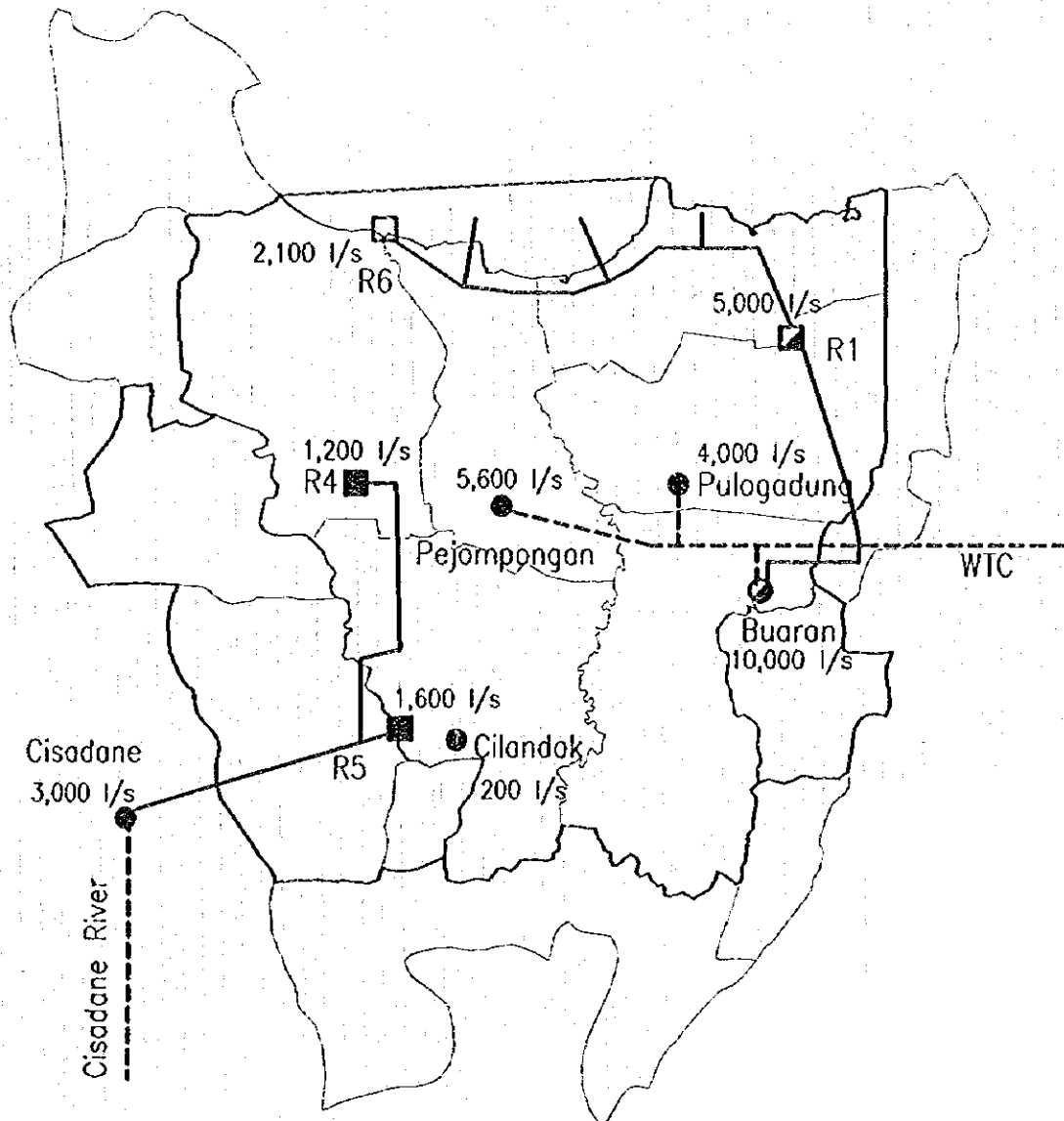
LOCAL PORTION

Year	Equivalent Yen	Present Cost	Factor	Total	To East		WTC	
					Pipe	Pump	Sheet pile	Pipe
	22,50	8,277%			II	II	I	II
	Y	Rp.		Rp.	Rp.	Rp.	Rp.	Rp.
	2,091	47,045		83,893	18,491	48,012	10,040	7,350
					3 years	3 years	3 years	3 years
1996	0	0	1.0000	0				
1997	0	0	0.9236	0				
1998	0	0	0.8530	0				
1999	141	3,164	0.7878	4,016			4,016	
2000	114	2,557	0.7275	3,514			3,514	
2001	75	1,687	0.6719	2,510			2,510	
2002	0	0	0.6206	0				
2003	752	16,931	0.5731	29,541	7,396	19,205		2,940
2004	608	13,682	0.5293	25,849	6,472	16,804		2,573
2005	401	9,026	0.4888	18,463	4,623	12,003		1,837
2006	0	0	0.4515	0				
2007	0	0	0.4170	0				
2008	0	0	0.3851	0				
2009	0	0	0.3557	0				
2010	0	0	0.3285	0				
2011	0	0	0.3034	0				
2012	0	0	0.2802	0				
2013	0	0	0.2588	0				
2014	0	0	0.2390	0				
2015	0	0	0.2207	0				
2016	0	0	0.2038	0				
2017	0	0	0.1883	0				
2018	0	0	0.1739	0				
2019	0	0	0.1606	0				

FOREIGN PORTION

Year	Equivalent Yen	Present Cost	Factor	Total	To East		WTC	
					Pipe	Pump	Sheet pile	Pipe
	*	2,055%		*	II	II	I	II
	Y	Y		Y	Y	Y	Y	Y
	7,185	7,185		8,374	4,838	2,046	940	550
					3 years	3 years	3 years	3 years
1996	0	0	1.0000	0				
1997	0	0	0.9799	0				
1998	0	0	0.9601	0				
1999	265	265	0.9408	282			282	
2000	347	347	0.9219	376			376	
2001	255	255	0.9033	282			282	
2002	0	0	0.8851	0				
2003	1,934	1,934	0.8673	2,230	1,451	614		165
2004	2,527	2,527	0.8498	2,973	1,935	818		220
2005	1,858	1,858	0.8327	2,231	1,452	614		165
2006	0	0	0.8159	0				
2007	0	0	0.7995	0				
2008	0	0	0.7834	0				
2009	0	0	0.7676	0				
2010	0	0	0.7522	0				
2011	0	0	0.7370	0				
2012	0	0	0.7222	0				
2013	0	0	0.7076	0				
2014	0	0	0.6934	0				
2015	0	0	0.6794	0				
2016	0	0	0.6658	0				
2017	0	0	0.6523	0				
2018	0	0	0.6392	0				
2019	0	0	0.6263	0				

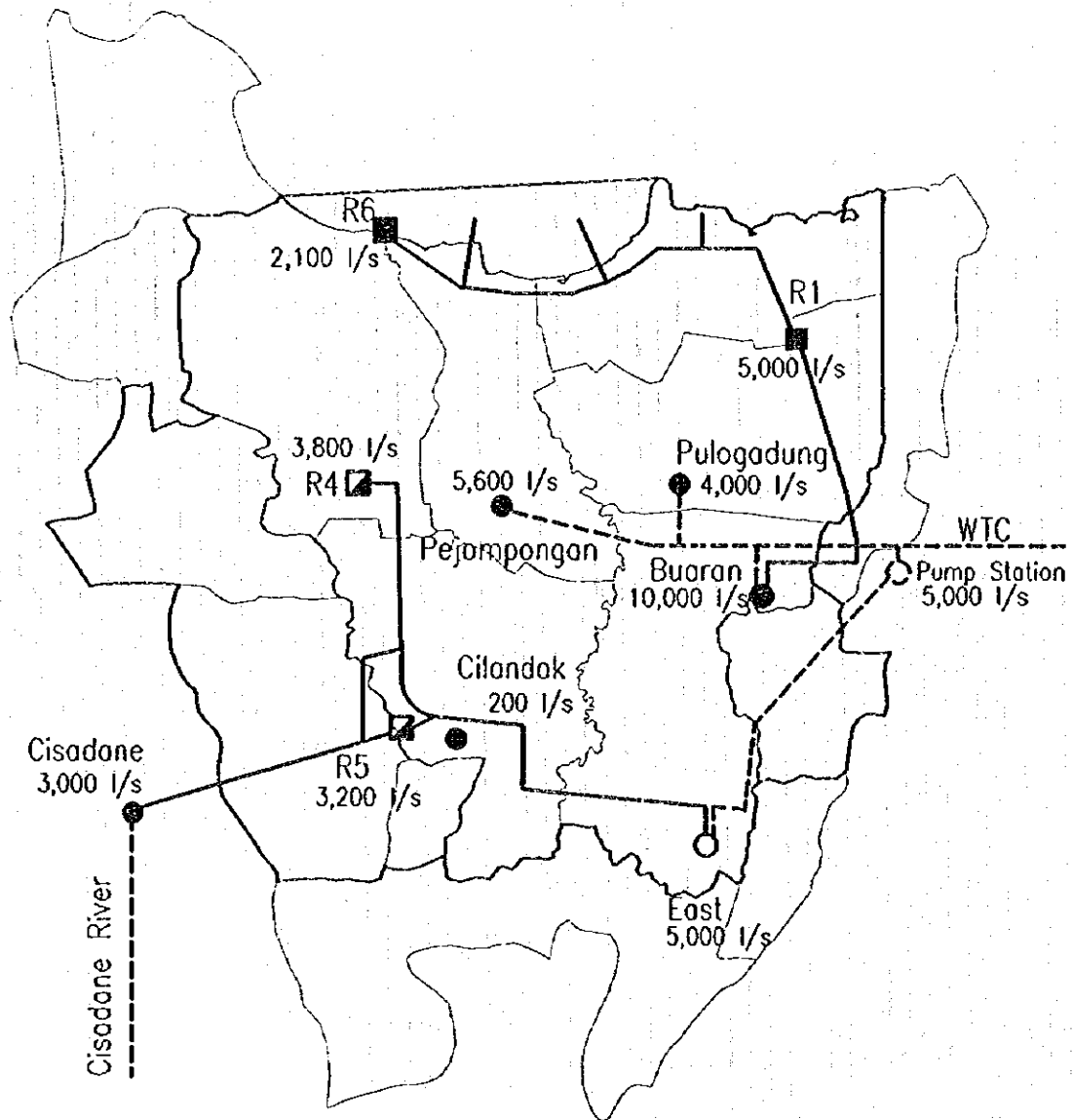
3.28 Proposed Water Supply System as of the Year 2002 in Revised Alternative Study



LEGEND :

- | | |
|--------------------------------|------------------------------------|
| ● Expansion of Treatment Plant | ▣ Expansion of Distribution Center |
| ○ Proposed Treatment Plant | □ Proposed Distribution Center |
| ● Existing Treatment Plant | ----- Raw Water |
| | ———— Treated Water Transmission |

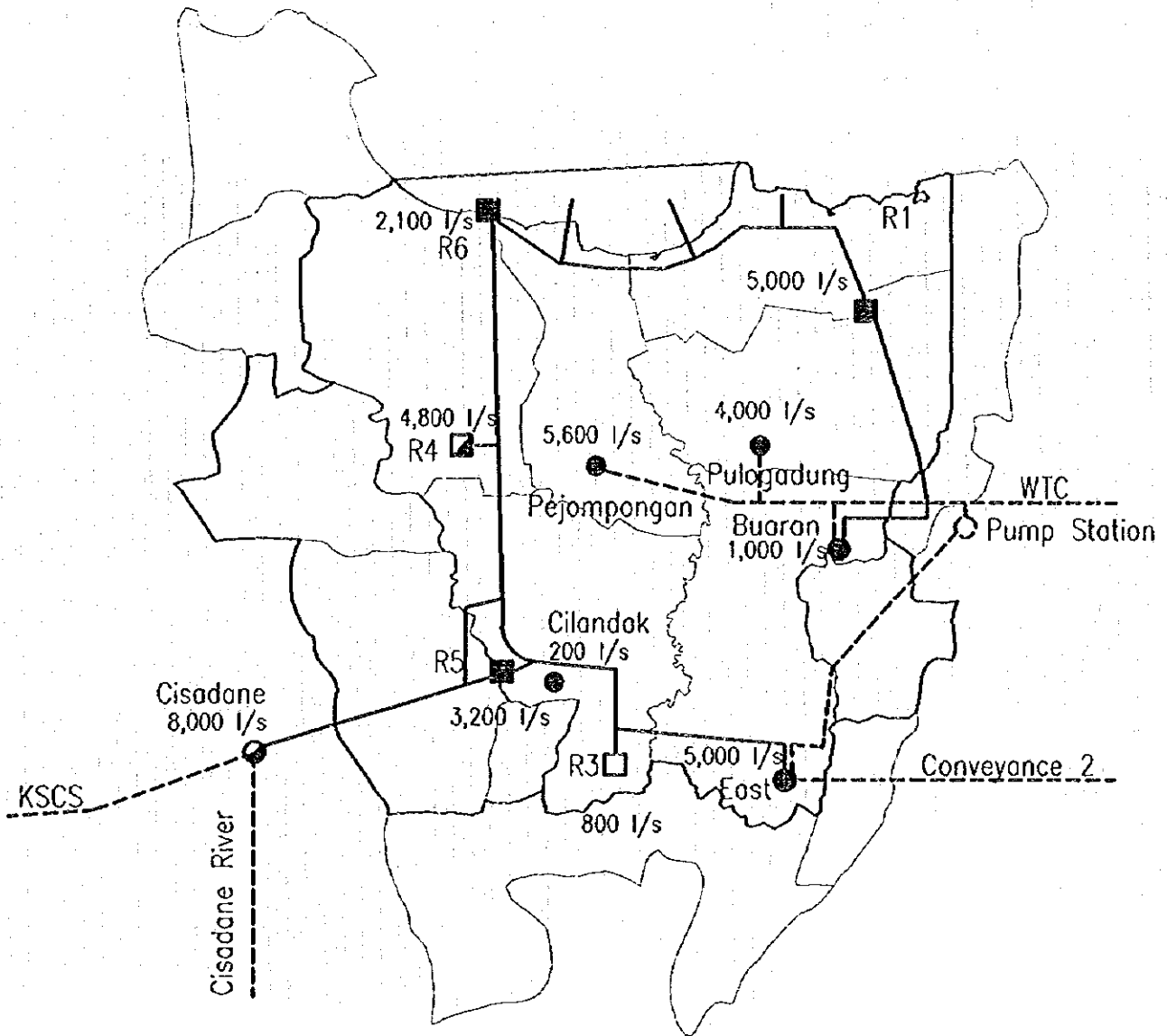
3.29 Proposed Water Supply System as of the Year 2006 in Revised Alternative Study



LEGEND :

- | | | | |
|---|------------------------------|-----|----------------------------------|
| ● | Expansion of Treatment Plant | ◻ | Expansion of Distribution Center |
| ○ | Proposed Treatment Plant | ■ | Existing Distribution Center |
| ● | Existing Treatment Plant | --- | Raw Water |
| | | — | Treated Water Transmission |

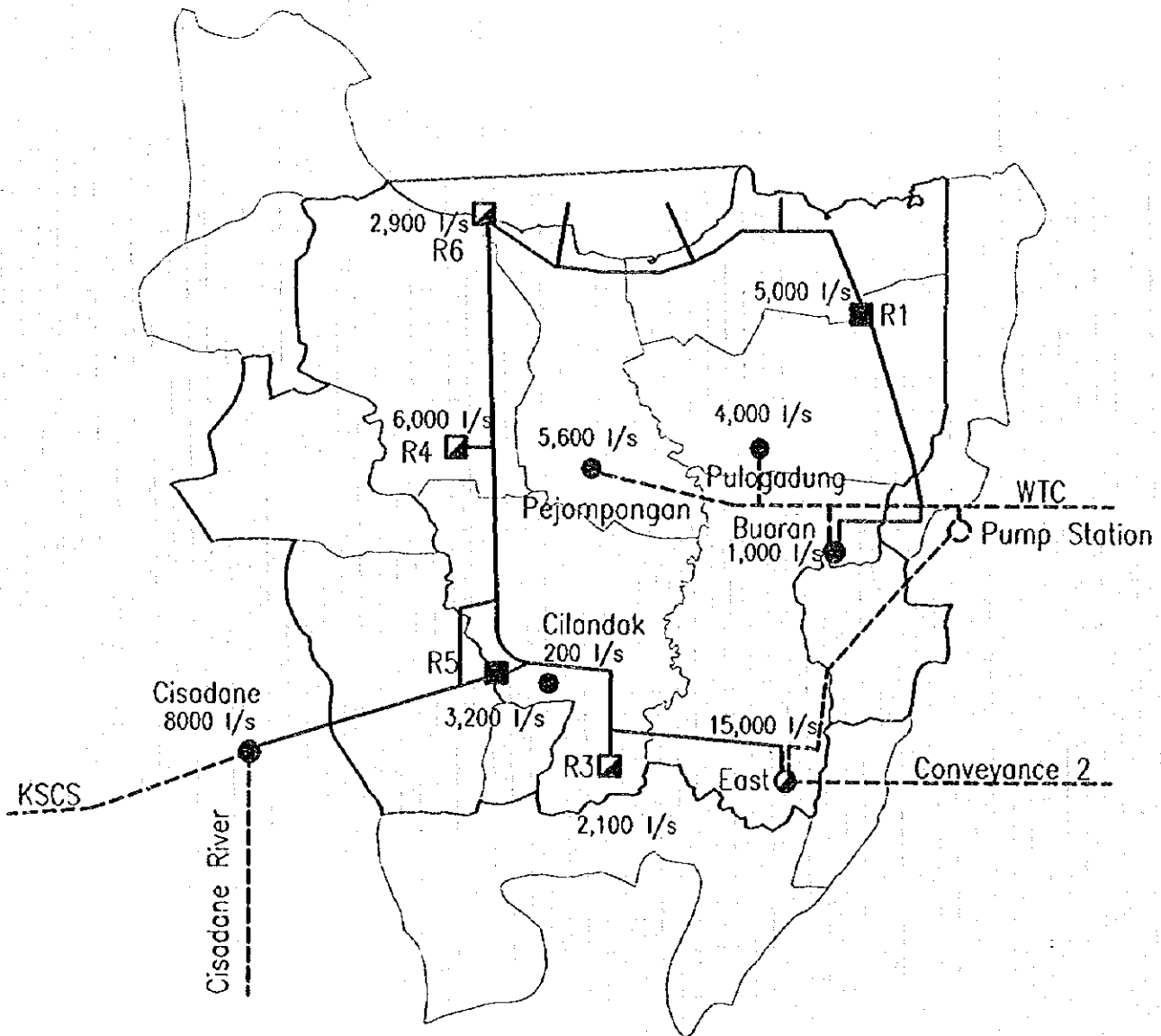
3.30 Proposed Water Supply System as of the Year 2009 in Revised Alternative Study



LEGEND :

- Expansion of Treatment Plant
- Proposed Treatment Plant
- Existing Distribution Center
- ▣ Expansion of Distribution Center
- Proposed Distribution Center
- Raw Water
- Treated Water Transmission

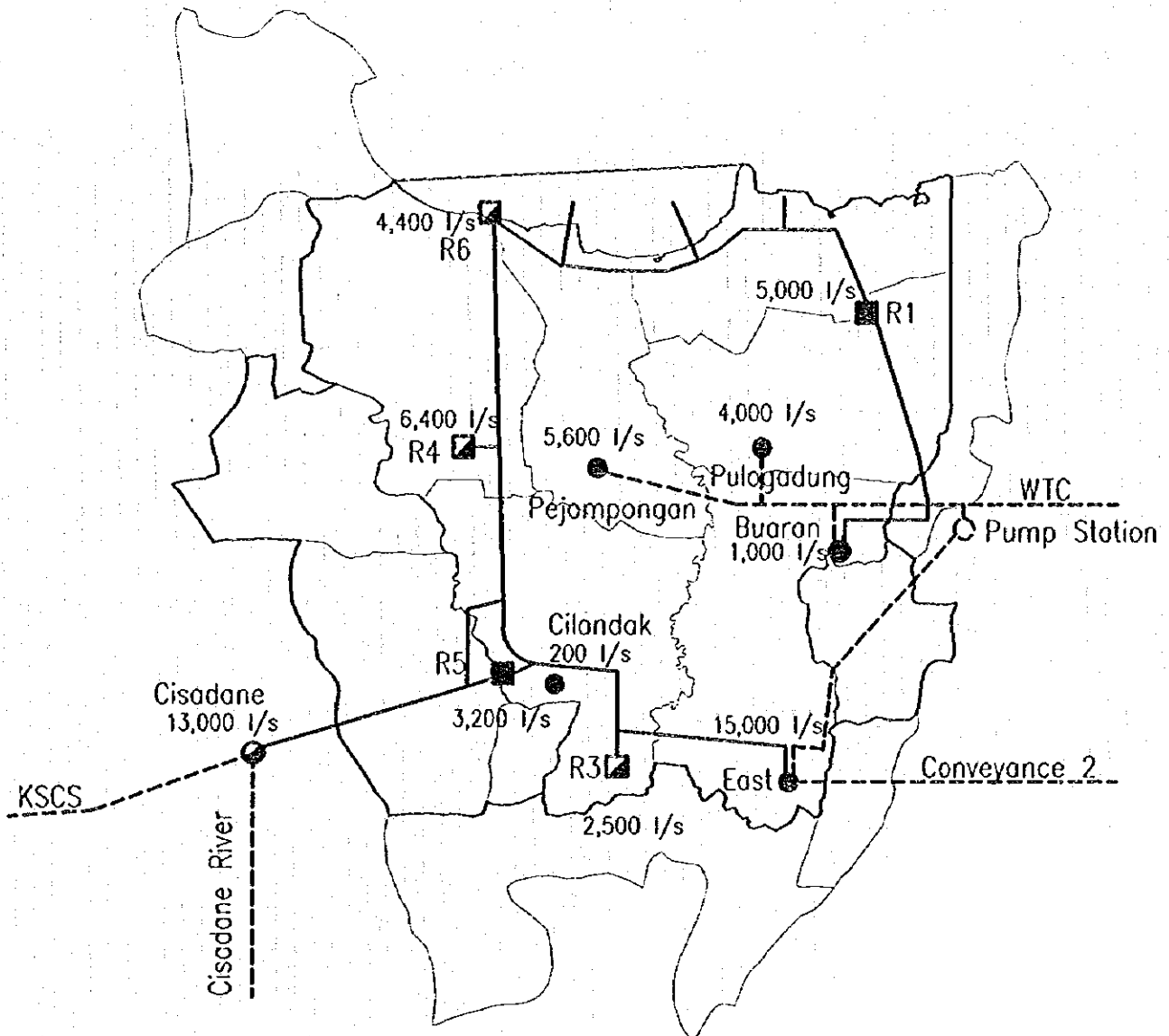
3.31 Proposed Water Supply System as of the Year 2012 in Revised Alternative Study



LEGEND :

- | | |
|--------------------------------|------------------------------------|
| ● Expansion of Treatment Plant | ▣ Expansion of Distribution Center |
| ● Existing Treatment Plant | □ Proposed Distribution Center |
| ■ Existing Distribution Center | --- Raw Water |
| | — Treated Water Transmission |

3.32 Proposed Water Supply System as of the Year 2016 in Revised Alternative Study



LEGEND :

- | | |
|--------------------------------|------------------------------------|
| ● Expansion of Treatment Plant | ◻ Expansion of Distribution Center |
| ● Existing Treatment Plant | ◻ Proposed Distribution Center |
| ■ Existing Distribution Center | --- Raw Water |
| | — Treated Water Transmission |

4. DISTRIBUTION FACILITIES

4.1.1 The Results of Preliminary Primary Pipe Network Analysis for Zone 1

«ZONE-1(2019)»
Node Data

Node-page : 1

NO	Node	Type	Q (l/sec)	VL (m)	CL (m)	EH (m)	Comments
1	IAD1	0	67.470	37.12	0.00	37.12	
2	IBC3	0	67.470	38.26	0.00	38.26	
3	IBC5	0	67.470	39.40	0.00	39.40	
4	IBC4	0	67.470	39.83	0.00	39.83	
5	IBD1	0	67.470	40.94	0.00	40.94	
6	IBD6	0	67.470	39.44	0.00	39.44	
7	ICD1	0	67.470	36.72	0.50	36.22	
8	ICD4	0	67.470	36.61	0.50	36.11	
9	ICD5	0	170.040	37.50	0.30	37.20	
10	IBD2	0	67.470	38.22	0.30	37.92	
11	IBD5	0	67.470	35.80	0.50	35.50	
12	ICD5	0	170.040	37.12	0.10	37.02	
13	ICD9	0	170.040	35.25	1.20	34.05	
14	ICD7	0	225.680	35.21	1.20	34.01	
15	ICD2X	0	0.000	35.37	1.30	34.07	
16	ICD2	0	170.040	35.43	0.00	35.43	
17	IBD3	0	67.470	40.50	0.00	40.50	
18	IBD4	0	67.470	38.88	0.30	38.58	
19	ICD8	0	67.470	36.50	0.50	36.00	
20	ICD4	0	55.640	35.55	1.20	34.36	
21	IDD1	0	55.640	37.00	1.30	35.70	
22	IDD6	0	115.050	37.10	1.10	36.00	
23	IDD5	0	170.040	37.10	0.90	36.20	
24	IDD7	0	115.050	37.18	1.30	35.88	
25	IDE1	0	115.050	37.23	1.80	35.43	
26	IDE5	0	115.050	35.81	1.80	34.01	
27	IDE3	0	115.050	32.87	2.60	30.27	
28	IDE2	0	216.840	29.98	0.70	29.28	
29	ICE7	0	101.790	31.46	1.00	30.46	
30	ICE9	0	101.790	29.67	1.10	28.57	
31	ICE2	0	101.790	32.66	0.30	32.36	
32	IBE1	0	92.560	30.40	0.10	30.30	
33	IBE3	0	92.560	28.83	0.10	28.73	
34	IBE5	0	92.560	28.31	1.00	27.31	
35	IBE2	0	92.560	28.48	1.00	27.48	
36	IBE6	0	92.560	28.34	1.90	26.44	
37	ICF1	0	114.400	27.99	1.00	26.99	
38	ICEA	0	89.570	28.00	0.20	27.80	
39	ICE3	0	101.790	31.95	1.50	30.45	
40	ICE4	0	194.350	29.46	1.50	27.96	
41	ICE5	0	101.790	31.93	1.10	30.83	
42	ICE8	0	101.790	31.92	1.00	30.92	
43	IDE6	0	115.050	32.82	2.60	30.22	
44	IDE4	0	89.570	30.15	3.00	27.15	
45	IDF1	0	89.570	28.84	2.00	26.84	
46	IDF1	0	115.050	31.05	4.80	29.25	
47	ICF2	0	92.560	27.90	2.00	25.90	
48	IDF3	0	114.400	28.00	2.00	26.00	
49	IDF2	0	89.570	27.37	2.00	25.37	
50	IDDC	0	271.830	36.11	0.90	35.21	

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Node page : 2

NO	Node	Type	Q (1/sec)	VL (m)	GL (m)	EH (m)	Comments
51	IDD8	0	115.050	37.00	1.10	35.90	
52	IDD4	0	55.640	36.99	1.30	35.69	
53	IED5	0	107.250	42.80	8.50	34.30	
54	IFD2	0	107.250	45.85	8.00	37.85	
55	IDD9	0	55.640	39.37	5.10	34.27	
56	IED3	0	107.250	39.33	6.20	33.13	
57	IED4	0	107.250	39.53	7.00	32.53	
58	IEE4	0	107.250	38.25	4.70	33.55	
59	IEE5	0	51.220	38.25	4.70	33.55	
60	IEE3	0	61.750	35.69	1.40	34.29	
61	IEE8	0	61.750	34.33	4.80	29.53	
62	IEE2	0	115.050	36.22	1.50	34.72	
63	IEE1	0	115.050	37.58	1.50	36.08	
64	IEEA	0	61.750	34.29	4.80	29.49	
65	IEE8	0	61.750	34.33	3.00	31.33	
66	IEE7	0	61.750	33.94	1.60	32.34	
67	IEE6	0	51.220	33.78	7.60	26.18	
68	IEEK	0	51.220	33.68	7.60	26.08	
69	IEEJ	0	51.220	33.68	5.00	28.68	
70	PEJ2	1	-4.718.741	50.00	1.00	49.00	
71	IFE2	0	61.750	38.04	3.70	34.34	
72	IFE3	0	113.880	37.38	8.10	29.28	
73	IFF1	0	61.750	35.57	11.60	23.97	
74	IFF2	0	61.750	34.83	8.50	26.33	
75	IFF3	0	61.750	34.63	6.00	28.63	
76	IFF3	0	61.750	34.56	8.00	26.56	
77	IFF9	0	61.750	34.69	8.50	26.19	
78	IFFC	0	52.130	35.47	8.30	27.17	
79	IFF5	0	105.300	35.46	8.30	27.16	
80	IFF8	0	70.200	35.49	8.30	27.19	
81	IFF7	0	122.330	35.76	12.80	22.96	
82	IFFA	0	70.200	36.73	12.30	24.43	
83	IGG2	0	70.200	36.73	16.00	20.73	
84	IGFF	0	0.000	37.73	20.50	17.23	
85	IGFC	0	0.000	37.61	20.50	17.11	
86	IGF9	0	70.200	36.93	16.00	20.93	
87	IFF8	0	70.200	37.01	16.30	20.71	
88	IGF8	0	70.200	37.16	12.50	24.66	
89	IGF6	0	70.200	36.97	12.50	24.47	
90	IGFE	0	70.200	37.61	18.00	19.61	
91	IGG1	0	70.200	37.59	17.00	20.59	
92	IGF4	0	70.200	38.01	17.00	21.01	
93	IGFA	0	0.000	37.82	20.50	17.32	
94	IGFB	0	0.000	37.83	20.50	17.33	
95	IGE5	0	52.130	38.47	14.30	24.17	
96	IGF1	0	52.130	37.60	16.00	21.60	
97	IFE6	0	52.130	37.50	14.00	23.50	
98	IFE1	0	52.130	41.42	9.80	31.62	
99	IFE9	0	51.220	48.07	5.00	43.07	
100	IFE4	0	52.130	39.59	5.80	33.79	

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NO	Node	Type	Q (1/sec)	HL (m)	GL (m)	EH (m)	Comments
101	IFE7	0	52.130	39.54	6.80	32.74	
102	IGE8	0	52.130	37.81	14.30	23.51	
103	IFE8	0	52.130	41.46	8.50	32.96	
104	IGE9	0	82.160	40.00	11.50	28.50	
105	IFE5	0	53.170	41.46	8.50	32.96	
106	IFDF	0	51.220	45.56	8.00	37.56	
107	IFDE	0	51.220	48.00	5.00	43.00	
108	IFDG	0	107.250	45.87	8.00	37.87	
109	IFD1	0	107.250	45.17	8.50	36.67	
110	IGD1	0	51.220	44.62	14.00	30.62	
111	IFDH	0	51.220	45.58	10.00	35.38	
112	IFDG	0	51.220	45.74	8.00	37.74	
113	IFDA	0	51.220	37.25	7.00	30.25	
114	IFD3	0	51.220	36.46	8.50	27.96	
115	IFD4	0	51.220	36.47	10.00	26.47	
116	IFD5	0	51.220	38.60	12.00	26.60	
117	IGDC	0	104.390	40.25	12.40	27.85	
118	IGDD	0	53.170	37.48	15.00	22.48	
119	IEE6	0	51.220	33.52	7.60	25.92	
120	IEE8	0	51.220	33.52	7.60	25.92	
121	IEE9	0	51.220	33.75	7.60	26.15	
122	IEEF	0	51.220	33.44	9.00	24.44	
123	DC-R6	0	-3.120.000	44.28	0.00	44.28	
124	IGFD	0	0.000	37.46	18.00	19.46	
125	IGEA	0	70.200	37.82	14.30	23.52	
126	X001	0	0.000	33.80	0.30	33.50	
127	X002	0	0.000	37.18	0.30	36.88	
128	X003	0	0.000	31.45	1.00	30.45	
129	IDD0	0	55.640	39.72	5.80	33.92	
130	X004	0	0.000	37.34	1.30	36.04	
131	X009	0	0.000	33.68	5.00	28.68	
132	X010	0	0.000	42.33	9.00	33.33	
133	X007	0	0.000	34.68	4.80	29.88	
134	X011	0	0.000	36.72	9.30	27.42	
135	X006	0	0.000	36.91	1.50	35.41	
136	X008	0	0.000	38.35	4.70	33.65	
137	X015	0	0.000	35.74	0.80	34.94	
138	X022	0	0.000	37.85	15.50	22.35	
139	IEC1	0	224.120	43.63	10.50	33.13	
140	IEF2	0	61.750	34.30	4.30	30.00	
141	PEJ11	0	-2.405.000	39.64	5.40	34.24	
142	PEJ12	0	-155.000	41.19	5.00	56.19	
143	X023	0	0.000	41.77	13.95	27.82	
144	IEC2	0	107.250	35.86	6.50	29.36	

ZONE-1(2019):
Branch Data

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NO	Node(U)	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dH (m)	f. dH (m)	Comments
1	IBC3	IAD1	0	300	2230	110	21.364	0.302	0.51	1.14	0.00	
2	IBC5	IBC3	0	400	650	110	88.834	0.707	1.75	1.14	0.00	
3	IBC4	IBC5	0	600	730	110	143.146	0.506	0.59	0.43	0.00	
4	IBD1	IBC4	0	600	920	110	210.616	0.745	1.20	1.11	0.00	
5	IBD1	IBD6	0	400	1020	110	80.628	0.642	1.47	1.50	0.00	
6	IBD5	IBC5	0	400	790	110	13.158	0.105	0.05	0.04	0.00	
7	IBD1	ICD1	0	600	1160	110	382.935	1.354	3.64	4.22	0.00	
8	ICD1	ICDA	0	400	230	110	43.421	0.346	0.47	0.11	0.00	
9	IBD2	ICD6	0	400	1050	110	53.995	0.430	0.70	0.72	0.00	
10	IBD2	IAD1	0	400	2110	110	46.106	0.367	0.52	1.10	0.00	
11	IBD2	IBD5	0	250	510	110	44.206	0.901	4.76	2.42	0.00	
12	IBD2	ICD6	0	1350	1040	110	1320.469	0.923	0.69	0.72	0.00	
13	ICD6	ICD5	0	1200	1430	110	582.961	0.515	0.27	0.38	0.00	
14	ICD5	ICD9	0	400	1420	110	75.936	0.604	1.31	1.87	0.00	
15	ICD9	ICD7	0	600	90	110	123.675	0.437	0.45	0.04	0.00	
16	ICD2X	ICD7	0	600	510	110	102.005	0.361	0.31	0.16	0.00	
17	ICD2	ICD2X	0	600	170	110	102.005	0.361	0.31	0.06	0.00	
18	IBD1	IBD3	0	250	190	110	30.005	0.611	2.32	0.44	0.00	
19	IBD3	IBD1	0	350	920	110	62.631	0.651	1.76	1.62	0.00	
20	IBD4	IBD2	0	1350	380	110	2158.110	1.508	1.72	0.66	0.00	
21	IBD3	ICD8	0	350	1280	110	85.300	0.887	3.12	4.00	0.00	
22	ICDA	ICD8	0	350	270	110	28.306	0.294	0.41	0.11	0.00	
23	ICD8	ICD9	0	350	1250	110	46.137	0.480	1.00	1.25	0.00	
24	ICD4	ICD9	0	350	490	110	35.699	0.371	0.62	0.31	0.00	
25	IDD1	ICD4	0	350	1530	110	44.659	0.464	0.94	1.44	0.00	
26	IDD6	IDD1	0	300	2170	90	4.845	0.069	0.05	0.10	0.00	
27	IDD6	IDD5	0	1200	580	110	61.103	0.054	0.00	0.00	0.00	
28	ICD5	IDD5	0	1200	1390	110	108.937	0.096	0.01	0.02	0.00	
29	IDD7	IDD6	0	1350	710	110	492.982	0.344	0.11	0.08	0.00	
30	IDE1	IDD7	0	1350	340	110	578.439	0.404	0.15	0.05	0.00	
31	IDE1	IDE5	0	600	230	90	417.968	1.478	6.20	1.42	0.00	
32	IDE5	IDE3	0	600	860	90	302.918	1.071	3.42	2.94	0.00	
33	IDE3	IDE2	0	350	880	90	71.776	0.746	3.29	2.89	0.00	
34	ICE7	IDE2	0	350	230	90	103.395	1.075	6.45	1.48	0.00	
35	ICE7	ICE9	0	350	1060	90	50.208	0.522	1.70	1.79	0.00	
36	ICE2	ICE9	0	350	1680	90	51.582	0.536	1.78	2.99	0.00	
37	IBD2	IBD5	0	700	570	110	625.865	1.626	4.26	2.42	0.00	
38	IBD5	IBE1	0	300	1750	110	56.485	0.799	3.08	5.40	0.00	
39	IBD5	IBE1	0	700	1630	110	546.115	1.419	3.31	5.40	0.00	
40	IBE1	IBE3	0	400	380	110	141.140	1.123	4.13	1.57	0.00	
41	IBE3	IBE5	0	400	910	110	48.580	0.387	0.57	0.52	0.00	
42	IBE2	IBE5	0	400	350	110	43.980	0.350	0.48	0.17	0.00	
43	IBE1	IBE2	0	400	950	110	95.042	0.764	2.03	1.92	0.00	
44	ICE2	IBE1	0	400	1310	110	83.066	0.700	1.72	2.26	0.00	
45	IBE6	ICF1	0	600	590	110	143.847	0.509	0.59	0.35	0.00	
46	ICEA	ICF1	0	400	260	110	11.527	0.092	0.04	0.01	0.00	
47	ICE3	ICEA	0	400	1770	110	101.097	0.805	2.23	3.95	0.00	
48	ICE2	ICE3	0	600	560	110	217.340	0.769	1.28	0.71	0.00	
49	ICE3	ICE5	0	600	1430	110	14.453	0.051	0.01	0.02	0.00	
50	ICE5	ICE8	0	800	760	110	43.144	0.086	0.02	0.01	0.00	

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NO	Node(U)	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dH (m)	f. dH (m)	Comments
51	ICE8	ICE7	0	500	110	110	255.394	1.301	4.18	0.46	0.00	
52	IDE6	ICE8	0	800	1450	110	314.040	0.625	0.62	0.90	0.00	
53	IDE3	IDE6	0	800	360	110	135.983	0.271	0.13	0.05	0.00	
54	IDE3	IDE4	0	400	1120	90	86.582	0.689	2.43	2.72	0.00	
55	IDE4	IDF1	0	400	830	90	68.789	0.547	1.59	1.31	0.00	
56	IEF1	IDE4	0	600	1570	110	311.598	1.102	2.48	3.90	0.00	
57	ICD5	ICE5	0	400	1450	110	130.481	1.038	3.57	5.19	0.00	
58	ICF1	ICF2	0	600	1580	110	40.974	0.145	0.06	0.09	0.00	
59	IDF3	ICF2	0	600	1100	110	51.586	0.182	0.09	0.10	0.00	
60	IDF3	IDF2	0	300	230	110	53.053	0.751	2.75	0.63	0.00	
61	IDE2	IDF2	0	300	1900	110	36.517	0.517	1.38	2.61	0.00	
62	IDDC	IDE2	0	300	1090	110	78.185	1.106	5.63	6.13	0.00	
63	IDD6	IDDC	0	600	590	110	252.449	0.893	1.68	0.99	0.00	
64	ICD5	IDDC	0	500	1430	110	97.567	0.497	0.70	1.01	0.00	
65	IDD6	IDDB	0	600	220	110	125.456	0.444	0.46	0.10	0.00	
66	IDDB	IDDA	0	600	1870	110	10.406	0.037	0.00	0.01	0.00	
67	IDF2	IED5	0	800	1340	110	633.410	1.260	2.27	3.05	0.00	
68	IDD9	IDD1	0	500	1250	110	166.605	0.849	1.89	2.37	0.00	
69	IDD9	IDD1	0	500	1400	110	156.706	0.798	1.69	2.37	0.00	
70	IDD9	IED3	0	600	550	110	44.542	0.158	0.07	0.04	0.00	
71	IED3	IDD7	0	300	1590	90	29.593	0.419	1.35	2.15	0.00	
72	IED4	IED3	0	600	750	110	92.300	0.326	0.26	0.20	0.00	
73	IED4	IEE4	0	300	1640	110	26.826	0.380	0.78	1.28	0.00	
74	IEE4	IEE5	0	900	110	110	70.027	0.110	0.02	0.00	0.00	
75	IEE8	IEF1	0	450	110	110	147.306	0.926	2.52	0.28	0.00	
76	IEE2	IEF1	0	450	1900	90	78.476	0.493	1.14	2.17	0.00	
77	IEE1	IEE2	0	600	300	90	353.348	1.250	4.54	1.36	0.00	
78	IEE1	IDE1	0	600	1230	110	96.062	0.340	0.28	0.35	0.00	
79	IEE4	IEE1	0	1500	1080	110	1645.776	0.931	0.62	0.67	0.00	
80	IEE4	IDE6	0	800	2690	110	293.107	0.583	0.55	1.47	0.00	
81	IEE8	IEE4	0	900	250	110	196.651	0.309	0.15	0.04	0.00	
82	IEE8	IEE4	0	900	360	110	158.206	0.249	0.10	0.04	0.00	
83	IEE8	IEE7	0	900	840	110	366.941	0.577	0.47	0.39	0.00	
84	IEE7	IEE6	0	1000	760	110	305.191	0.389	0.20	0.16	0.00	
85	IDE1	IDD6	0	600	930	110	65.921	0.233	0.14	0.13	0.00	
86	IFE2	IEE8	0	800	1880	110	586.897	1.168	1.97	3.71	0.00	
87	IFE2	IFE3	0	800	260	110	669.592	1.332	2.52	0.66	0.00	
88	IFF1	IFF2	0	400	950	110	57.387	0.457	0.78	0.74	0.00	
89	IFF2	IEF3	0	500	680	110	61.750	0.314	0.30	0.20	0.00	
90	IFF9	IFF3	0	600	690	90	61.750	0.218	0.18	0.13	0.00	
91	IFF2	IFF9	0	400	170	110	60.011	0.478	0.85	0.14	0.00	
92	IFF9	IEF1	0	800	2340	110	200.866	0.400	0.27	0.64	0.00	
93	IFFC	IFF5	0	600	190	110	32.656	0.115	0.01	0.01	0.00	
94	IFF1	IFF5	0	600	680	110	72.644	0.257	0.17	0.11	0.00	
95	IFF8	IFFC	0	400	170	110	24.023	0.191	0.16	0.02	0.00	
96	IFF7	IFF8	0	400	680	110	39.426	0.314	0.39	0.27	0.00	
97	IFFA	IFF7	0	400	930	110	67.127	0.534	1.05	0.97	0.00	
98	IFFA	IGC2	0	400	880	110	1.819	0.014	0.00	0.00	0.00	
99	IGFF	IGFC	0	300	180	110	24.659	0.349	0.67	0.12	0.00	
100	IGFC	IGF9	0	300	1030	110	24.659	0.349	0.67	0.68	0.00	

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NO	Node(U)	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (‰)	dH (m)	f. dH (m)	Comments
101	IGF9	IFF7	0	300	1920	110	23.518	0.533	0.61	1.17	0.00	
102	IFFB	IFFA	0	400	880	110	34.982	0.278	0.31	0.28	0.00	
103	IFFB	IGF9	0	400	240	110	35.438	0.282	0.32	0.08	0.00	
104	IGF8	IGF9	0	400	800	110	33.622	0.268	0.29	0.23	0.00	
105	IGF8	IGF6	0	400	620	110	34.596	0.275	0.31	0.19	0.00	
106	IGF6	IGG2	0	600	1860	110	63.279	0.224	0.13	0.24	0.00	
107	IGFF	IGFE	0	400	440	110	33.742	0.269	0.29	0.12	0.00	
108	IGFE	IGG1	0	1000	960	110	70.200	0.089	0.01	0.02	0.00	
109	IGF4	IFFB	0	600	1770	110	140.600	0.497	0.57	1.00	0.00	
110	IGF4	IGFA	0	400	630	110	34.678	0.276	0.31	0.19	0.00	
111	IGFA	IGFF	0	400	280	110	34.678	0.276	0.31	0.09	0.00	
112	IGFF	IGFE	0	1000	520	110	343.958	0.438	0.25	0.12	0.00	
113	IGFB	IGFF	0	1000	350	110	357.680	0.468	0.28	0.10	0.00	
114	IGF4	IGFB	0	1000	650	110	357.680	0.468	0.28	0.18	0.00	
115	IGE5	IGF4	0	400	1030	110	42.235	0.336	0.44	0.46	0.00	
116	IGE5	IGF4	0	600	940	110	129.028	0.456	0.49	0.46	0.00	
117	IGF1	IFE6	0	600	530	110	78.678	0.278	0.19	0.10	0.00	
118	IFE6	IFE3	0	500	1870	110	26.548	0.135	0.06	0.12	0.00	
119	IFE1	IFE2	0	900	680	110	1318.239	2.072	4.97	3.38	0.00	
120	PEJ2	IFE9	0	1000	380	110	1762.218	2.244	5.09	1.93	0.00	
121	PEJ12	IFE4	0	600	1060	90	195.000	0.690	1.51	1.60	0.00	
122	IFE4	IFE7	0	300	250	110	13.064	0.185	0.21	0.05	0.00	
123	IFE1	IFE7	0	300	1560	110	33.974	0.481	1.20	1.88	0.00	
124	IFE7	IGF1	0	800	2210	110	378.199	0.752	0.88	1.91	0.00	
125	IGF1	IFFA	0	800	1570	110	295.957	0.589	0.56	0.87	0.00	
126	IFE8	IGE8	0	300	2050	110	42.019	0.594	1.78	3.65	0.00	
127	IGE9	IGE5	0	1000	1310	110	794.166	1.011	1.16	1.53	0.00	
128	IFE5	IGE9	0	1000	1050	110	876.326	1.116	1.40	1.46	0.00	
129	IFDF	IFE5	0	1000	2200	110	1023.645	1.303	1.86	4.10	0.00	
130	IFD2	IFDF	0	1000	140	110	1074.865	1.369	2.04	0.29	0.00	
131	IFDE	IFD2	0	1000	490	110	1627.174	2.072	4.39	2.15	0.00	
132	PEJ2	IFDE	0	1000	430	110	1678.394	2.137	4.65	2.00	0.00	
133	PEJ2	IFD6	0	900	1040	110	1167.399	1.835	3.97	4.13	0.00	
134	IFD6	IFD1	0	800	440	110	522.243	1.039	1.59	0.70	0.00	
135	IFDH	IGD1	0	800	1900	110	247.115	0.492	0.40	0.76	0.00	
136	IFDC	IFDH	0	800	650	110	298.335	0.594	0.56	0.36	0.00	
137	IFD6	IFDC	0	800	170	110	349.555	0.695	0.76	0.13	0.00	
138	IFDA	IFD3	0	350	750	110	47.153	0.490	1.04	0.79	0.00	
139	IFD4	IFD3	0	300	270	110	4.067	0.058	0.02	0.01	0.00	
140	IFD5	IFD4	0	300	720	110	55.287	0.782	2.96	2.13	0.00	
141	IGDC	IFD5	0	400	670	110	106.507	0.848	2.45	1.65	0.00	
142	PEJ2	IGDC	0	400	2550	90	110.729	0.881	3.82	9.75	0.00	
143	IFE4	IGDD	0	400	2140	90	53.170	0.423	0.98	2.11	0.00	
144	IEE4	IEE5	0	900	110	110	70.027	0.110	0.02	0.00	0.00	
145	IEE2	IEE6	0	300	670	90	53.349	0.755	4.02	2.70	0.00	
146	IEE6	IEEW	0	300	210	90	2.129	0.030	0.01	0.00	0.00	
147	IEEH	IEEW	0	300	80	110	54.717	0.774	2.91	0.23	0.00	
148	IEEW	IEEF	0	300	1350	90	5.626	0.030	0.06	0.03	0.00	
149	IEEC	IEEH	0	1000	220	110	253.971	0.323	0.14	0.03	0.00	
150	IEEH	IEEK	0	1000	1390	110	148.034	0.188	0.05	0.07	0.00	

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Pipe page : 4

NO	Node(U)	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dH (m)	f.dH (m)	Comments
151	DC-R6	1BD1	0	1600	2250	110	3120.000	1.552	1.48	3.31	0.00	
152	1BE2	1BE6	0	600	90	110	236.407	0.836	1.49	0.14	0.00	
153	1FD1	1ED4	0	500	1690	110	226.377	1.153	3.31	5.84	0.00	
154	1CFD	1GF8	0	400	310	110	64.450	0.513	0.97	0.30	0.00	
155	1CFE	1GFD	0	400	130	110	69.009	0.549	1.10	0.15	0.00	
156	1GES	1GEA	0	300	110	110	80.311	1.136	5.91	0.65	0.00	
157	1GEA	1GE8	0	300	110	110	10.111	0.143	0.13	0.01	0.00	
158	1EE2	1DE3	0	450	1670	90	106.473	0.669	2.00	3.35	0.00	
159	X001	1CE2	0	600	150	110	569.108	2.013	7.57	1.14	0.00	
160	1CD6	X001	0	600	490	110	569.108	2.013	7.57	3.70	0.00	
161	X002	1CDA	0	400	860	110	52.355	0.417	0.66	0.57	0.00	
162	1CD6	X002	0	400	490	110	52.355	0.417	0.66	0.32	0.00	
163	1CE2	X003	0	400	460	110	110.390	0.878	2.62	1.21	0.00	
164	X003	1CE4	0	400	760	110	110.390	0.878	2.62	1.99	0.00	
165	1ED5	1DD0	0	800	1910	110	526.180	1.047	1.61	3.08	0.00	
166	1EE1	X004	0	1500	830	110	1081.316	0.612	0.29	0.24	0.00	
167	X004	1DE1	0	1500	380	110	1081.316	0.612	0.29	0.11	0.00	
168	1EEK	X009	0	1000	380	110	51.220	0.065	0.01	0.00	0.00	
169	X009	1EE1	0	1000	280	110	51.220	0.065	0.01	0.00	0.00	
170	X010	1FE1	0	1000	190	110	1710.998	2.179	4.82	0.91	0.00	
171	1FE9	X010	0	1000	1190	110	1710.998	2.179	4.82	5.74	0.00	
172	1EE3	X007	0	900	960	90	467.456	0.735	1.06	1.01	0.00	
173	X007	1EEB	0	900	330	90	467.456	0.735	1.06	0.35	0.00	
174	1FE3	X011	0	800	340	110	582.260	1.158	1.94	0.66	0.00	
175	X011	1FF1	0	800	590	110	582.260	1.158	1.94	1.15	0.00	
176	1EE5	X006	0	900	980	90	529.206	0.832	1.33	1.31	0.00	
177	X006	1EE3	0	900	940	90	529.206	0.832	1.33	1.25	0.00	
178	X008	1EE4	0	1500	120	110	1866.254	1.056	0.79	0.10	0.00	
179	X015	1CD2	0	600	160	110	272.045	0.962	1.93	0.31	0.00	
180	1CD1	X015	0	600	510	110	272.045	0.962	1.93	0.98	0.00	
181	1GES	X022	0	400	1090	110	48.566	0.386	0.57	0.62	0.00	
182	X022	1GFI	0	400	420	110	48.566	0.386	0.57	0.25	0.00	
183	1FD1	1EC1	0	600	1570	110	188.616	0.667	0.98	1.54	0.00	
184	1EEB	1EF2	0	800	570	90	61.750	0.123	0.04	0.03	0.00	
185	PEJ11	1FDA	0	350	590	110	98.373	1.022	4.06	2.39	0.00	
186	PEJ11	1EE5	0	900	1470	90	410.373	0.692	0.95	1.39	0.00	
187	PEJ11	X008	0	1500	1650	110	1866.253	1.056	0.79	1.29	0.00	
188	1DF1	1DF3	0	600	650	110	219.039	0.775	1.29	0.84	0.00	
189	X023	1CPC	0	400	480	90	100.167	0.797	3.18	1.52	0.00	
190	1GD1	X023	0	300	320	110	100.167	1.417	8.90	2.85	0.00	
191	1GD1	1EC1	0	600	3530	110	95.728	0.339	0.28	0.99	0.00	
192	1EC1	1EC2	0	300	2240	110	60.224	0.852	3.47	7.77	0.00	
193	1DD0	1EC2	0	300	1760	110	47.026	0.665	2.20	3.86	0.00	
194	1DD0	1DD9	0	800	330	110	423.494	0.843	1.08	0.35	0.00	
195	1BD1	1BD3	0	1350	220	110	2348.345	1.641	2.01	0.44	0.00	
196	1BD3	1BD4	0	1350	940	110	2162.949	1.511	1.72	1.62	0.00	
197	1CD4	1CD9	0	600	570	110	135.944	0.481	0.54	0.31	0.00	
198	1DD1	1CD1	0	600	1560	110	182.624	0.646	0.92	1.44	0.00	
199	1DE4	1DF1	0	600	860	110	239.820	0.848	1.53	1.31	0.00	
200	1FF2	1FF9	0	800	320	110	264.355	0.526	0.45	0.14	0.00	

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Pipe page : 5

NO	Node(U)	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dH (m)	f. dH (m)	Comments
201	IFF1	IFF2	0	800	800	110	390.479	0.777	0.93	0.74	0.00	
202	IFF8	IFFC	0	600	220	110	60.763	0.215	0.12	0.02	0.00	
203	IFF7	IFF8	0	600	670	110	115.560	0.409	0.40	0.27	0.00	
204	IFFA	IFF7	0	600	1010	110	186.671	0.660	0.95	0.97	0.00	
205	IFFA	ICG2	0	600	940	110	5.103	0.018	0.00	0.00	0.00	
206	IGE5	IGF4	0	1000	1160	110	441.896	0.563	0.39	0.46	0.00	
207	IGPE	IGFD	0	600	180	110	168.291	0.595	0.79	0.15	0.00	
208	IGFD	IGF8	0	600	360	110	172.850	0.611	0.83	0.30	0.00	
209	IGF8	IGF6	0	600	640	110	98.883	0.350	0.30	0.19	0.00	
210	IBE1	IBE2	0	600	965	110	276.905	0.979	2.00	1.92	0.00	
211	IFE1	IFE7	0	700	1650	110	306.655	0.797	1.14	1.88	0.00	
212	IFE5	IFE8	0	1000	83	110	94.149	0.120	0.02	0.00	0.00	
213	IEEX	IEEF	0	300	118	110	45.594	0.645	2.07	0.24	0.00	
214	IFE4	IFE7	0	600	277	110	76.636	0.271	0.19	0.05	0.00	
215	IDD1	IDDA	0	600	100	110	45.234	0.160	0.07	0.01	0.00	
216	IFD6	IFD2	0	800	100	110	188.351	0.375	0.24	0.02	0.00	
217	IBE1	ICE4	0	400	595	110	83.960	0.668	1.58	0.94	0.00	

4.1.2 The Results of Preliminary Primary Pipe Network Analysis for Zone 2

«ZONE-2(2019)»
Node Data

Node-page : 1

NO	Node	Type	Q (l/sec)	VL (m)	CL (m)	EH (m)	Comments
1	2DF6	0	59.670	29.18	2.00	27.18	
2	2DF5	0	59.670	31.16	4.00	27.16	
3	2DFC	0	59.670	30.86	2.50	28.36	
4	2DF7	0	59.670	30.90	3.50	27.40	
5	2EF5	0	59.670	31.20	4.00	27.20	
6	2EFC	0	59.670	31.34	4.50	26.84	
7	2EF6	0	59.670	32.48	6.00	26.48	
8	2EF4	0	59.670	32.48	6.00	26.48	
9	2EG4	0	93.600	32.61	6.00	26.61	
10	2EG6	0	74.450	33.61	6.00	27.61	
11	2EG7	0	40.820	37.54	5.00	32.54	
12	2EG3	0	40.820	33.51	3.50	30.01	
13	2EG2	0	40.820	33.24	3.50	29.74	
14	2EG1	0	40.820	32.94	4.00	28.94	
15	2DG8	0	40.820	33.03	4.00	29.03	
16	2DG6	0	40.820	33.51	4.00	29.51	
17	2DG7	0	59.150	31.44	1.20	30.24	
18	2DG2	0	59.150	33.96	1.20	32.76	
19	2DG4	0	59.150	34.45	4.00	30.45	
20	2DH3	0	59.150	38.90	1.50	37.40	
21	2DFD	0	59.150	31.45	2.50	28.95	
22	2DF4	0	93.600	31.58	3.00	28.58	
23	2DFA	0	59.670	31.17	3.50	27.67	
24	2DFB	0	93.600	31.20	3.50	27.70	
25	2EFB	0	59.670	31.33	4.50	26.83	
26	2EF9	0	59.670	32.14	6.00	26.14	
27	2DH2	0	76.830	40.05	1.50	38.55	
28	2DH5	0	40.820	40.03	1.50	38.53	
29	2CK3	0	46.670	42.04	3.00	39.04	
30	2DK3	0	46.670	42.12	3.00	39.12	
31	2EK3	0	161.980	45.31	3.50	41.81	
32	2EL1	0	161.980	45.85	3.50	42.35	
33	2FK2	0	161.980	56.93	10.00	46.93	
34	2FK4	0	161.980	54.56	10.00	44.56	
35	2FK3	0	161.980	52.21	10.00	42.21	
36	2EK1	0	161.980	47.03	3.50	43.53	
37	2EK2	0	161.980	46.40	3.50	42.90	
38	2DK5	0	0.000	41.70	3.00	38.70	
39	2DK4	0	46.670	41.51	3.00	38.51	
40	2CJ1	0	46.670	41.99	3.00	38.99	
41	2CJ7	0	76.830	42.18	3.00	39.18	
42	2CJ4	0	0.000	43.60	3.00	40.60	
43	2CJ3	0	0.000	43.86	3.00	40.86	
44	2DJ2	0	76.830	45.53	2.00	43.53	
45	2DJ1	0	76.830	42.01	3.50	38.51	
46	2EJA	0	76.830	47.42	3.50	43.92	
47	2EJ6	0	161.980	47.71	3.50	44.21	
48	2EJ4	0	161.980	48.66	6.00	42.66	
49	2FJ3	0	161.980	51.75	11.00	40.75	
50	2FK1	0	161.980	52.95	11.00	41.95	

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Node-page : 2

NO	Node	Type	Q (1/sec)	VL (m)	Cl. (m)	EH (m)	Comments
51	2EJ1	0	76.830	47.33	3.50	43.83	
52	2EH1	0	76.830	43.00	3.00	40.00	
53	2DH1	0	76.830	42.27	3.00	39.27	
54	2DH6	0	76.830	40.95	2.00	38.95	
55	2EJ3	0	161.980	48.77	4.60	44.17	
56	2EJ2	0	78.390	48.03	4.60	43.43	
57	2EH4	0	78.390	46.12	5.00	41.12	
58	2EH7	0	78.390	46.32	5.40	40.92	
59	2EH5	0	78.390	46.83	5.00	41.83	
60	2EJ7	0	161.980	50.03	4.60	45.43	
61	2EJ8	0	161.980	48.64	4.00	44.64	
62	2EG5	0	112.060	40.07	5.00	35.07	
63	2EH6	0	78.390	42.05	4.50	37.55	
64	2EH3	0	78.390	43.51	6.00	37.51	
65	2EH2	0	76.830	37.26	4.50	32.76	
66	2EH9	0	78.390	33.68	4.00	29.68	
67	2EH8	0	78.390	33.65	6.00	27.65	
68	2DG5	0	40.820	40.01	5.20	34.81	
69	2FH1	0	78.390	50.85	7.00	43.85	
70	2FH4	0	78.390	38.34	10.00	28.34	
71	2FH3	0	78.390	38.70	11.00	27.70	
72	2FG9	0	33.670	33.89	7.00	26.89	
73	2FG2	0	33.670	34.32	6.50	27.82	
74	2FGD	0	33.670	31.82	11.00	23.82	
75	2FG4	0	33.670	35.01	10.00	25.01	
76	2FG8	0	33.670	36.82	16.00	20.82	
77	2FGC	0	33.670	36.07	11.00	25.07	
78	2FCB	0	33.670	33.73	7.00	26.73	
79	2EFD	0	33.670	33.25	6.50	26.75	
80	2FF4	0	33.670	33.22	7.00	26.22	
81	2FG5	0	33.670	39.62	9.00	30.62	
82	2FGA	0	33.670	35.58	7.00	28.58	
83	2EFA	0	93.340	33.21	7.00	26.21	
84	2FG1	0	33.670	34.32	6.50	27.82	
85	2FG3	0	33.670	34.24	6.50	27.74	
86	2FF7	0	33.670	34.07	6.50	27.57	
87	2FG7	0	33.670	38.80	14.20	24.60	
88	2FG6	0	112.060	39.49	16.00	23.49	
89	2FE6	0	78.390	42.15	12.50	29.65	
90	2FH2	0	78.390	43.31	13.00	30.31	
91	2FJ5	0	161.980	46.68	12.00	34.68	
92	2FJ2	0	161.980	46.75	9.00	37.75	
93	2FJ1	0	161.980	51.89	7.00	44.89	
94	2FJ4	0	161.980	46.69	11.00	35.69	
95	2FH5	0	78.390	45.79	10.00	35.79	
96	2FH8	0	78.390	52.79	4.00	48.79	
97	2FH9	0	0.000	53.51	4.50	49.01	
98	2FH7	0	78.390	52.29	4.00	48.29	
99	PULOG	1	-4.962.750	55.00	1.00	54.00	
100	2FGE	0	0.000	39.94	15.30	24.64	

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Node page : 3

NO	Node	Type	Q (l/sec)	H (m)	GL (m)	EH (m)	Comments
101	X012	0	0.000	39.59	10.80	28.79	
102	2FCF	0	0.000	38.41	14.20	24.21	
103	2DC3	0	59.150	33.99	1.20	32.79	
104	X021	0	0.000	32.82	6.00	26.82	
105	X020	0	0.000	40.65	4.90	35.75	
106	X019	0	0.000	47.55	3.50	44.05	
107	2BL1	0	46.670	36.66	2.50	34.16	
108	2CK1	0	46.670	36.81	2.50	34.31	
109	2DL1	0	161.980	41.77	3.50	38.27	
110	2DK2	0	161.980	41.67	3.50	38.17	
111	2DK1	0	161.980	42.42	3.50	38.92	
112	2CJ9	0	46.670	41.99	3.00	38.99	
113	2CH1	0	76.830	39.88	1.10	38.78	
114	2CH2	0	76.830	39.88	1.10	38.78	
115	2FK5	0	161.980	52.05	13.00	39.05	
116	2CK2	0	46.670	37.24	3.00	34.24	
117	BRN3	0	-3.666.000	61.37	8.00	53.37	

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Branch Data

Pipe page : 1

NO	Node(U)	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dH (m)	f. dH (m)	Comments
1	2DF5	2DF6	0	400	1630	90	59.670	0.475	1.22	1.93	0.00	
2	2DF7	2DFC	0	600	310	110	59.670	0.211	0.12	0.04	0.00	
3	2EF5	2DF7	0	600	710	110	119.340	0.422	0.42	0.30	0.00	
4	2EFC	2EF5	0	800	370	110	240.140	0.478	0.38	0.14	0.00	
5	2EF6	2EFC	0	800	1700	110	328.375	0.653	0.67	1.14	0.00	
6	2EFG	2EF4	0	500	180	110	15.642	0.080	0.02	0.00	0.00	
7	2EG4	2EF4	0	500	820	110	44.028	0.224	0.16	0.13	0.00	
8	2EG7	2EG6	0	500	1530	110	196.354	1.000	2.57	3.93	0.00	
9	2EG7	2EG3	0	250	1090	110	38.548	0.785	3.69	4.03	0.00	
10	2EG3	2EG2	0	350	150	110	63.315	0.658	1.80	0.27	0.00	
11	2EG2	2EG1	0	350	1190	110	22.526	0.234	0.27	0.30	0.00	
12	2DGS	2EG1	0	250	540	110	7.095	0.145	0.16	0.09	0.00	
13	2DGS	2DGS	0	250	340	110	22.856	0.466	1.40	0.48	0.00	
14	2DGS	2DGS	0	350	900	90	59.150	0.615	2.30	2.07	0.00	
15	2DH3	2DG4	0	800	1810	110	661.040	1.315	2.46	4.45	0.00	
16	2DF4	2DFD	0	600	1100	110	59.150	0.209	0.11	0.13	0.00	
17	2DG4	2DF4	0	600	1080	90	264.535	0.936	2.66	2.87	0.00	
18	2DGS	2DFA	0	350	1740	90	44.206	0.459	1.34	2.34	0.00	
19	2DFA	2DF5	0	350	480	90	5.250	0.055	0.03	0.01	0.00	
20	2DF4	2DFB	0	600	700	90	111.785	0.395	0.54	0.38	0.00	
21	2EF5	2DFB	0	600	570	90	2.528	0.009	0.00	0.00	0.00	
22	2EF8	2DF5	0	500	480	90	55.489	0.283	0.38	0.17	0.00	
23	2EF9	2EF8	0	550	1560	90	86.593	0.364	0.51	0.81	0.00	
24	2DH2	2DH3	0	800	400	110	720.190	1.433	2.88	1.15	0.00	
25	2DH2	2DH5	0	800	340	110	88.838	0.177	0.06	0.02	0.00	
26	2DK3	2EK3	0	600	600	110	137.392	0.273	0.13	0.08	0.00	
27	2EL1	2EK3	0	300	2410	110	13.656	0.193	0.22	0.54	0.00	
28	2FK2	2FK4	0	200	500	110	24.534	0.781	4.75	2.37	0.00	
29	2FK4	2FK3	0	250	680	110	37.163	0.757	3.45	2.35	0.00	
30	2FK3	2EK1	0	300	2580	110	44.822	0.634	2.01	5.18	0.00	
31	2EK1	2EK2	0	800	260	110	655.056	1.303	2.42	0.63	0.00	
32	2EK2	2EK3	0	800	830	110	469.655	0.934	1.31	1.09	0.00	
33	2EK2	2DK5	0	250	3200	110	23.421	0.477	1.47	4.70	0.00	
34	2DK5	2DK4	0	250	130	110	23.421	0.477	1.47	0.19	0.00	
35	2CJ1	2DK4	0	250	1210	110	11.616	0.237	0.40	0.48	0.00	
36	2CJ4	2CJ7	0	600	840	110	253.693	0.897	1.70	1.42	0.00	
37	2CJ3	2CJ4	0	600	150	110	253.693	0.897	1.70	0.26	0.00	
38	2DJ2	2CJ3	0	300	1230	110	36.278	0.513	1.35	1.67	0.00	
39	2DJ2	2DJ1	0	200	1150	110	19.356	0.616	3.06	3.52	0.00	
40	2EJA	2DJ1	0	250	700	110	57.474	1.171	7.74	5.41	0.00	
41	2EJA	2EK1	0	800	1720	110	183.217	0.364	0.23	0.39	0.00	
42	2EJ6	2EJA	0	800	100	110	723.200	1.439	2.90	0.29	0.00	
43	2EJ4	2EJ6	0	300	940	110	30.880	0.437	1.01	0.95	0.00	
44	2FJ3	2EJ4	0	1200	2620	110	1291.154	1.142	1.18	3.09	0.00	
45	2FK1	2FJ3	0	200	610	110	15.250	0.485	1.97	1.20	0.00	
46	2EJ1	2EH1	0	1000	1790	110	1178.781	1.501	2.42	4.33	0.00	
47	2EH1	2DH4	0	400	380	110	93.424	0.743	1.93	0.73	0.00	
48	2DH4	2DH6	0	250	1800	110	16.084	0.328	0.73	1.32	0.00	
49	2DJ2	2DH6	0	300	1520	110	55.880	0.789	3.01	4.58	0.00	
50	2EJA	2DJ2	0	800	1900	110	405.678	0.807	1.00	1.89	0.00	

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NO	Node(L) ->	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dH (m)	f. dH (m)	Comments
51	2EJ4	2EJ6	0	1200	990	110	1154.872	1.021	0.96	0.95	0.00	
52	2EJ3	2EJ4	0	600	1000	110	56.588	0.200	0.11	0.11	0.00	
53	2EJ3	2EJ2	0	500	160	110	259.976	1.324	4.32	0.69	0.00	
54	2EJ2	2EH1	0	500	880	110	181.586	0.925	2.22	1.96	0.00	
55	2EH7	2EH4	0	500	190	110	122.645	0.625	1.08	0.20	0.00	
56	2EH5	2EH7	0	500	190	110	201.035	1.024	2.68	0.51	0.00	
57	2EJ7	2EH5	0	500	790	110	253.326	1.290	4.11	3.25	0.00	
58	2EJ7	2EJ8	0	1000	660	110	1117.009	1.422	2.19	1.44	0.00	
59	2EJ8	2EJ1	0	1000	800	110	955.029	1.216	1.64	1.31	0.00	
60	2EH4	2EG7	0	500	2580	110	225.841	1.150	3.33	8.58	0.00	
61	2EG5	2EG7	0	250	90	110	115.499	2.353	28.13	2.53	0.00	
62	2EH3	2EH6	0	800	600	110	655.579	1.304	2.42	1.46	0.00	
63	2EH5	2EH3	0	800	860	110	844.788	1.681	3.87	3.32	0.00	
64	2EH3	2EH2	0	300	1050	110	80.604	1.140	5.95	6.25	0.00	
65	2EH2	2EH9	0	300	550	110	84.603	1.197	6.51	3.58	0.00	
66	2EH9	2EH8	0	300	490	110	6.213	0.088	0.05	0.03	0.00	
67	2DG5	2EH8	0	300	1310	110	72.177	1.021	4.85	6.36	0.00	
68	2DH5	2DG5	0	800	1250	110	48.018	0.096	0.02	0.02	0.00	
69	2EH1	2DH2	0	1000	1940	110	916.936	1.167	1.52	2.95	0.00	
70	2EH1	2DH4	0	300	430	110	40.978	0.580	1.70	0.73	0.00	
71	2DH4	2DH6	0	300	1840	110	25.685	0.363	0.72	1.32	0.00	
72	2DH4	2DH6	0	250	1860	110	15.802	0.322	0.71	1.32	0.00	
73	2FH1	2EH5	0	800	980	110	870.887	1.733	4.10	4.02	0.00	
74	2EH6	2FH4	0	500	1440	110	51.246	0.725	2.57	3.71	0.00	
75	2FH3	2FH4	0	300	450	110	27.144	0.384	0.79	0.36	0.00	
76	2EG7	2EG3	0	300	990	110	65.618	0.928	4.07	4.03	0.00	
77	2FG9	2EF6	0	800	1420	110	403.687	0.803	0.99	1.41	0.00	
78	2FG2	2FG9	0	800	450	110	396.243	0.788	0.95	0.43	0.00	
79	2FGD	2FG2	0	800	430	110	442.742	0.881	1.17	0.50	0.00	
80	2FG4	2FGD	0	800	140	110	476.412	0.948	1.34	0.19	0.00	
81	2FG8	2FG4	0	800	600	110	738.475	1.469	3.02	1.81	0.00	
82	2FGC	2FGB	0	600	1470	90	200.402	0.709	1.59	2.34	0.00	
83	2FCB	2EFD	0	600	430	90	166.732	0.590	1.13	0.48	0.00	
84	2EFD	2FF4	0	600	390	90	33.670	0.119	0.06	0.03	0.00	
85	2DG4	2DG8	0	250	430	110	36.258	0.739	3.30	1.42	0.00	
86	2DG4	2EG6	0	300	2880	110	15.764	0.223	0.29	0.84	0.00	
87	2EG5	2FG5	0	800	1250	110	233.405	0.464	0.36	0.45	0.00	
88	2FG5	2FGA	0	300	780	110	74.783	1.058	5.18	4.04	0.00	
89	2FGA	2FG9	0	300	990	110	41.113	0.582	1.71	1.69	0.00	
90	2EFA	2EF9	0	550	790	90	146.263	0.616	1.36	1.07	0.00	
91	2FG1	2EFA	0	600	1350	90	140.212	0.496	0.82	1.11	0.00	
92	2FG4	2FG1	0	600	340	90	228.393	0.308	2.03	0.69	0.00	
93	2FG1	2FG3	0	400	260	110	34.004	0.271	0.30	0.08	0.00	
94	2FG2	2FG3	0	400	260	110	33.336	0.265	0.29	0.08	0.00	
95	2FG3	2FF7	0	400	570	110	33.670	0.268	0.29	0.17	0.00	
96	2FG6	2FG7	0	800	120	110	1039.887	2.069	5.69	0.69	0.00	
97	2FH2	2FH6	0	1000	540	110	1105.386	1.407	2.15	1.16	0.00	
98	2FK2	2FK1	0	200	1830	110	16.100	0.512	2.18	3.93	0.00	
99	2FK2	2FK4	0	800	510	110	933.245	1.857	4.65	2.37	0.00	
100	2FJ2	2FJ5	0	600	100	110	154.175	0.545	0.68	0.07	0.00	

((ZONE-2(2019)))

Pipe-page : 3

NO	Node(U)	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	j (%)	dH (m)	f. dH (m)	Comments
101	2FJ1	2FJ2	0	1000	1100	110	1653.854	2.144	4.68	5.14	0.00	
102	2FJ1	2EJ7	0	1350	1200	110	2010.859	1.405	1.51	1.81	0.00	
103	2EJ7	2EJ3	0	600	240	110	478.544	1.693	5.49	1.31	0.00	
104	2FJ3	2FJ4	0	200	1130	110	23.763	0.756	4.48	5.06	0.00	
105	2FJ4	2FJ5	0	200	740	110	1.111	0.035	0.02	0.01	0.00	
106	2FK3	2EK1	0	800	2610	110	588.997	1.172	1.99	5.18	0.00	
107	2FK4	2FK3	0	800	740	110	758.636	1.509	3.17	2.35	0.00	
108	2FJ2	2FH5	0	1000	300	110	1367.699	1.741	3.18	0.96	0.00	
109	2FH5	2FH2	0	1000	870	110	1289.309	1.642	2.85	2.48	0.00	
110	2FH2	2FR3	0	300	470	110	105.534	1.493	9.80	4.61	0.00	
111	2FH8	2FJ1	0	1500	300	110	3856.693	2.182	3.01	0.90	0.00	
112	2FH9	2FR8	0	1500	230	110	3935.083	2.227	3.12	0.72	0.00	
113	2FH9	2FH7	0	800	220	110	1027.667	2.044	5.56	1.22	0.00	
114	2FH7	2FH1	0	800	300	110	949.277	1.889	4.80	1.44	0.00	
115	FCLOG	2FR9	0	1500	310	110	4952.750	2.808	4.80	1.49	0.00	
116	2EH1	2EH2	0	300	950	110	80.829	1.144	5.98	5.74	0.00	
117	2EH3	2EH1	0	400	2120	110	30.215	0.240	0.24	0.51	0.00	
118	2EG5	2DG5	0	800	1900	110	64.979	0.129	0.03	0.06	0.00	
119	2FK1	2FJ3	0	1200	680	110	1607.669	1.421	1.77	1.20	0.00	
120	2FGE	2FGE	0	1000	240	110	1026.996	1.308	1.87	0.45	0.00	
121	2FH6	2FGE	0	1000	1180	110	1026.996	1.308	1.87	2.21	0.00	
122	X012	2FGE	0	800	910	110	124.951	0.249	0.11	0.10	0.00	
123	2FG5	X012	0	800	300	110	124.951	0.249	0.11	0.03	0.00	
124	2FCF	2FG8	0	800	600	110	687.950	1.369	2.65	1.59	0.00	
125	2FC7	2FCF	0	800	150	110	687.950	1.369	2.65	0.39	0.00	
126	2DG3	2DG2	0	600	140	90	59.150	0.209	0.17	0.03	0.00	
127	2DG4	2DG3	0	600	770	90	118.300	0.418	0.60	0.46	0.00	
128	X021	2EG4	0	500	160	110	137.628	0.701	1.33	0.21	0.00	
129	2EG5	X021	0	500	590	110	137.628	0.701	1.33	0.79	0.00	
130	X020	2EG5	0	800	360	110	525.943	1.046	1.61	0.58	0.00	
131	2EH5	X020	0	800	870	110	525.943	1.046	1.61	1.40	0.00	
132	2EJ6	X019	0	800	290	110	300.582	0.598	0.57	0.16	0.00	
133	X019	2EJ1	0	800	380	110	300.582	0.598	0.57	0.22	0.00	
134	2CK1	2BL1	0	300	1450	110	9.241	0.131	0.11	0.15	0.00	
135	2DL1	2BL1	0	300	3550	110	37.429	0.530	1.44	5.11	0.00	
136	2EL1	2DL1	0	600	2520	110	247.458	0.875	1.62	4.08	0.00	
137	2DL1	2DK2	0	600	1260	110	48.050	0.170	0.08	0.10	0.00	
138	2DK1	2DK2	0	600	1150	110	151.556	0.536	0.65	0.75	0.00	
139	2DK2	2CK1	0	300	3340	110	37.626	0.532	1.45	4.88	0.00	
140	2DK1	2DK3	0	800	1320	110	184.062	0.366	0.23	0.30	0.00	
141	2EK3	2DK1	0	800	1990	110	497.598	0.990	1.45	2.89	0.00	
142	2CJ9	2DK4	0	250	1200	110	11.633	0.237	0.40	0.48	0.00	
143	2DH6	2CH1	0	250	1870	110	14.025	0.286	0.57	1.07	0.00	
144	2DE6	2CH2	0	300	1900	110	22.516	0.319	0.56	1.07	0.00	
145	2FK5	2EL1	0	800	3020	110	599.361	1.192	2.05	6.20	0.00	
146	2CK2	2CK1	0	300	1130	110	18.285	0.259	0.38	0.43	0.00	
147	2CK3	2CK2	0	300	1200	110	64.955	0.919	3.99	4.80	0.00	
148	2CK3	2CJ9	0	600	1900	110	25.767	0.091	0.02	0.05	0.00	
149	2CJ1	2CJ9	0	600	70	110	32.537	0.115	0.04	0.00	0.00	
150	2DH2	2CH2	0	500	2030	110	31.078	0.158	0.08	0.17	0.00	

<<ZONE-2(2019)>>

Pipe-page : 4

NO	Node(U)	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dH (m)	f. dH (m)	Comments
151	2CH1	2CH2	0	500	80	110	23.236	0.118	0.05	0.00	0.00	
152	2CJ7	2CR1	0	500	4110	110	86.011	0.438	0.56	2.30	0.00	
153	2CJ7	2CJ1	0	600	730	110	90.822	0.321	0.25	0.19	0.00	
154	2FG8	2FGC	0	600	510	110	234.072	0.828	1.46	0.75	0.00	
155	2FK2	2FK5	0	800	1530	110	761.341	1.515	3.19	4.88	0.00	
156	2DJ2	2CJ3	0	600	1310	110	217.415	0.759	1.28	1.67	0.00	
157	2EL1	2EK3	0	800	2520	110	176.267	0.351	0.21	0.51	0.00	
158	2FK2	2FK1	0	1200	1890	110	1768.800	1.564	2.11	3.98	0.00	
159	2EF5	2DF5	0	500	132	110	58.602	0.298	0.27	0.04	0.00	
160	2EFC	2EFB	0	550	77	110	28.565	0.120	0.05	0.01	0.00	
161	2DFB	2DFA	0	350	103	110	20.714	0.215	0.23	0.03	0.00	
162	2DG4	2DGG	0	350	87	110	167.032	1.736	10.81	0.94	0.00	
163	2DG8	2EG1	0	300	564	110	11.199	0.158	0.15	0.09	0.00	
164	2FG1	2FG2	0	600	172	110	20.508	0.073	0.02	0.00	0.00	
165	2FG7	2FG8	0	600	769	110	318.267	1.126	2.58	1.98	0.00	
166	2EFD	2EFA	0	600	127	110	99.392	0.352	0.30	0.04	0.00	
167	2FJ4	2FJ5	0	400	780	110	6.894	0.053	0.01	0.01	0.00	
168	2FJ3	2FJ4	0	400	1149	110	146.023	1.162	4.40	5.06	0.00	
169	BRN3	2FK2	0	1800	3934	110	3666.000	1.411	1.13	4.41	0.00	

4.1.3 The Results of Preliminary Primary Pipe Network Analysis for Zone 3

(ZONE-3(2019))
Node Data

Node-page : 1

NO	Node	Type	Q (l/sec)	XL (m)	CL (m)	EH (m)	Comments
1	3BF1	0	24.830	24.02	0.50	23.52	
2	3BG1	0	24.830	24.34	0.50	23.84	
3	3BG2	0	24.830	24.36	0.50	23.86	
4	3BF2	0	24.830	24.35	0.50	23.85	
5	3BE4	0	29.900	23.91	1.90	22.01	
6	3CF4	0	54.730	23.72	0.80	22.92	
7	3CFA	0	54.730	23.73	2.00	21.73	
8	3DF3	0	25.350	24.65	2.00	22.65	
9	3DF4	0	25.350	24.69	1.90	22.79	
10	3CF9	0	54.730	24.27	2.00	22.27	
11	3CF2	0	29.900	23.31	0.80	22.51	
12	3CF3	0	54.730	22.43	2.00	20.43	
13	3CCD	0	25.350	29.16	2.10	27.06	
14	3CC5	0	51.870	30.93	2.20	28.73	
15	SINTER	0	0.000	30.93	1.00	29.93	
16	3CHA	0	51.870	25.92	1.00	24.92	
17	3BH4	0	51.870	25.42	1.00	24.42	
18	3BH1	0	51.870	23.51	2.00	21.51	
19	3BH8	0	51.870	20.93	0.50	20.43	
20	3AH1	0	51.870	20.38	0.50	19.88	
21	3AH6	0	51.870	20.25	0.50	19.75	
22	3BG6	0	51.870	20.11	2.00	18.11	
23	3BG7	0	51.870	20.98	0.50	20.48	
24	3BG4	0	51.870	21.34	1.00	20.34	
25	3BG5	0	51.870	20.90	1.50	19.40	
26	3BH7	0	51.870	26.06	2.00	24.06	
27	3BH2	0	51.870	25.19	2.00	23.19	
28	3AH2	0	51.870	24.31	0.50	23.81	
29	3BH3	0	51.870	25.43	2.00	23.43	
30	3BH8	0	51.870	29.90	2.00	27.90	
31	3CC8	0	51.870	29.16	2.60	26.56	
32	3CH4	0	51.870	29.95	1.00	28.95	
33	3CC2	0	51.870	29.66	1.00	28.66	
34	3DG1	0	51.870	29.43	1.50	27.93	
35	3DR5	0	51.870	29.79	3.00	26.79	
36	3CC6	0	0.000	29.15	3.00	26.15	
37	3CC3	0	25.350	28.64	2.00	26.64	
38	3CC8	0	51.870	29.60	1.50	28.10	
39	3CG1	0	25.350	29.99	2.60	27.39	
40	3CG4	0	51.870	32.12	1.00	31.12	
41	3CH9	0	51.870	34.16	1.50	32.66	
42	3CH6	0	51.870	35.06	2.80	32.26	
43	3CH5	0	51.870	36.34	1.50	34.84	
44	3CH8	0	51.870	35.91	1.50	34.41	
45	3CH8	0	51.870	35.23	1.00	34.23	
46	3CG9	0	51.870	34.17	1.00	33.17	
47	3CF7	0	499.980	19.04	1.50	17.54	
48	3BF3	0	24.830	24.50	1.50	23.00	
49	3BG8	0	24.830	25.24	0.50	24.74	
50	3BG3	0	24.830	24.99	0.50	24.49	

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Node-page : 2

NO	Node	Type	Q (l/sec)	HL (m)	GL (m)	EH (m)	Comments
51	3CG7	0	51.870	29.05	2.30	26.75	
52	3DF1	0	0.000	26.93	2.50	24.48	
53	3DF2	0	51.870	26.05	2.50	23.55	
54	3CF5	0	0.000	25.58	1.70	23.88	
55	3DH6	0	18.460	30.08	0.80	29.28	
56	3CH2	0	18.460	30.69	1.00	29.69	
57	3CHC	0	51.870	31.04	1.00	30.04	
58	3CH1	0	51.870	31.20	1.50	29.70	
59	3CH3	0	51.870	30.84	1.00	29.84	
60	38HA	0	51.870	30.15	2.00	28.15	
61	3CH7	0	18.460	31.19	1.50	29.69	
62	38H9	0	60.190	31.14	2.00	29.14	
63	3CJ1	0	18.460	39.42	1.00	38.42	
64	3CJ5	0	18.460	40.05	2.00	38.05	
65	3CJ2	0	60.190	41.68	3.00	38.68	
66	3CJ6	0	18.460	42.19	3.00	39.19	
67	3AH5	0	60.190	24.74	1.00	23.74	
68	3AH3	0	60.190	24.54	2.00	22.54	
69	3AH4	0	60.190	24.60	1.00	23.60	
70	3AJ1	0	106.860	25.18	1.30	23.88	
71	3AJ2	0	39.390	29.01	0.60	28.41	
72	3AJ3	0	39.390	33.08	3.00	30.08	
73	3BJ5	0	39.390	34.43	2.80	31.63	
74	3BK1	0	39.390	37.72	2.50	35.22	
75	3AK2	0	39.390	29.38	1.00	28.38	
76	3AK1	0	39.390	28.68	0.50	28.18	
77	3AK3	0	39.390	28.83	0.50	28.33	
78	3CK4	0	39.390	42.61	2.90	39.71	
79	3CK1	0	39.390	41.69	2.70	38.99	
80	3BJ3	0	60.190	37.63	2.00	35.63	
81	3BJ2	0	60.190	28.78	1.00	27.78	
82	3BJ8	0	60.190	35.89	2.00	33.89	
83	3BJ4	0	60.190	32.95	2.00	30.95	
84	3BHC	0	60.190	30.22	2.00	28.22	
85	3BH5	0	60.190	25.71	0.50	25.21	
86	3BH6	0	60.190	25.03	2.00	23.03	
87	3BJ6	0	60.190	26.91	2.00	24.91	
88	3BJ9	0	60.190	39.46	3.00	36.46	
89	3BJ7	0	39.390	40.18	3.00	37.18	
90	3CJ3	0	39.390	42.94	3.00	39.94	
91	3CK2	0	39.390	45.42	3.00	42.42	
92	DC-R1	1	-4.597.710	46.00	2.00	44.00	
93	3CG4	0	51.870	29.94	1.00	28.94	
94	3BE7	0	0.000	23.92	1.00	22.92	
95	X018	0	0.000	23.89	1.00	22.89	
96	3AJ4	0	39.390	32.18	0.50	31.68	
97	3AL1	0	39.390	28.35	0.50	27.85	
98	3BL1	0	39.390	31.18	2.50	28.68	

ZONE-3(2019)>>
Branch Data

Pipe-page : 1

NO	Node(U) ->	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (‰)	dH (m)	f. dH (m)	Comments
1	3BG1	3BF1	0	600	1760	110	75.984	0.269	0.18	0.32	0.00	
2	3BG2	3BG1	0	600	80	110	100.791	0.356	0.31	0.02	0.00	
3	3BG2	3BF2	0	250	1780	110	1.224	0.025	0.01	0.01	0.00	
4	3BF2	3BE4	0	250	1300	110	10.529	0.214	0.33	0.44	0.00	
5	3BE4	3CF4	0	400	730	110	31.762	0.253	0.26	0.19	0.00	
6	3CF4	3CF4	0	400	1430	110	4.559	0.036	0.01	0.01	0.00	
7	3DF3	3CFA	0	400	1100	110	59.289	0.472	0.83	0.92	0.00	
8	3DF4	3DF3	0	600	170	110	84.639	0.299	0.22	0.04	0.00	
9	3DF4	3CF9	0	600	2020	110	81.186	0.287	0.21	0.42	0.00	
10	3CF9	3CF4	0	500	700	110	103.039	0.525	0.78	0.55	0.00	
11	3CF4	3CF2	0	400	260	110	84.630	0.673	1.60	0.41	0.00	
12	3CF2	3CF3	0	300	300	110	54.730	0.774	2.91	0.88	0.00	
13	3CG5	SNTER	0	500	270	110	0.000	0.000	0.00	0.00	0.00	
14	3CG5	3CHA	0	350	1460	90	73.495	0.764	3.43	5.01	0.00	
15	3CHA	3BH4	0	350	1390	90	21.625	0.225	0.36	0.50	0.00	
16	3BH4	3BH1	0	350	1340	90	45.722	0.475	1.43	1.91	0.00	
17	3BH1	3BH3	0	350	400	90	103.409	1.075	6.46	2.58	0.00	
18	3BH3	3AH1	0	350	310	90	51.539	0.536	1.78	0.55	0.00	
19	3AH1	3AH6	0	250	210	110	14.445	0.294	0.60	0.13	0.00	
20	3AH6	3BG6	0	250	1530	110	5.185	0.106	0.09	0.14	0.00	
21	3BG7	3BG6	0	250	720	110	20.981	0.427	1.20	0.87	0.00	
22	3BG2	3BG7	0	250	460	110	55.933	1.139	7.36	3.38	0.00	
23	3BG4	3BG7	0	300	1100	110	16.918	0.239	0.33	0.36	0.00	
24	3BG4	3BG5	0	300	740	110	23.138	0.327	0.59	0.44	0.00	
25	3BG5	3BG6	0	300	1100	110	25.704	0.364	0.72	0.79	0.00	
26	3BH4	3BG5	0	300	1570	110	54.436	0.770	2.88	4.52	0.00	
27	3BH7	3BH4	0	300	130	110	72.759	1.029	4.92	0.64	0.00	
28	3BH7	3BH2	0	600	1110	90	136.725	0.484	0.78	0.87	0.00	
29	3BH2	3AH2	0	400	620	90	64.872	0.516	1.42	0.88	0.00	
30	3AH2	3AH1	0	250	510	110	57.386	1.169	7.71	3.93	0.00	
31	3BH2	3BH1	0	400	650	110	109.557	0.872	2.59	1.68	0.00	
32	3BH3	3BH2	0	600	950	110	89.574	0.317	0.25	0.24	0.00	
33	3BH3	3BH3	0	400	1510	110	117.869	0.938	2.96	4.47	0.00	
34	3BH8	3BH7	0	300	970	110	64.629	0.914	3.95	3.84	0.00	
35	3BH7	3BH4	0	300	200	110	57.645	0.816	3.20	0.64	0.00	
36	3CG8	3BG4	0	300	1030	110	91.926	1.300	7.59	7.82	0.00	
37	3CH4	3CG8	0	600	820	110	186.487	0.660	0.96	0.79	0.00	
38	3CG2	3DG1	0	600	1750	90	51.870	0.183	0.13	0.23	0.00	
39	3DH5	3CGC	0	400	1530	110	41.235	0.328	0.42	0.64	0.00	
40	3CGD	3CGC	0	350	270	110	9.832	0.103	0.06	0.01	0.00	
41	3CGC	3CG3	0	400	800	110	51.117	0.407	0.63	0.51	0.00	
42	3CG8	3CG3	0	600	750	110	217.277	0.768	1.27	0.96	0.00	
43	3CG1	3CG3	0	600	210	110	269.147	0.952	1.89	0.39	0.00	
44	3CGA	3CG1	0	900	1490	110	671.664	1.056	1.43	2.13	0.00	
45	3CGA	3CG5	0	500	400	110	212.467	1.032	2.97	1.19	0.00	
46	3CH9	3CGA	0	1000	1290	110	936.001	1.192	1.58	2.01	0.00	
47	3CH6	3CH9	0	1000	520	110	987.871	1.258	1.74	0.90	0.00	
48	3CH5	3CH6	0	1200	430	110	2131.584	1.835	2.98	1.28	0.00	
49	3CH5	3CH8	0	900	320	110	655.590	1.031	1.36	0.43	0.00	
50	3CH8	3CH8	0	900	580	110	603.720	0.949	1.17	0.68	0.00	

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Pipe page : 2

NO	Node(U)	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dH (m)	f. dH (m)	Comments
51	3CH8	3CG9	0	900	1070	110	551.850	0.867	0.99	1.06	0.00	
52	3CG9	3CF7	0	600	2540	110	499.980	1.768	5.96	15.13	0.00	
53	3BF3	3BF2	0	400	490	110	34.134	0.272	0.30	0.15	0.00	
54	3BF3	3CF9	0	600	1230	110	76.583	0.271	0.19	0.23	0.00	
55	3BG8	3BF3	0	600	1390	110	135.547	0.479	0.53	0.74	0.00	
56	3BG8	3BG3	0	600	210	110	207.611	0.734	1.17	0.25	0.00	
57	3BG3	3BG2	0	600	680	110	182.781	0.646	0.93	0.63	0.00	
58	3CG7	3BG8	0	600	1130	110	367.989	1.301	3.38	3.81	0.00	
59	3CG8	3CG7	0	600	1680	110	42.692	0.151	0.06	0.11	0.00	
60	3CG1	3CG7	0	800	1080	110	377.167	0.750	0.87	0.94	0.00	
61	3CG3	3DF1	0	600	1060	110	243.044	0.860	1.57	1.66	0.00	
62	3DF1	3DF2	0	600	590	110	243.044	0.860	1.57	0.93	0.00	
63	3DF2	3CF5	0	600	470	110	191.174	0.676	1.01	0.47	0.00	
64	3CF5	3DF4	0	600	890	110	191.174	0.676	1.01	0.89	0.00	
65	3CH2	3DH6	0	600	1650	110	111.565	0.395	0.37	0.61	0.00	
66	3CHC	3CH2	0	600	710	110	130.025	0.460	0.49	0.35	0.00	
67	3CH1	3CHC	0	600	170	110	181.895	0.643	0.92	0.16	0.00	
68	3CH6	3CH1	0	600	660	110	493.375	1.752	5.85	3.88	0.00	
69	3CH1	3CH3	0	600	310	110	206.923	0.732	1.16	0.36	0.00	
70	3CH3	3BH4	0	600	1010	110	155.053	0.548	0.68	0.69	0.00	
71	3CH1	3CH7	0	600	130	110	54.687	0.193	0.10	0.01	0.00	
72	3CH7	3BH9	0	600	1000	110	36.227	0.128	0.05	0.05	0.00	
73	3CJ1	3CH5	0	1350	1080	110	2839.044	1.933	2.85	3.08	0.00	
74	3CJ5	3CJ1	0	1650	580	110	2857.504	1.336	1.09	0.63	0.00	
75	3CJ2	3CJ5	0	1650	1480	110	2875.964	1.345	1.10	1.63	0.00	
76	3CJ6	3CJ2	0	1650	300	110	3623.210	1.694	1.69	0.51	0.00	
77	3AH1	3AH6	0	400	280	110	42.610	0.339	0.45	0.13	0.00	
78	3AH5	3AH2	0	400	890	110	44.384	0.353	0.49	0.43	0.00	
79	3BH3	3AH5	0	400	520	110	76.017	0.605	1.32	0.69	0.00	
80	3AH5	3AH3	0	400	430	110	43.779	0.348	0.47	0.20	0.00	
81	3AH4	3AH3	0	400	780	110	16.411	0.131	0.08	0.06	0.00	
82	3AJ1	3AH4	0	400	890	110	51.960	0.413	0.65	0.58	0.00	
83	3AJ2	3AJ1	0	400	1020	110	134.011	1.066	3.75	3.83	0.00	
84	3AJ3	3AJ2	0	400	600	110	184.470	1.468	6.78	4.07	0.00	
85	3BJ5	3AJ3	0	600	490	110	329.660	1.166	2.76	1.35	0.00	
86	3BK1	3BJ5	0	600	970	110	389.050	1.305	3.40	3.29	0.00	
87	3AJ3	3AK2	0	300	890	110	66.410	0.940	4.16	3.70	0.00	
88	3AK2	3AK1	0	300	880	110	27.020	0.382	0.79	0.70	0.00	
89	3AK3	3AK1	0	300	770	110	12.370	0.175	0.19	0.15	0.00	
90	3CK4	3CK1	0	800	440	110	607.783	1.209	2.11	0.92	0.00	
91	3CK1	3BK1	0	800	2130	110	568.393	1.131	1.86	3.97	0.00	
92	3BK1	3AK3	0	300	2290	110	64.007	0.906	3.68	8.89	0.00	
93	3BK1	3BJ3	0	800	1300	110	95.947	0.191	0.07	0.09	0.00	
94	3BJ3	3BJ2	0	250	1530	110	49.121	1.001	5.79	8.85	0.00	
95	3AJ2	3BJ2	0	250	620	110	11.069	0.225	0.37	0.23	0.00	
96	3BJ3	3BJ8	0	800	580	110	737.665	1.468	3.01	1.74	0.00	
97	3BJ8	3BJ4	0	800	1140	110	677.475	1.348	2.57	2.94	0.00	
98	3BJ4	3BH9	0	800	1160	110	532.286	1.059	1.65	1.81	0.00	
99	3BH9	3BHC	0	600	150	110	503.323	1.798	6.14	0.92	0.00	
100	3BHC	3BHA	0	600	140	110	131.184	0.464	0.50	0.07	0.00	

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Pipe page : 3

NO	Node(U)	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dH (m)	f. dH (m)	Comments
101	3BH4	3BH8	0	600	170	110	234.368	0.829	1.47	0.25	0.00	
102	3BH4	3BH5	0	600	1760	110	316.949	1.121	2.56	4.51	0.00	
103	3BH5	3BH3	0	600	340	110	171.928	0.608	0.83	0.28	0.00	
104	3BH5	3BH6	0	400	420	110	84.831	0.675	1.61	0.68	0.00	
105	3BH6	3AH4	0	300	650	110	24.641	0.349	0.66	0.43	0.00	
106	3BH3	3AH5	0	400	570	110	72.336	0.576	1.20	0.69	0.00	
107	3BH6	3AJ1	0	250	1060	110	24.809	0.505	1.63	1.73	0.00	
108	3BJ4	3BJ6	0	250	1340	110	42.921	0.874	4.51	6.04	0.00	
109	3BJ4	3BJ6	0	250	1390	110	42.079	0.857	4.34	6.04	0.00	
110	3BJ9	3BJ3	0	800	820	110	626.866	1.247	2.23	1.83	0.00	
111	3CJ2	3BJ9	0	800	840	110	587.056	1.367	2.64	2.22	0.00	
112	3BJ7	3BJ3	0	250	1190	110	28.695	0.585	2.14	2.55	0.00	
113	3CJ3	3BJ7	0	250	800	110	37.167	0.757	3.45	2.76	0.00	
114	3CJ3	3BJ7	0	400	820	110	126.386	1.006	3.37	2.76	0.00	
115	3BJ7	3BJ3	0	400	1270	110	95.468	0.760	2.01	2.55	0.00	
116	3CJ3	3CJ6	0	1800	680	110	3541.670	1.431	1.11	0.75	0.00	
117	3CK2	3CJ3	0	1800	2010	110	3844.613	1.511	1.23	2.48	0.00	
118	3CK2	3CK4	0	800	990	110	713.707	1.420	2.83	2.81	0.00	
119	DC-R1	3CK2	0	1800	340	110	4597.710	1.807	1.71	0.58	0.00	
120	3CH6	3CH4	0	600	620	110	586.467	2.110	8.25	5.11	0.00	
121	3CH4	3BH7	0	600	1570	90	254.370	0.900	2.47	3.89	0.00	
122	3CG4	3CG0	0	350	890	90	35.232	0.366	0.88	0.78	0.00	
123	3CG5	3CG4	0	350	210	90	87.102	0.905	4.70	0.99	0.00	
124	3BF1	3BE7	0	600	1070	110	51.134	0.181	0.09	0.10	0.00	
125	3CH4	X018	0	600	130	90	103.740	0.367	0.47	0.06	0.00	
126	X018	3CG2	0	600	480	90	103.740	0.367	0.47	0.23	0.00	
127	3AJ3	3AJ4	0	300	570	110	39.390	0.557	1.58	0.90	0.00	
128	3AK3	3AL1	0	300	2630	110	12.247	0.173	0.18	0.48	0.00	
129	3BL1	3AL1	0	300	3560	110	27.143	0.384	0.79	2.83	0.00	
130	3CK4	3BL1	0	300	2740	110	66.533	0.941	4.17	11.43	0.00	
131	3BE7	3BE4	0	600	80	110	51.134	0.181	0.09	0.01	0.00	
132	3DH6	3DH5	0	400	150	110	93.105	0.741	1.91	0.29	0.00	

4.1.4 The Results of Preliminary Primary Pipe Network Analysis for Zone 4

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Node Data

Node-page : 1

NO	Node	Type	Q (l/sec)	HL (m)	GL (m)	EH (m)	Comments
1	4BX1	0	182.910	22.01	2.00	20.01	
2	4CX1	0	182.910	24.97	7.00	17.97	
3	4CA1	0	348.140	26.13	7.00	19.13	
4	4DX1	0	182.910	31.41	13.00	18.41	
5	4EA6	0	165.230	36.33	15.00	21.33	
6	4DD8	0	111.410	27.14	1.50	25.64	
7	4DC2	0	92.170	28.14	4.00	24.14	
8	4CD3	0	111.410	26.50	1.20	25.30	
9	4DD4	0	0.000	27.91	5.10	22.81	
10	4EC8	0	92.170	43.49	10.90	32.59	
11	4FC4	0	131.170	44.37	10.80	33.57	
12	4CC5	0	39.000	44.80	12.00	32.80	
13	4EA1	0	119.730	45.76	7.00	38.76	
14	4FA1	0	119.730	45.75	10.00	35.75	
15	4FB1	0	119.730	48.27	10.00	38.27	
16	4EB2	0	119.730	52.53	8.00	44.53	
17	4EB3	0	119.730	50.37	7.00	43.37	
18	4EB1	0	92.170	46.38	6.00	40.38	
19	4DB2	0	92.170	42.24	5.00	37.24	
20	4DB1	0	165.230	38.71	3.00	35.71	
21	4DA1	0	165.230	37.32	3.00	34.32	
22	4BA1	0	165.230	25.67	1.00	24.67	
23	4CA2	0	165.230	27.65	2.10	25.55	
24	4BB1	0	219.180	23.75	0.50	23.25	
25	4BB2	0	219.180	23.78	1.00	22.78	
26	4BC2	0	219.180	25.51	1.00	24.51	
27	4CC2	0	165.230	29.48	1.00	28.48	
28	4CC1	0	276.640	32.38	4.00	28.38	
29	4CC4	0	39.000	46.26	18.00	28.26	
30	4CC4	0	165.230	25.25	4.00	21.25	
31	4CB1	0	165.230	31.40	1.00	30.40	
32	4DC1	0	92.170	34.59	2.00	32.59	
33	4EC2	0	92.170	51.12	10.00	41.12	
34	4EC3	0	92.170	55.66	10.00	45.66	
35	4EC1	0	92.170	37.10	4.00	33.10	
36	4EC6	0	92.170	34.06	7.00	27.06	
37	4EC7	0	111.410	32.19	6.00	26.19	
38	4ED1	0	111.410	31.38	6.00	25.38	
39	4EC5	0	92.170	43.38	11.00	32.38	
40	4EC4	0	92.170	56.06	10.00	46.06	
41	4FC1	0	92.170	57.28	10.00	47.28	
42	DC-R4	1	-7.990.970	59.00	2.00	57.00	
43	4FC3	0	92.170	49.03	14.00	35.03	
44	4FC2	0	92.170	48.16	11.00	37.16	
45	4CC3	0	92.170	28.64	4.00	24.64	
46	4FA2	0	119.730	44.56	23.00	21.56	
47	4EA3	0	119.730	43.50	15.50	28.00	
48	4DA2	0	348.140	31.95	3.00	28.95	
49	4BA3	0	348.140	24.14	1.00	23.14	
50	4BA2	0	348.140	24.41	3.00	21.41	

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Node-page : 2

NO	Node	Type	Q (1/sec)	VL (m)	GL (m)	EH (m)	Comments
51	4A41	0	182.910	21.56	0.50	21.06	
52	4A42	0	219.180	17.66	0.50	17.16	
53	4E42	0	284.960	44.34	6.60	37.74	
54	4CD1	0	111.410	26.32	1.51	24.81	
55	4E44	0	119.730	40.34	4.80	35.54	
56	4E45	0	0.000	45.76	15.00	30.76	

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Branch Data

Pipe page : 1

NO	Node(C)	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dH (m)	f. dH (m)	Comments
1	4BX1	4AA1	0	600	2350	110	77.595	0.274	0.19	0.45	0.00	
2	4CX1	4BX1	0	600	1660	110	260.505	0.921	1.78	2.96	0.00	
3	4CA1	4CX1	0	500	1260	110	113.090	0.576	0.93	1.16	0.00	
4	4CA1	4BA2	0	900	2010	110	510.495	0.802	0.86	1.72	0.00	
5	4CA2	4CA1	0	600	1510	110	190.977	0.675	1.00	1.52	0.00	
6	4DA2	4CA1	0	800	1740	110	780.749	1.553	3.35	5.82	0.00	
7	4DX1	4CX1	0	600	2330	110	330.325	1.168	2.77	6.44	0.00	
8	4DA2	4DX1	0	700	1290	110	179.111	0.465	0.42	0.51	0.00	
9	4EA6	4DX1	0	600	1740	110	334.124	1.182	2.83	4.92	0.00	
10	4EA4	4EA6	0	800	2740	110	499.354	0.993	1.46	4.01	0.00	
11	4DC2	4DD8	0	400	2050	110	44.400	0.353	0.49	1.00	0.00	
12	4DD1	4DD8	0	800	1200	110	319.008	0.635	0.64	0.77	0.00	
13	4FC4	4EC8	0	500	720	110	131.277	0.669	1.22	0.88	0.00	
14	4GC5	4FC4	0	500	1370	110	62.840	0.320	0.31	0.43	0.00	
15	4EA1	4FA1	0	600	3030	110	3.309	0.012	0.00	0.01	0.00	
16	4FB1	4FA1	0	600	1690	110	236.151	0.835	1.49	2.52	0.00	
17	4EB2	4FB1	0	700	2190	110	409.892	1.055	1.95	4.26	0.00	
18	4EB2	4EB3	0	1800	970	110	5290.398	2.079	2.22	2.16	0.00	
19	4EB3	4EB1	0	1350	1410	110	2827.370	1.975	2.83	3.99	0.00	
20	4EB1	4DB2	0	1350	1750	110	2567.934	1.794	2.37	4.14	0.00	
21	4DB2	4DB1	0	1200	1230	110	2090.542	1.848	2.87	3.53	0.00	
22	4DB1	4DA1	0	900	2090	110	443.989	0.698	0.66	1.39	0.00	
23	4CA2	4BA1	0	600	1870	110	196.309	0.694	1.06	1.98	0.00	
24	4BB2	4BB1	0	600	1840	110	21.579	0.076	0.02	0.03	0.00	
25	4BC2	4BB2	0	600	2210	110	167.015	0.591	0.78	1.73	0.00	
26	4CC2	4BC2	0	700	2280	110	386.195	1.004	1.74	3.97	0.00	
27	4CC1	4CC2	0	600	1880	110	240.615	0.851	1.54	2.90	0.00	
28	4CC2	4CC4	0	300	270	110	136.053	1.925	15.67	4.23	0.00	
29	4CB1	4CC2	0	500	2500	110	102.167	0.520	0.77	1.92	0.00	
30	4CB1	4BB2	0	300	1510	110	73.744	1.043	5.05	7.62	0.00	
31	4CB1	4BA1	0	800	2230	110	676.801	1.346	2.57	5.73	0.00	
32	4BA1	4BB1	0	600	880	110	291.149	1.050	2.19	1.92	0.00	
33	4DA1	4CA2	0	600	1350	110	552.516	1.954	7.16	9.67	0.00	
34	4DB1	4CB1	0	1000	2310	110	1362.638	1.735	3.16	7.31	0.00	
35	4DB1	4CC1	0	400	2110	110	118.686	0.944	3.00	6.33	0.00	
36	4DC1	4CC1	0	800	990	110	627.309	1.248	2.23	2.21	0.00	
37	4EB1	4DC1	0	600	1640	110	553.727	1.958	7.19	11.79	0.00	
38	4EC2	4EB1	0	600	1280	110	386.511	1.367	3.70	4.74	0.00	
39	4EB3	4EA1	0	1350	2310	110	2343.298	1.637	2.00	4.61	0.00	
40	4EC3	4EB2	0	500	1220	110	196.408	1.000	2.57	3.13	0.00	
41	4EC3	4EC2	0	900	1360	110	1063.835	1.672	3.34	4.54	0.00	
42	4CB1	4CC2	0	800	2600	110	344.695	0.636	0.74	1.92	0.00	
43	4EC1	4DC1	0	600	3250	110	165.752	0.586	0.77	2.51	0.00	
44	4EC1	4EC6	0	500	460	110	327.232	1.667	6.61	3.04	0.00	
45	4EC6	4EC7	0	600	270	110	541.828	1.916	6.91	1.87	0.00	
46	4EC7	4ED1	0	600	180	110	430.418	1.522	4.51	0.81	0.00	
47	4ED1	4DD4	0	600	1340	110	319.008	1.128	2.59	3.47	0.00	
48	4EC5	4EC6	0	500	1590	110	305.765	1.562	5.86	9.32	0.00	
49	4EC4	4EC5	0	500	1610	110	359.829	1.833	7.87	12.68	0.00	
50	4EC4	4EC3	0	1000	120	110	1389.065	1.769	3.28	0.40	0.00	

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Pipe-page : 2

NO	Node(U)	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dH (m)	f. dH (m)	Comments
51	4FC1	4EC4	0	1200	480	110	1962.713	1.735	2.56	1.22	0.00	
52	DC-R4	4FC1	0	1800	360	110	7990.970	3.140	4.76	1.72	0.00	
53	4FC1	4FC3	0	600	1559	110	470.775	1.665	5.33	8.25	0.00	
54	4FC3	4FC2	0	500	400	110	178.998	0.912	2.16	0.87	0.00	
55	4FB1	4FC2	0	500	450	110	54.011	0.275	0.24	0.11	0.00	
56	4FC2	4CC4	0	500	1370	110	140.840	0.717	1.39	1.90	0.00	
57	4FC3	4FC4	0	500	1760	110	199.607	1.017	2.65	4.66	0.00	
58	4EC8	4EC5	0	500	850	110	39.107	0.199	0.13	0.11	0.00	
59	4EC2	4EC1	0	600	1760	110	585.154	2.070	7.97	14.02	0.00	
60	4CC1	4CC3	0	400	370	110	228.740	1.820	10.10	3.74	0.00	
61	4CC3	4CC2	0	400	130	110	136.570	1.087	3.89	0.50	0.00	
62	4DD8	4CD3	0	800	1540	110	251.997	0.501	0.41	0.64	0.00	
63	4FA1	4FA2	0	600	2820	110	119.730	0.423	0.42	1.19	0.00	
64	4DA1	4DA2	0	1000	1830	110	1307.999	1.665	2.93	5.37	0.00	
65	4BA1	4BA3	0	800	1460	110	416.732	0.829	1.05	1.53	0.00	
66	4BA2	4BA3	0	800	1430	110	162.355	0.323	0.18	0.27	0.00	
67	4BA3	4AA1	0	600	1810	110	230.947	0.817	1.43	2.58	0.00	
68	4BB1	4AA2	0	400	3150	110	93.548	0.744	1.93	6.09	0.00	
69	4AA1	4AA2	0	400	1170	110	123.632	1.000	3.33	3.90	0.00	
70	4EA1	4EA2	0	1200	440	110	2220.259	1.963	3.21	1.42	0.00	
71	4EA2	4EA3	0	600	2000	110	119.730	0.423	0.42	0.84	0.00	
72	4CD1	4CC4	0	300	1180	110	29.177	0.413	0.91	1.07	0.00	
73	4CD3	4CD1	0	800	1280	110	140.587	0.280	0.14	0.18	0.00	
74	4CC4	4CC5	0	500	1920	110	101.840	0.519	0.76	1.46	0.00	
75	4EA4	4DA1	0	1200	1760	110	1581.757	1.399	1.71	3.02	0.00	
76	4EA2	4EA4	0	1200	1810	110	1815.569	1.605	2.21	4.00	0.00	
77	4DB2	4EA4	0	800	2100	110	385.272	0.766	0.91	1.90	0.00	
78	4EA1	4EA5	0	800	1440	110	0.000	0.000	0.00	0.00	0.00	
79	4EC3	4EB2	0	1800	1260	110	5623.612	2.210	2.49	3.13	0.00	
80	4EC4	4EC3	0	1800	160	110	5586.961	2.196	2.46	0.40	0.00	
81	4FC1	4EC4	0	1800	520	110	5465.311	2.148	2.36	1.22	0.00	

4.1.5 The Results of Preliminary Primary Pipe Network Analysis for Zone 5

<<ZONE-5(2019)>>

Node Data							Node-page : 1
NO	Node	Type	Q (l/sec)	WL (m)	GL (m)	EH (m)	Comments
1	SEG1	0	107.640	45.45	18.00	27.45	
2	SRE5	0	107.640	49.03	21.00	28.03	
3	SGF2	0	82.160	48.97	20.50	28.47	
4	SGD2	0	155.740	48.87	12.00	36.87	
5	SGDE	0	44.720	49.59	14.00	35.59	
6	SGDB	0	44.720	49.60	15.00	34.60	
7	SGD3	0	44.720	49.63	16.00	33.63	
8	SHD1	0	44.720	50.28	21.00	26.28	
9	SCE4	0	82.160	47.79	14.00	33.79	
10	SGE6	0	82.160	47.83	14.00	33.83	
11	SHE2	0	189.800	48.00	24.00	24.00	
12	SHE3	0	189.800	49.63	22.00	27.63	
13	SHP2	0	107.640	49.26	25.00	24.26	
14	SHP4	0	0.000	49.11	21.00	28.11	
15	SHP3	0	83.330	49.94	25.00	24.94	
16	SJF1	0	83.330	62.15	30.00	32.15	
17	SJE2	0	83.330	69.81	28.00	41.81	
18	SHE7	0	107.640	69.09	22.00	47.09	
19	SHE4	0	82.160	51.95	22.00	29.95	
20	SHE5	0	82.160	52.64	22.00	30.64	
21	SHD4	0	44.720	54.34	24.00	30.34	
22	SHD2	0	44.720	56.25	24.00	32.25	
23	SHC2	0	155.740	59.70	21.00	38.70	
24	SHD5	0	44.720	50.90	24.00	26.90	
25	SHD7	0	44.720	48.70	24.00	24.70	
26	SHD6	0	44.720	50.55	24.00	26.55	
27	SHD8	0	44.720	49.71	24.00	25.71	
28	SGD7	0	44.720	50.20	21.00	29.20	
29	SGD6	0	44.720	50.42	22.00	28.42	
30	SGD4	0	44.720	50.90	22.10	28.80	
31	SGD8	0	44.720	50.69	22.00	28.69	
32	SGDA	0	44.720	50.27	17.50	32.77	
33	SGD9	0	44.720	49.81	17.70	32.11	
34	SCE1	0	44.720	48.61	12.00	36.61	
35	SGE3	0	82.160	48.11	14.00	34.11	
36	SHE1	0	82.160	47.28	24.00	23.28	
37	SGE2	0	44.720	48.99	18.00	30.99	
38	SJE3	0	83.330	71.88	32.00	39.88	
39	SKE2	0	83.330	74.21	35.00	39.21	
40	SHE8	0	83.330	75.41	29.00	46.41	
41	SKE1	0	0.000	75.81	25.00	50.81	
42	SJE1	0	83.330	67.77	28.00	39.77	
43	SJE4	0	83.330	64.73	26.20	38.53	
44	SHE6	0	0.000	64.73	22.00	42.73	
45	SJD1	0	135.460	52.46	26.00	26.46	
46	SJD2	0	135.460	53.39	26.00	27.39	
47	SKD1	0	135.460	66.49	28.00	38.49	
48	SKD2	0	218.790	59.23	23.50	35.73	
49	CLDAK	1	-218.790	61.00	23.00	38.00	
50	SKD1	0	0.000	66.82	31.50	35.32	

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Node page : 2

NO	Node	Type	Q (l/sec)	VL (m)	GL (m)	EH (m)	Comments
51	SJC2	0	135.460	68.08	32.00	36.08	
52	DC-R3	1	-4.157.400	71.00	26.00	45.00	
53	SJC1	0	115.050	62.97	27.00	35.97	
54	SHB3	0	44.720	55.26	24.00	31.26	
55	SOC2	0	155.740	55.85	18.00	37.85	
56	SOC1	0	155.740	55.85	18.00	37.85	
57	SOB1	0	115.050	57.12	20.00	37.12	
58	SHC1	0	115.050	58.86	23.00	35.86	
59	SOC3	0	155.740	51.86	18.00	33.86	
60	SKF1	0	71.500	75.82	51.00	24.82	
61	SOB2	0	115.050	56.64	21.00	35.64	
62	SFA1	0	66.560	56.21	11.30	44.91	
63	SOB3	0	66.560	56.34	14.50	41.84	
64	SKC1	0	135.460	67.76	31.80	35.96	
65	SKE5	0	83.330	74.40	39.80	31.60	
66	SHB1	0	115.050	58.38	22.00	36.38	
67	SJC3	0	270.790	62.83	30.00	32.83	
68	SKE6	0	83.330	71.07	50.00	21.07	
69	SKE4	0	83.330	78.50	37.25	41.25	
70	SZ01	0	0.000	81.01	33.98	47.03	
71	SZ02	0	0.000	81.05	30.28	50.77	
72	SZ03	0	0.000	59.23	27.47	31.76	
73	SZ04	0	0.000	59.23	24.75	34.48	
74	SZ05	0	0.000	67.77	26.12	41.65	
75	SNE3	0	154.830	81.41	48.00	33.41	
76	SND3	0	135.460	81.05	54.00	27.05	
77	SNE2	0	71.500	86.49	62.00	24.49	
78	SND1	0	71.500	84.36	59.00	25.36	
79	SNE1	0	71.500	84.04	62.00	22.04	
80	SNE1	0	71.500	87.72	58.00	29.72	
81	DC-R3	1	-3.265.210	88.00	45.00	43.00	
82	SNF1	0	71.500	85.48	60.50	24.98	
83	SLF1	0	154.830	81.11	55.00	26.11	
84	SKC1	0	71.500	73.76	49.00	24.76	
85	SNC2	0	135.460	81.01	55.00	26.01	
86	SNK1L	0	27.950	83.69	63.00	20.69	
87	SKE7	0	154.830	82.33	50.00	32.33	
88	SLE3	0	71.500	84.46	52.00	32.46	
89	SLE1	0	71.500	83.19	48.00	35.19	
90	SLF2	0	71.500	83.08	60.00	23.08	
91	SND2	0	71.500	85.17	55.00	30.17	
92	SNE2	0	71.500	85.04	62.00	23.04	
93	SLE2	0	71.500	83.34	55.00	28.34	
94	SND1	0	71.500	81.22	60.00	24.22	
95	SNE3	0	71.500	83.31	65.00	18.31	

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Branch Data

Pipe page : 1

NO	Node(U)	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dh (m)	f dh (m)	Comments
1	5HF5	5HG1	0	400	1430	110	107.640	0.857	2.50	3.53	0.00	
2	5HF5	5GF2	0	800	1150	110	82.160	0.163	0.05	0.06	0.00	
3	5GDE	5GD2	0	500	1630	110	75.809	0.386	0.44	0.72	0.00	
4	5GD3	5GDB	0	400	250	90	15.973	0.127	0.11	0.03	0.00	
5	5GD3	5GDE	0	800	350	110	120.529	0.240	0.11	0.01	0.00	
6	5HD1	5GDB	0	400	2480	90	26.654	0.212	0.27	0.68	0.00	
7	5GE6	5GE4	0	600	210	110	82.160	0.231	0.21	0.01	0.00	
8	5HE2	5GE6	0	600	1220	110	64.097	0.227	0.13	0.17	0.00	
9	5HE3	5HE2	0	600	960	110	253.897	0.898	1.70	1.63	0.00	
10	5HF2	5HF4	0	800	260	110	297.440	0.592	0.56	0.15	0.00	
11	5HF4	5HF5	0	800	150	110	297.440	0.592	0.56	0.08	0.00	
12	5HF3	5HF2	0	600	170	110	405.080	1.433	4.03	0.68	0.00	
13	5JF1	5HF3	0	600	2140	110	488.410	1.727	5.70	12.21	0.00	
14	5JE2	5JF1	0	400	2180	110	129.351	1.029	3.52	7.66	0.00	
15	5JE2	5HE7	0	600	2090	110	107.640	0.381	0.35	0.72	0.00	
16	5HE4	5HE3	0	800	1980	110	443.697	0.883	1.18	2.33	0.00	
17	5HE5	5HE4	0	800	350	110	585.325	1.164	1.96	0.68	0.00	
18	5HD4	5HE5	0	900	1200	110	667.485	1.049	1.41	1.70	0.00	
19	5HD2	5HD4	0	900	1200	110	712.205	1.120	1.59	1.91	0.00	
20	5HC2	5HD2	0	1000	1600	110	1108.665	1.412	2.16	3.45	0.00	
21	5HD5	5HD1	0	400	210	90	96.044	0.764	2.91	0.62	0.00	
22	5HD2	5HD5	0	350	1000	90	93.415	0.971	5.35	5.35	0.00	
23	5HD5	5HD7	0	300	1100	110	44.720	0.633	2.00	2.20	0.00	
24	5HD5	5HD6	0	400	350	110	65.164	0.519	0.99	0.35	0.00	
25	5HD6	5HD8	0	300	1230	90	20.444	0.289	0.68	0.84	0.00	
26	5GD7	5HD8	0	300	520	90	24.276	0.343	0.94	0.49	0.00	
27	5GD6	5GD7	0	300	150	110	37.940	0.537	1.48	0.22	0.00	
28	5GD4	5GD6	0	500	420	110	126.705	0.645	1.14	0.48	0.00	
29	5GD4	5GD8	0	800	210	110	410.025	0.816	1.02	0.21	0.00	
30	5GD8	5GD7	0	300	330	90	31.055	0.439	1.48	0.49	0.00	
31	5GD8	5GD3	0	400	820	90	61.636	0.490	1.29	1.06	0.00	
32	5GD4	5GD3	0	500	630	110	119.585	0.609	1.03	0.64	0.00	
33	5GD4	5GD4	0	500	310	110	164.305	0.837	1.85	0.63	0.00	
34	5GD8	5GD9	0	350	410	110	66.965	0.696	1.99	0.88	0.00	
35	5GD9	5GD8	0	350	810	110	22.245	0.231	0.26	0.21	0.00	
36	5GDB	5GE1	0	300	2150	110	20.151	0.285	0.46	0.99	0.00	
37	5GE1	5GE3	0	600	440	110	205.075	0.725	1.15	0.50	0.00	
38	5GE3	5GE6	0	600	910	110	100.223	0.354	0.30	0.28	0.00	
39	5GE3	5HE1	0	300	1460	110	22.691	0.321	0.57	0.83	0.00	
40	5HE4	5HE1	0	300	1380	110	59.469	0.841	3.39	4.68	0.00	
41	5GE2	5GE1	0	300	590	110	23.935	0.339	0.63	0.38	0.00	
42	5GD6	5GE2	0	350	1560	110	44.045	0.458	0.92	1.43	0.00	
43	5HD1	5GE2	0	300	1940	110	24.670	0.349	0.67	1.29	0.00	
44	5GD8	5GE1	0	600	1800	110	203.648	0.727	1.15	2.08	0.00	
45	5JE3	5JE2	0	600	790	110	320.321	1.133	2.61	2.07	0.00	
46	5KE2	5JE3	0	400	960	110	105.835	0.842	2.43	2.33	0.00	
47	5KE2	5JE3	0	600	1020	110	297.816	1.053	2.28	2.33	0.00	
48	5HE8	5KE2	0	400	530	110	102.109	0.813	2.27	1.20	0.00	
49	5KE1	5HE8	0	400	100	110	138.321	1.101	3.98	0.40	0.00	
50	5KE1	5JE1	0	400	1430	110	166.660	1.326	5.62	8.04	0.00	

<<ZONE-5(2019)>>

Pipe-page : 2

NO	Node(U)	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dH (m)	f. dH (m)	Comments
51	5JE1	5JE4	0	300	480	110	83.330	1.179	6.33	3.04	0.00	
52	5JE4	5HE6	0	300	1210	110	0.000	0.000	0.00	0.00	0.00	
53	5JE1	5Z05	0	400	2307	110	0.000	0.000	0.00	0.00	0.00	
54	5JD2	5JD1	0	350	310	110	79.089	0.822	2.71	0.84	0.00	
55	5KD1	5JD2	0	400	1470	110	214.549	1.707	8.97	13.19	0.00	
56	CLDAK	5KD2	0	400	190	110	218.790	1.741	9.30	1.77	0.00	
57	5KD2	5Z04	0	400	857	110	0.000	0.000	0.00	0.00	0.00	
58	5KD1	5KD1	0	600	110	110	350.009	1.238	3.08	0.33	0.00	
59	DC-R5	5JC2	0	1200	660	110	2642.338	2.336	4.43	2.92	0.00	
60	5JC2	5HC2	0	1100	3020	110	1631.125	1.716	2.77	8.38	0.00	
61	5JC1	5HC2	0	800	2050	110	523.015	1.041	1.59	3.27	0.00	
62	5JC2	5JC1	0	1200	2110	110	1905.346	1.685	2.42	5.11	0.00	
63	5HD2	5HD3	0	350	160	90	101.091	1.051	6.19	0.99	0.00	
64	5HD3	5JD1	0	350	1330	90	56.371	0.586	2.10	2.80	0.00	
65	5HC2	5GC2	0	1000	2680	110	889.735	1.133	1.44	3.85	0.00	
66	5GC2	5GD4	0	800	1610	110	745.755	1.484	3.07	4.95	0.00	
67	5GC1	5GC2	0	500	1420	110	4.588	0.023	0.00	0.00	0.00	
68	5GB1	5GC1	0	800	1290	110	403.172	0.802	0.99	1.27	0.00	
69	5HC1	5GB1	0	1000	1590	110	766.391	0.976	1.09	1.74	0.00	
70	5JC1	5PC1	0	1000	2320	110	996.491	1.269	1.77	4.11	0.00	
71	5GC3	5GD2	0	400	2070	110	79.931	0.636	1.44	2.99	0.00	
72	5GC1	5GC3	0	500	1110	110	235.671	1.200	3.60	3.99	0.00	
73	5KF1	5KG1	0	400	1760	110	71.500	0.569	1.17	2.06	0.00	
74	5LF1	5KF1	0	800	1640	110	765.397	1.523	3.23	5.29	0.00	
75	5KF1	5JF1	0	600	2880	110	442.389	1.565	4.75	13.67	0.00	
76	5GB1	5GB2	0	600	1240	110	115.050	0.407	0.39	0.48	0.00	
77	5GB1	5GB3	0	600	1520	110	133.120	0.471	0.51	0.78	0.00	
78	5GB3	5FA1	0	600	890	110	66.560	0.235	0.14	0.13	0.00	
79	5KC1	5KD4	0	800	1230	110	350.009	0.696	0.76	0.94	0.00	
80	5JC2	5KC1	0	1000	680	110	485.469	0.618	0.47	0.32	0.00	
81	5KF1	5KE5	0	600	1580	110	180.008	0.637	0.90	1.42	0.00	
82	5KE5	5KE2	0	600	680	110	96.678	0.342	0.28	0.19	0.00	
83	5HC1	5HB1	0	600	1220	110	115.050	0.407	0.39	0.48	0.00	
84	5KE7	5KE6	0	300	1780	110	83.330	1.179	6.33	11.26	0.00	
85	5Z02	5KD3	0	300	1879	110	0.000	0.000	0.00	0.00	0.00	
86	5KE3	5KE4	0	800	1000	110	723.623	1.440	2.91	2.91	0.00	
87	5KE4	5KE1	0	800	1160	110	640.293	1.274	2.32	2.69	0.00	
88	5JC1	5JC3	0	1000	900	110	270.790	0.345	0.16	0.14	0.00	
89	5Z01	5KC2	0	1000	2221	110	0.000	0.000	0.00	0.00	0.00	
90	5GC1	5GC2	0	600	1510	110	7.172	0.025	0.00	0.00	0.00	
91	5HD2	5HD5	0	400	1060	110	157.234	1.251	5.05	5.35	0.00	
92	DC-R5	5JC2	0	1000	760	110	1515.062	1.929	3.85	2.92	0.00	
93	5KE1	5HE8	0	600	140	110	335.312	1.186	2.84	0.40	0.00	
94	5HE8	5KE2	0	600	560	110	288.194	1.019	2.15	1.20	0.00	
95	5Z03	5KD2	0	400	1212	110	0.000	0.000	0.00	0.00	0.00	
96	5KE3	5KD3	0	1000	2780	110	242.558	0.309	0.13	0.36	0.00	
97	5NE1	5NE2	0	1200	980	110	1332.559	1.178	1.25	1.23	0.00	
98	DC-R3	5NE1	0	1800	310	110	3265.210	1.283	0.91	0.28	0.00	
99	5NE1	5XF1	0	800	970	110	639.303	1.272	2.31	2.24	0.00	
100	5XK1L	5KC2	0	300	3110	110	28.362	0.401	0.86	2.68	0.00	

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Pipe-page : 3

NO	Node(L)	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (‰)	dH (m)	f. dH (m)	Comments
101	5LE3	5KE7	0	1000	920	110	1150.343	1.465	2.31	2.13	0.00	
102	5NE1	5LE3	0	1000	1260	110	1221.843	1.556	2.58	3.26	0.00	
103	5KE7	5KE3	0	1000	1960	110	488.264	0.622	0.47	0.92	0.00	
104	5NF1	5LF2	0	800	1290	110	567.808	1.130	1.86	2.40	0.00	
105	5LF2	5LF1	0	800	1360	110	496.308	0.987	1.45	1.97	0.00	
106	5NE2	5ND2	0	1000	1150	110	789.039	1.005	1.15	1.32	0.00	
107	5ND2	5ND1	0	500	700	110	127.812	0.651	1.16	0.81	0.00	
108	5NE2	5NE2	0	600	1380	110	196.096	0.694	1.05	1.45	0.00	
109	5NE2	5NE1	0	400	1470	110	53.096	0.423	0.68	1.00	0.00	
110	5LE2	5KE3	0	600	1700	110	204.424	0.723	1.14	1.93	0.00	
111	5NE2	5LE2	0	600	1590	110	275.924	0.976	1.98	3.15	0.00	
112	5ND3	5NC2	0	1000	1290	110	107.098	0.136	0.03	0.04	0.00	
113	5ND1	5NK1L	0	500	2630	110	56.312	0.287	0.25	0.67	0.00	
114	5ND2	5LE1	0	800	1350	110	499.824	0.994	1.47	1.93	0.00	
115	5ND2	5ND1	0	500	1570	110	89.904	0.458	0.61	0.95	0.00	
116	5ND1	5NE1	0	400	1850	110	18.404	0.146	0.10	0.18	0.00	
117	5NE2	5NE3	0	400	1470	110	71.500	0.569	1.17	1.73	0.00	
118	5LE1	5KE3	0	800	1620	110	428.324	0.852	1.10	1.78	0.00	
119	5KE7	5LF1	0	800	1130	110	423.920	0.843	1.08	1.22	0.00	

4.1.6 The Results of Preliminary Primary Pipe Network Analysis for Zone 6

<<ZONE-6(2019)>>

Node Data

Node-page : 1

NO	Node	Type	Q (l/sec)	IL (m)	CL (m)	EH (m)	Comments
1	EFK1	0	62.010	58.41	13.00	45.41	
2	ECC8	0	0.000	58.87	17.00	41.87	
3	EGCG	0	65.130	58.80	17.00	41.80	
4	EGG3	0	65.130	58.78	18.00	40.78	
5	EGGJ	0	63.310	58.84	20.00	38.84	
6	EHG3	0	63.310	71.46	20.00	51.46	
7	EHG4	0	63.310	71.46	20.00	51.46	
8	EHG8	0	63.310	71.92	24.00	47.92	
9	EHG6	0	63.310	72.60	23.00	49.60	
10	EHG7	0	66.040	73.99	22.00	51.99	
11	EHH2	0	66.040	71.36	21.50	49.86	
12	EHH6	0	66.040	70.93	20.00	50.93	
13	EHH5	0	66.040	69.18	20.00	49.18	
14	EHH4	0	66.040	68.97	24.00	44.97	
15	ECH3	0	65.130	59.02	19.00	40.02	
16	EGG9	0	65.130	58.98	16.00	42.98	
17	EGGE	0	65.130	58.93	16.50	42.43	
18	EGGF	0	65.130	58.85	22.00	36.85	
19	EGG8	0	65.130	58.84	21.00	37.84	
20	EGG4	0	0.000	58.84	20.00	38.84	
21	EGG1	0	0.000	58.83	18.00	40.83	
22	EGG4	0	0.000	58.81	18.00	40.81	
23	EGG4	0	0.000	58.84	16.30	42.54	
24	EGG2	0	65.130	58.84	17.00	41.84	
25	EGG6	0	65.130	58.80	16.50	42.30	
26	EGGA	0	65.130	58.88	16.50	42.38	
27	EGGC	0	65.130	58.94	16.00	42.94	
28	EGG7	0	65.130	58.99	14.50	44.49	
29	EGH2	0	65.130	56.25	18.00	38.25	
30	EGH1	0	62.010	56.25	10.00	46.25	
31	EGJ3	0	62.010	55.90	15.00	40.90	
32	EGJ1	0	62.010	59.40	8.00	51.40	
33	EGK2	0	62.010	60.91	9.00	51.91	
34	EGK3	0	62.010	58.80	10.00	48.80	
35	EGK1	0	62.010	58.34	13.00	45.34	
36	EGD	0	65.130	58.98	14.80	44.18	
37	EGH6	0	62.010	59.37	14.00	45.37	
38	EHH3	0	62.010	59.61	20.00	39.61	
39	EHJ1	0	62.010	59.82	11.00	48.82	
40	EHG1	0	63.310	71.32	20.00	51.32	
41	EHG2	0	63.310	71.35	20.00	51.35	
42	EHG5	0	63.310	71.19	24.00	47.19	
43	EHGA	0	63.310	71.10	21.00	50.10	
44	EHGC	0	63.310	72.58	23.00	49.58	
45	EGC4	0	0.000	72.57	32.00	40.57	
46	EGC2	0	79.820	73.01	39.00	34.01	
47	PSR80	0	0.000	73.65	44.00	29.65	
48	EGC1	0	63.310	73.01	39.00	34.01	
49	EGC6	0	0.000	72.62	32.00	40.62	
50	EGC5	0	63.310	72.54	32.00	40.54	

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Node-page : 2

NO	Node	Type	Q (1/sec)	HL (m)	GL (m)	EH (m)	Comments
51	6HG9	0	63.310	71.31	23.00	48.31	
52	6GX4	0	62.010	58.48	12.00	46.48	
53	6GX5	0	62.010	59.16	10.00	49.16	
54	6HX2	0	62.010	60.22	17.00	43.22	
55	6HX1	0	62.010	61.79	15.00	46.79	
56	BUARN	1	-2.656.550	62.00	8.00	51.00	
57	6HJ2	0	62.010	60.73	12.00	48.73	
58	6HJ3	0	128.050	60.19	11.00	49.19	
59	6GJ2	0	62.010	59.89	10.00	49.89	
60	6FK2	0	62.010	59.41	10.00	49.41	
61	6FJ2	0	62.010	59.61	11.00	48.61	
62	6GH4	0	62.010	58.03	13.00	45.03	
63	6CH5	0	62.010	56.44	12.00	44.44	
64	6CG5	0	0.000	58.86	16.30	42.56	
65	6FJ1	0	62.010	59.82	11.00	48.82	
66	6FK3	0	62.010	59.94	10.90	49.04	
67	6FK4	0	62.010	60.42	9.90	50.52	
68	6FJ3	0	62.010	59.50	12.10	47.40	
69	6FG1	0	65.130	59.18	14.20	44.98	
70	6HJ8	0	66.040	69.75	21.50	48.25	
71	6HH7	0	66.040	71.91	24.00	47.91	
72	6JH2	0	130.910	78.66	47.00	31.66	
73	6JH1	0	130.910	78.59	48.50	30.09	
74	6JH1	0	129.350	78.85	43.00	35.85	
75	6HGO	0	66.040	75.49	22.00	53.49	
76	6KH3	0	64.870	80.53	47.60	32.93	
77	6JH3	0	64.870	78.60	47.80	30.60	
78	6HX3B	0	30.810	69.72	25.00	44.72	
79	6HJAB	0	30.810	69.74	22.00	47.74	
80	6HJ9B	0	30.810	71.01	21.50	49.51	
81	6JH2B	0	30.810	76.17	45.00	31.17	
82	6JH3B	0	30.810	72.56	32.00	40.56	
83	6JK1B	0	30.810	71.19	31.00	40.19	
84	6JK3B	0	13.130	70.10	35.00	35.10	
85	6JK2B	0	13.130	70.53	34.00	36.53	
86	6KK1B	0	30.810	73.29	45.00	28.29	
87	6KJ2	0	64.870	80.59	48.00	32.59	
88	6KG2	0	75.270	75.12	49.00	26.12	
89	6KG1	0	155.090	76.06	48.50	27.56	
90	6LG1	0	155.090	82.50	48.50	34.00	
91	6NG1	0	75.270	81.10	60.50	20.60	
92	6LH1	0	144.690	88.13	48.00	40.13	
93	6KH1	0	210.730	82.95	48.00	34.95	
94	6KH2	0	64.870	83.53	48.00	35.53	
95	6KJ1	0	64.870	76.39	49.00	27.39	
96	6LH2	0	64.870	89.95	58.00	31.95	
97	6NJ1	0	144.690	84.20	63.00	21.20	
98	CIPVN	1	-5.387.720	95.00	54.00	41.00	
99	6KK2B	0	30.810	74.65	48.00	26.65	
100	6KK3B	0	30.810	71.76	44.00	27.76	

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Node-page : 3

NO	Node	Type	Q (1/sec)	HL (m)	GL (m)	EH (m)	Comments
101	6LJ1	0	64.870	88.30	58.00	30.30	
102	6NH2	0	79.820	82.69	55.00	27.69	
103	6NH1	0	79.820	82.09	55.00	27.09	
104	6LH5	0	64.870	85.28	48.00	37.28	
105	6LG7	0	75.270	77.87	50.00	27.87	
106	6NG2	0	75.270	77.50	60.00	17.50	
107	6LG2	0	75.270	76.85	50.00	26.85	
108	6LG5	0	75.270	74.75	49.00	25.75	
109	6LG3	0	75.270	77.05	55.00	22.05	
110	6KJ3	0	64.870	83.44	48.00	35.44	
111	6NG2	0	75.270	81.24	60.00	21.24	
112	6NH3	0	144.690	86.74	60.00	26.74	
113	6NG1	0	75.270	81.24	48.00	33.24	
114	6NG3	0	155.090	76.07	48.00	28.07	
115	6LH3	0	144.690	85.73	48.00	37.73	
116	6LH4	0	64.870	85.81	48.00	37.81	
117	6VJ1	0	64.870	93.67	58.00	35.67	
118	6LG5	0	155.090	78.27	48.50	29.77	
119	6LG4	0	155.090	77.26	48.50	28.76	
120	6NJ2	0	64.870	89.63	62.00	27.63	
121	6NH1	0	144.690	84.93	59.00	25.93	

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Branch Data

Pipe page : 1

NO	Node(U) ->	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dH (m)	f. dH (m)	Comments
1	EGGG	EGG3	0	600	820	90	24.699	0.097	0.03	0.02	0.00	
2	EGGJ	EGG3	0	600	740	90	40.431	0.143	0.08	0.05	0.00	
3	EGG4	EGG3	0	800	170	110	63.310	0.126	0.03	0.00	0.00	
4	EGG8	EGG4	0	800	690	110	325.270	0.647	0.65	0.46	0.00	
5	EGG6	EGG8	0	800	740	110	388.580	0.773	0.92	0.68	0.00	
6	EGG7	EGH2	0	400	1000	110	110.602	0.880	2.63	2.63	0.00	
7	EGH2	EGH5	0	400	880	110	41.562	0.355	0.49	0.43	0.00	
8	EGH6	EGH5	0	400	810	110	99.331	0.790	2.16	1.75	0.00	
9	EGH5	EGH4	0	400	730	110	33.291	0.265	0.29	0.21	0.00	
10	EGH3	EGG9	0	1100	230	110	367.801	0.387	0.18	0.04	0.00	
11	EGG9	EGGE	0	1100	340	110	318.747	0.335	0.14	0.05	0.00	
12	EGGE	EGGF	0	1000	580	110	253.617	0.323	0.14	0.03	0.00	
13	EGGF	EGGJ	0	1000	390	110	103.741	0.132	0.03	0.01	0.00	
14	EGGF	EGGB	0	1000	490	110	84.747	0.108	0.02	0.01	0.00	
15	EGGB	EGGM	0	600	280	110	19.617	0.069	0.01	0.00	0.00	
16	EGGM	EGGN	0	600	300	90	19.617	0.069	0.02	0.01	0.00	
17	EGGN	EGGH	0	600	340	90	19.617	0.069	0.02	0.02	0.00	
18	EGGH	EGGG	0	600	80	110	48.758	0.172	0.08	0.01	0.00	
19	EGG4	EGGH	0	600	640	90	29.141	0.103	0.04	0.03	0.00	
20	EGG2	EGG4	0	600	110	90	29.141	0.103	0.04	0.00	0.00	
21	EGG8	EGG2	0	600	80	110	94.271	0.333	0.27	0.03	0.00	
22	EGGA	EGG6	0	600	550	110	65.130	0.230	0.14	0.08	0.00	
23	EGGC	EGGA	0	1000	450	110	265.603	0.338	0.15	0.06	0.00	
24	EGG7	EGH2	0	300	680	110	65.324	0.924	4.03	2.74	0.00	
25	EGH2	EGH1	0	300	1860	110	0.194	0.003	0.00	0.00	0.00	
26	EGH1	EGJ3	0	300	1180	110	16.018	0.227	0.30	0.35	0.00	
27	EGJ1	EGJ3	0	300	1660	110	45.991	0.651	2.11	3.50	0.00	
28	EGK2	EGJ1	0	300	1470	110	31.249	0.442	1.03	1.51	0.00	
29	EGK2	EGK3	0	400	1140	110	91.439	0.728	1.85	2.11	0.00	
30	EGK3	EGK1	0	300	500	110	29.429	0.416	0.92	0.46	0.00	
31	EGG7	EGGD	0	900	570	110	81.203	0.128	0.03	0.01	0.00	
32	EGGD	EGG9	0	900	1000	110	16.073	0.025	0.00	0.00	0.00	
33	EGH6	EGH3	0	1100	1490	110	432.931	0.456	0.24	0.35	0.00	
34	EGH3	EGH6	0	1100	770	110	494.941	0.521	0.31	0.24	0.00	
35	EGH1	EGH3	0	1100	550	110	556.954	0.586	0.38	0.21	0.00	
36	EGH2	EGH1	0	600	190	90	63.310	0.224	0.19	0.03	0.00	
37	EGH4	EGH2	0	600	100	110	198.650	0.703	1.03	0.11	0.00	
38	EGH2	EGH5	0	600	680	90	72.030	0.255	0.24	0.16	0.00	
39	EGG6	EGHC	0	800	240	110	88.876	0.177	0.06	0.02	0.00	
40	EGHC	EGJ4	0	800	1940	110	25.566	0.051	0.01	0.01	0.00	
41	EGJ2	EGJ4	0	600	1640	90	76.368	0.270	0.27	0.44	0.00	
42	PSR30	EGJ2	0	600	690	90	149.400	0.528	0.92	0.64	0.00	
43	PSR20	EGJ1	0	600	690	90	149.374	0.528	0.92	0.64	0.00	
44	EGJ1	EGJ2	0	600	100	110	6.787	0.024	0.00	0.00	0.00	
45	EGJ1	EGG6	0	600	1380	90	79.276	0.280	0.29	0.39	0.00	
46	EGG6	EGG5	0	600	250	90	79.276	0.280	0.29	0.08	0.00	
47	EGJ4	EGG5	0	600	90	110	101.933	0.361	0.31	0.03	0.00	
48	EGG5	EGG9	0	600	2070	90	117.900	0.417	0.60	1.23	0.00	
49	EGG9	EGG5	0	600	840	90	54.590	0.193	0.14	0.12	0.00	
50	EGK1	EGK1	0	400	1070	110	14.495	0.115	0.05	0.07	0.00	

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NO	Node(U)	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dH (m)	f. dH (m)	Comments
51	6GK4	6GK1	0	400	1530	110	18.086	0.144	0.09	0.14	0.00	
52	6GK5	6GK4	0	400	470	110	89.096	0.637	1.45	0.68	0.00	
53	6HK2	6GK5	0	500	750	110	142.106	0.724	1.41	1.06	0.00	
54	6HK1	6HK2	0	600	1380	110	204.116	0.722	1.14	1.57	0.00	
55	BUARN	6HK1	0	1200	300	110	980.649	0.867	0.71	0.21	0.00	
56	BUARN	6HK1	0	1500	330	110	1675.901	0.948	0.64	0.21	0.00	
57	6HK1	6HJ2	0	1200	1310	110	1040.396	0.920	0.79	1.06	0.00	
58	6HJ2	6HJ3	0	1200	1600	110	846.215	0.748	0.54	0.54	0.00	
59	6HJ3	6HJ1	0	1200	910	110	718.165	0.635	0.40	0.37	0.00	
60	6HJ2	6GJ2	0	500	630	110	132.171	0.673	1.23	0.84	0.00	
61	6GJ2	6GJ1	0	500	1290	110	70.161	0.357	0.38	0.49	0.00	
62	6FK2	6GJ1	0	400	1090	110	6.591	0.052	0.01	0.01	0.00	
63	6HK1	6GK2	0	1500	2030	110	1350.027	0.764	0.43	0.88	0.00	
64	6GH3	6GH1	0	300	1060	110	40.643	0.575	1.68	1.78	0.00	
65	6GH5	6GH1	0	400	530	110	37.191	0.296	0.35	0.19	0.00	
66	6HJ1	6GH5	0	400	1570	110	99.201	0.789	2.15	3.38	0.00	
67	6HG5	6HGA	0	500	280	110	63.310	0.322	0.32	0.09	0.00	
68	6GG8	6GG5	0	600	100	90	41.072	0.145	0.08	0.01	0.00	
69	6GG5	6GG6	0	600	630	90	41.072	0.145	0.08	0.06	0.00	
70	6FJ1	6FJ2	0	250	1150	110	7.556	0.154	0.18	0.21	0.00	
71	6FK3	6FK2	0	400	490	110	68.601	0.546	1.09	0.53	0.00	
72	6GK2	6FK4	0	1500	1510	110	1165.329	0.659	0.33	0.49	0.00	
73	6FJ3	6GH4	0	400	640	110	102.653	0.817	2.29	1.47	0.00	
74	6FJ2	6FJ3	0	250	740	110	6.993	0.142	0.16	0.11	0.00	
75	6FK3	6FJ1	0	250	600	110	8.121	0.165	0.21	0.12	0.00	
76	6FK4	6FK3	0	1500	1810	110	1026.814	0.581	0.26	0.48	0.00	
77	6FG1	6GG7	0	900	1130	110	211.658	0.333	0.17	0.19	0.00	
78	6HJ8	6HH4	0	400	2830	110	32.749	0.261	0.28	0.78	0.00	
79	6HH7	6HH6	0	500	940	110	120.808	0.615	1.05	0.98	0.00	
80	6JH2	6HH7	0	500	2880	110	186.848	0.952	2.31	6.75	0.00	
81	6JH1	6JH2	0	600	1380	110	142.479	0.283	0.14	0.19	0.00	
82	6KH1	6JH1	0	1000	2080	110	1055.277	1.344	1.97	4.10	0.00	
83	6KG1	PSR80	0	600	1050	110	298.774	1.037	2.30	2.41	0.00	
84	6HGD	6HG6	0	700	890	110	510.765	1.405	3.25	2.89	0.00	
85	6HGD	6HG7	0	400	240	110	176.642	1.406	6.26	1.50	0.00	
86	6JH1	6HGD	0	1000	2960	110	783.448	0.998	1.14	3.36	0.00	
87	6FG1	6GGC	0	1000	1040	110	330.733	0.421	0.23	0.24	0.00	
88	6FJ3	6FG1	0	1500	3160	110	607.520	0.344	0.10	0.32	0.00	
89	6GGA	6GG8	0	1000	220	110	133.343	0.172	0.04	0.01	0.00	
90	6FK4	6FK1	0	400	1510	110	76.505	0.609	1.33	2.01	0.00	
91	6KH3	6JH2	0	600	1060	110	259.417	0.918	1.77	1.87	0.00	
92	6KH2	6KH3	0	600	1160	110	318.605	1.127	2.59	3.00	0.00	
93	6JH2	6JH3	0	800	1080	110	84.138	0.167	0.05	0.06	0.00	
94	6JH3	6JJ1	0	890	1020	110	19.268	0.038	0.00	0.01	0.00	
95	6HJAB	6HK38	0	300	3270	110	2.103	0.030	0.01	0.02	0.00	
96	6HJ98	6HJAB	0	300	1120	110	32.913	0.466	1.13	1.27	0.00	
97	6HJ98	6HJ8	0	400	590	110	98.789	0.786	2.14	1.26	0.00	
98	6JJ28	6HJ93	0	500	2850	110	162.512	0.828	1.81	5.16	0.00	
99	6JJ1	6JJ28	0	500	440	110	295.503	1.510	5.50	2.42	0.00	
100	6JJ28	6JJ33	0	300	830	110	68.029	0.982	4.35	3.61	0.00	

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Pipe page : 3

NO	Node(U) ->	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dH (m)	f. dH (m)	Comments
101	6JJ3B	6JK1B	0	300	950	110	37.219	0.527	1.42	1.37	0.00	
102	6JK1B	6HK3B	0	300	3520	110	19.202	0.272	0.42	1.47	0.00	
103	6JK3B	6HK3B	0	300	3360	110	9.506	0.134	0.11	0.38	0.00	
104	6JK2B	6JK3B	0	300	760	110	22.636	0.320	0.57	0.43	0.00	
105	6JK1B	6JK2B	0	300	1840	110	17.652	0.250	0.36	0.66	0.00	
106	6KK3B	6JK2B	0	300	3270	110	18.114	0.256	0.38	1.23	0.00	
107	6KK1B	6JK1B	0	300	2130	110	30.445	0.431	0.98	2.10	0.00	
108	6JJ2B	6KK1B	0	300	2250	110	35.152	0.497	1.28	2.88	0.00	
109	6KK2B	6KK1B	0	300	1840	110	26.102	0.369	0.74	1.36	0.00	
110	6KJ3	6KJ2	0	800	2110	110	478.697	0.952	1.35	2.85	0.00	
111	6KJ2	6JF1	0	800	1980	110	408.145	0.812	1.01	2.00	0.00	
112	6KJ2	6KH3	0	300	1320	110	5.682	0.080	0.04	0.06	0.00	
113	6FJ2	6FJ3	0	1500	770	110	765.190	0.433	0.15	0.11	0.00	
114	6FJ1	6FJ2	0	1500	1197	110	826.637	0.468	0.17	0.21	0.00	
115	6FK3	6FJ1	0	1500	625	110	888.082	0.503	0.20	0.12	0.00	
116	6KG1	6KG2	0	400	730	110	75.270	0.599	1.29	0.94	0.00	
117	6LH1	6LG1	0	900	2360	110	886.075	1.393	2.38	5.63	0.00	
118	6KH1	6KG1	0	700	2400	110	505.811	1.314	2.87	6.89	0.00	
119	6LH2	6LH1	0	1500	900	110	3115.916	1.763	2.03	1.82	0.00	
120	6KH2	6KH1	0	600	1030	110	139.539	0.494	0.56	0.58	0.00	
121	6KJ1	6KK2B	0	400	720	110	105.838	0.812	2.43	1.74	0.00	
122	6KK2B	6KK3B	0	300	1220	110	48.924	0.692	2.36	2.89	0.00	
123	6NH2	6NH1	0	600	420	110	230.015	0.814	1.42	0.60	0.00	
124	6LJ1	6LH5	0	300	1430	110	46.013	0.651	2.11	3.02	0.00	
125	6LG7	6YC2	0	500	850	110	75.270	0.383	0.44	0.37	0.00	
126	6LG7	6LC2	0	400	880	110	70.715	0.563	1.15	1.02	0.00	
127	6LG2	6LC6	0	300	1030	110	45.243	0.640	2.04	2.10	0.00	
128	6LC3	6LC2	0	500	940	110	49.798	0.254	0.20	0.20	0.00	
129	6KH2	6KJ3	0	600	1960	110	35.405	0.125	0.01	0.09	0.00	
130	6KJ3	6KJ1	0	400	1200	110	170.706	1.358	5.88	7.05	0.00	
131	6NC2	6NC1	0	600	790	110	75.270	0.266	0.18	0.14	0.00	
132	6NH3	6NJ1	0	500	1740	110	144.690	0.737	1.46	2.54	0.00	
133	6LC1	6YC1	0	600	1010	110	214.505	0.760	1.25	1.26	0.00	
134	6NC1	6NC2	0	600	920	110	0.345	0.001	0.00	0.00	0.00	
135	6KG3	6KC1	0	600	480	110	23.523	0.082	0.02	0.01	0.00	
136	6LH1	6LH3	0	1200	1000	110	1893.397	1.674	2.39	2.40	0.00	
137	6LH3	6KH1	0	1200	1530	110	1632.279	1.443	1.82	2.78	0.00	
138	6LH4	6KH2	0	800	1280	110	558.419	1.111	1.80	2.31	0.00	
139	6LH2	6LH4	0	800	1710	110	653.328	1.300	2.41	4.11	0.00	
140	6MJ1	6LH2	0	1600	1710	110	3834.114	1.907	2.17	3.72	0.00	
141	CIPYN	6MJ1	0	1800	550	110	5387.720	2.117	2.30	1.33	0.00	
142	6LC1	6LG5	0	600	670	110	516.079	1.825	6.31	4.23	0.00	
143	6LG4	6KG3	0	600	1010	110	208.440	0.737	1.18	1.19	0.00	
144	6LC5	6LC4	0	600	680	110	235.922	0.834	1.48	1.01	0.00	
145	6LJ1	6KJ3	0	800	1880	110	678.868	1.351	2.58	4.86	0.00	
146	6MJ1	6LJ1	0	800	1570	110	789.751	1.571	3.42	5.37	0.00	
147	6MJ1	6NJ2	0	800	1480	110	698.985	1.391	2.73	4.04	0.00	
148	6NJ2	6NH3	0	800	1270	110	634.115	1.262	2.28	2.89	0.00	
149	6NH3	6NH2	0	600	1650	110	309.835	1.096	2.46	4.05	0.00	
150	6NH1	6NG2	0	600	1320	110	150.195	0.531	0.64	0.85	0.00	

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NO	Node(E) ->	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dH (m)	f. dH (m)	Comments
151	6XG1	6LC7	0	600	2560	110	221.255	0.783	1.32	3.37	0.00	
152	6LG5	6LC3	0	500	1100	110	125.068	0.637	1.11	1.22	0.00	
153	6LH3	6LC4	0	400	2470	110	127.609	1.015	3.43	8.47	0.00	
154	6LH4	6LH3	0	300	660	110	11.181	0.158	0.15	0.11	0.00	
155	6LH4	6LH5	0	300	1360	110	18.857	0.267	0.41	0.56	0.00	
156	6XG3	6LC6	0	300	1350	110	30.027	0.425	0.96	1.32	0.00	
157	6LH1	6XH1	0	500	1300	110	191.755	0.977	2.46	3.20	0.00	
158	6XH3	6XH1	0	300	1430	110	34.900	0.494	1.26	1.81	0.00	
159	6XH1	6XG1	0	400	2440	110	81.964	0.652	1.51	3.69	0.00	

4.1.7 The Results of Preliminary Primary Pipe Network Analysis for Zone 7

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Node Data

Node page : 1

NO	Node	Type	Q (l/sec)	HL (m)	CL (m)	EH (m)	Comments
1	7EX1	0	75.660	42.70	18.00	24.70	
2	7EA2	0	75.660	41.35	15.00	26.36	
3	7EX2	0	75.660	43.16	18.00	25.16	
4	7EA3	0	75.660	43.32	22.00	21.32	
5	7FX3	0	75.660	46.74	23.00	23.74	
6	7FX2	0	75.660	47.00	23.00	24.00	
7	7EX3	0	75.660	43.16	22.00	21.16	
8	7EY1	0	75.660	44.80	23.00	21.80	
9	7FY1	0	75.660	48.00	23.00	25.00	
10	7EY3	0	75.660	45.22	25.00	20.22	
11	7EY2	0	75.660	44.02	23.00	21.02	
12	7EY4	0	75.660	44.95	25.00	19.95	
13	7FY2	0	75.660	50.92	25.00	25.92	
14	7FY3	0	75.660	52.13	28.00	24.13	
15	7EY5	0	75.660	41.90	25.00	19.90	
16	7FY5	0	75.660	52.77	30.00	22.77	
17	7FY6	0	75.660	50.24	30.00	20.24	
18	7FY4	0	75.660	50.91	25.00	25.91	
19	7FY7	0	75.660	51.81	25.00	26.81	
20	7FX4	0	75.660	50.10	23.00	27.10	
21	7FX1	0	75.660	47.49	23.00	24.49	
22	7FA1	0	260.650	46.77	23.00	23.77	
23	7FA2	0	184.990	45.98	25.00	20.98	
24	7CA1	0	184.990	45.80	25.00	20.80	
25	7CA2	0	184.990	45.54	23.00	22.54	
26	7CA6	0	184.990	49.63	25.00	24.63	
27	7CA7	0	184.990	48.70	30.00	18.70	
28	7HA1	0	184.990	48.48	30.00	18.48	
29	7HA2	0	55.640	88.08	35.00	53.08	
30	7CA1	0	75.660	50.33	28.00	22.33	
31	7FY8	0	75.660	53.92	30.00	23.92	
32	7CY1	0	75.660	56.73	35.00	21.73	
33	7CY2	0	75.660	57.54	35.00	22.54	
34	7HY1	0	75.660	59.84	40.00	19.84	
35	7HY2	0	75.660	61.83	40.00	21.83	
36	7CA2	0	75.660	52.26	30.00	22.26	
37	7HA1	0	240.630	47.11	30.00	17.11	
38	7HY2	0	55.640	85.56	46.00	39.56	
39	7HX3	0	55.640	81.12	48.00	33.12	
40	7JX1	0	55.640	86.06	48.00	38.06	
41	7JX2	0	55.640	88.43	50.00	38.43	
42	7JX3	0	145.730	89.49	50.00	39.49	
43	7KX1	0	90.090	95.50	50.00	45.50	
44	CISTP	1	-8.454	290	53.00	58.00	-5.00
45	7LX1	0	162.370	93.01	61.00	32.01	
46	7MX1	0	72.280	90.41	60.50	29.91	
47	7EA1	0	75.660	40.94	14.00	26.94	
48	7EA4	0	75.660	42.90	15.50	27.40	
49	7EA5	0	184.990	46.00	15.00	31.00	
50	7FA3	0	184.990	45.00	22.00	23.00	

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Node-page : 2

NO	Node	Type	Q (l/sec)	HL (m)	GL (m)	EH (m)	Comments
51	7GA3	0	181.990	43.61	25.00	18.61	
52	7GA4	0	181.990	41.61	23.00	18.61	
53	7HA5	0	55.640	76.80	22.00	54.80	
54	7HB1	0	55.640	76.64	22.00	54.64	
55	7GA5	0	181.990	42.56	23.00	19.56	
56	7HA4	0	55.640	76.76	30.00	46.76	
57	7HA3	0	55.640	77.88	30.00	47.88	
58	7JA1	0	145.730	77.23	23.00	54.23	
59	7JA2	0	145.730	76.00	35.00	41.00	
60	7JA1	0	145.730	88.43	40.00	48.43	
61	7HA7	0	55.640	88.12	40.00	48.12	
62	7HA8	0	55.640	79.33	35.00	44.33	
63	7JB1	0	90.090	82.57	48.00	34.57	
64	7KB2	0	90.090	83.06	58.00	25.06	
65	7KB3	0	90.090	82.43	59.00	23.43	
66	7KB1	0	90.090	81.68	55.00	29.68	
67	7JA3	0	90.090	78.72	49.00	29.72	
68	7KA1	0	90.090	89.18	50.00	39.18	
69	7KA2	0	90.090	90.04	50.00	40.04	
70	7KB5	0	162.370	84.59	55.00	29.59	
71	7KC2	0	90.090	82.62	58.00	24.62	
72	7KC1	0	90.090	82.51	48.00	34.51	
73	7KC3	0	90.090	81.18	50.00	31.18	
74	7LA1	0	72.280	88.22	60.50	27.72	
75	7MA1	0	72.280	87.35	60.50	26.85	
76	7NA2	0	72.280	85.67	60.00	25.67	
77	7NA1	0	72.280	86.66	69.00	17.66	
78	7NA3	0	72.280	85.05	65.00	20.05	
79	7WB1	0	72.280	85.07	60.50	24.57	
80	7LB1	0	162.370	84.70	58.00	26.70	
81	7LA2	0	72.280	85.67	60.00	25.67	
82	7MA2	0	72.280	85.67	61.00	24.67	
83	7WB2	0	90.090	81.54	61.00	20.54	
84	7KB1	0	90.090	82.38	60.50	21.88	
85	7KC1	0	72.280	80.63	61.00	19.63	
86	7NC1	0	72.280	80.65	60.00	20.65	

<<ZONE-7(2019)>>

Branch Data

Pipe page : 1

NO	Node(U) ->	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dH (m)	f, dH (m)	Comments
1	7EX1	7EA2	0	300	640	110	45.830	0.648	2.09	1.31	0.00	
2	7EA2	7EA1	0	300	1270	110	16.893	0.239	0.33	0.42	0.00	
3	7EX2	7EA2	0	300	830	110	46.723	0.661	2.17	1.80	0.00	
4	7EA3	7EX2	0	600	820	110	77.625	0.275	0.19	0.16	0.00	
5	7EA3	7EA1	0	600	800	110	131.427	0.475	0.52	0.42	0.00	
6	7FX3	7EA3	0	600	1600	110	287.712	1.018	2.14	3.43	0.00	
7	7FX2	7FX3	0	800	420	110	309.513	0.818	0.60	0.25	0.00	
8	7FX2	7EX2	0	300	1800	110	46.276	0.655	2.13	3.81	0.00	
9	7EX2	7EX3	0	600	1270	110	1.518	0.005	0.00	0.00	0.00	
10	7EX3	7EX1	0	600	1050	110	121.490	0.430	0.43	0.16	0.00	
11	7EY1	7EX3	0	600	1550	110	195.632	0.692	1.05	1.61	0.00	
12	7FY1	7EY1	0	600	1310	110	309.158	1.093	2.45	3.21	0.00	
13	7FY1	7EY3	0	400	780	110	130.373	1.037	3.57	2.78	0.00	
14	7EY3	7EY2	0	300	820	110	37.791	0.535	1.47	1.20	0.00	
15	7EY1	7EY2	0	300	530	110	37.866	0.536	1.47	0.78	0.00	
16	7EY3	7EY4	0	300	790	110	16.919	0.239	0.33	0.26	0.00	
17	7FY2	7EY4	0	300	1420	110	66.728	0.941	4.20	5.96	0.00	
18	7FY2	7FY1	0	800	980	110	732.326	1.457	2.97	2.91	0.00	
19	7FY3	7FY2	0	1000	870	110	876.511	1.116	1.40	1.22	0.00	
20	7FY3	7EY5	0	300	1680	110	67.673	0.957	4.31	7.23	0.00	
21	7EY4	7EY5	0	300	730	110	7.987	0.113	0.08	0.06	0.00	
22	7FY5	7FY3	0	1200	810	110	1019.814	0.902	0.76	0.61	0.00	
23	7FY5	7FY6	0	400	1910	110	75.660	0.602	1.30	2.53	0.00	
24	7FY5	7FY4	0	300	910	110	44.481	0.629	1.98	1.86	0.00	
25	7FY2	7FY4	0	300	1270	110	1.798	0.025	0.01	0.01	0.00	
26	7FY7	7FY4	0	300	980	110	29.381	0.416	0.92	0.90	0.00	
27	7FY7	7FX4	0	1200	1610	110	1222.255	1.081	1.06	1.71	0.00	
28	7FX4	7FX1	0	600	1200	110	289.974	1.026	2.17	2.61	0.00	
29	7FX1	7FX2	0	800	410	110	431.448	0.858	1.12	0.49	0.00	
30	7FY1	7FX1	0	800	1610	110	217.131	0.432	0.31	0.51	0.00	
31	7FX4	7FA1	0	1000	2160	110	924.191	1.177	1.51	3.33	0.00	
32	7FA1	7EA5	0	800	1680	110	265.742	0.529	0.46	0.77	0.00	
33	7FA1	7FX3	0	800	960	110	53.860	0.107	0.02	0.02	0.00	
34	7FA1	7FA2	0	800	1070	110	343.939	0.681	0.73	0.79	0.00	
35	7FA2	7FA3	0	300	750	110	35.463	0.502	1.30	0.98	0.00	
36	7FA2	7CA1	0	800	1670	110	123.486	0.246	0.11	0.18	0.00	
37	7CA1	7CA2	0	800	610	110	253.420	0.504	0.42	0.25	0.00	
38	7CA2	7FA3	0	500	1460	110	68.775	0.350	0.37	0.51	0.00	
39	7CA2	7CA3	0	800	1750	110	429.223	0.854	1.11	1.91	0.00	
40	7CA6	7CA2	0	600	910	110	429.568	1.519	4.50	4.09	0.00	
41	7CA6	7CA7	0	1000	920	110	736.357	0.938	1.01	0.93	0.00	
42	7CA7	7CA5	0	400	1840	110	125.747	1.001	3.34	6.14	0.00	
43	7CA7	7HA1	0	1000	590	110	425.620	0.542	0.37	0.22	0.00	
44	7HA2	7HA3	0	300	1470	110	87.558	1.239	6.91	10.20	0.00	
45	7HA7	7HA2	0	1000	1010	110	143.198	0.182	0.05	0.05	0.00	
46	7GX1	7CA1	0	600	1790	110	314.924	1.114	2.53	1.53	0.00	
47	7GX1	7FX4	0	600	1580	110	67.570	0.239	0.15	0.23	0.00	
48	7FY7	7GX1	0	600	1700	110	176.928	0.626	0.87	1.48	0.00	
49	7FY8	7FY7	0	1200	1350	110	1504.223	1.330	1.56	2.11	0.00	
50	7FY8	7FY5	0	1200	1090	110	1215.646	1.075	1.05	1.15	0.00	

<<ZONE-7(2019)>>

Pipe page : 2

NO	Node(U) ->	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dH (m)	f, dH (m)	Comments
51	7GY1	7FY8	0	600	3060	110	182.199	0.611	0.92	2.82	0.00	
52	7GY2	7FY8	0	1300	1230	110	2613.329	1.969	2.91	3.62	0.00	
53	7HY1	7GY2	0	1800	1160	110	4396.791	1.728	1.58	2.30	0.00	
54	7HY2	7HY1	0	1800	1220	110	4172.451	1.758	1.63	1.99	0.00	
55	7HY2	7GY1	0	600	2910	110	257.859	0.912	1.75	5.09	0.00	
56	7GY2	7GX2	0	1200	2670	110	1707.801	1.510	1.93	5.28	0.00	
57	7GX2	7CX1	0	600	940	110	281.226	0.935	2.05	1.93	0.00	
58	7GX2	7CA6	0	1200	2050	110	1350.915	1.191	1.28	2.63	0.00	
59	7HX1	7HX1	0	600	890	110	240.630	0.851	1.54	1.37	0.00	
60	7HX2	7HX3	0	300	1480	110	55.640	0.787	3.00	4.41	0.00	
61	7HA7	7HX2	0	300	1970	110	35.458	0.502	1.30	2.57	0.00	
62	7JX1	7HX2	0	500	1140	110	75.822	0.386	0.41	0.50	0.00	
63	7JX2	7JA1	0	500	1910	110	131.462	0.670	1.22	2.37	0.00	
64	7JX2	7JA4	0	600	1360	110	3.829	0.011	0.00	0.00	0.00	
65	7JX3	7JX2	0	600	1050	110	190.931	0.675	1.00	1.05	0.00	
66	7KX1	7JX3	0	600	2100	110	336.661	1.191	2.87	6.02	0.00	
67	7KX1	7LX1	0	1100	1370	110	1297.866	1.366	1.82	2.49	0.00	
68	C1STP	7KX1	0	1800	4920	110	3648.320	1.434	1.12	5.50	18.00	
69	7KX1	7KA2	0	1200	2220	110	1923.702	1.701	2.46	5.47	0.00	
70	C1STP	7HY2	0	2200	8820	110	4805.970	1.264	0.70	6.17	15.00	
71	7LX1	7LA1	0	600	2170	110	292.456	1.031	2.21	4.79	0.00	
72	7LX1	7KX1	0	1000	2000	110	843.040	1.073	1.30	2.60	0.00	
73	7KX1	7KA1	0	800	1940	110	520.519	1.036	1.58	3.07	0.00	
74	7KX1	7KA1	0	600	2270	110	250.241	0.885	1.65	3.76	0.00	
75	7EA1	7EA1	0	300	590	110	58.767	0.831	3.32	1.96	0.00	
76	7EA5	7FA3	0	500	2010	110	80.752	0.411	0.50	1.00	0.00	
77	7GA3	7CA1	0	600	2080	110	181.990	0.651	0.95	1.97	0.00	
78	7HA5	7HB1	0	600	1500	110	55.640	0.197	0.10	0.15	0.00	
79	7GA3	7CA5	0	400	1260	110	59.243	0.471	0.83	1.05	0.00	
80	7HA3	7HA4	0	300	230	110	72.233	1.022	4.86	1.12	0.00	
81	7JA1	7HA5	0	600	1100	110	114.960	0.407	0.39	0.43	0.00	
82	7HA5	7HA4	0	300	1820	110	3.680	0.052	0.02	0.01	0.00	
83	7HA4	7JA2	0	300	1650	110	20.272	0.287	0.46	0.76	0.00	
84	7JA4	7JA2	0	300	1520	110	95.729	1.354	8.18	12.43	0.00	
85	7JA4	7HA7	0	1000	1310	110	330.250	0.420	0.23	0.31	0.00	
86	7HA7	7HA8	0	300	1070	110	95.955	1.357	8.22	8.79	0.00	
87	7HA8	7HA3	0	300	880	110	40.315	0.570	1.65	1.45	0.00	
88	7JA1	7JA2	0	300	1310	110	29.728	0.421	0.91	1.23	0.00	
89	7JB1	7JA1	0	600	3090	110	256.076	0.906	1.73	5.31	0.00	
90	7KB2	7JB1	0	1000	1950	110	316.166	0.441	0.25	0.49	0.00	
91	7KB2	7KB3	0	350	850	110	39.173	0.407	0.74	0.63	0.00	
92	7KB3	7KB4	0	350	320	110	15.851	0.165	0.14	0.01	0.00	
93	7KB1	7KB2	0	1000	1400	110	793.465	1.010	1.16	1.63	0.00	
94	7KB1	7JA3	0	300	1510	110	63.929	0.904	3.88	5.97	0.00	
95	7JA3	7JA1	0	300	1210	110	31.312	0.486	1.23	1.49	0.00	
96	7KA1	7JA3	0	300	2990	110	60.509	0.856	3.50	10.47	0.00	
97	7KA1	7JA4	0	1000	1200	110	567.880	0.723	0.63	0.75	0.00	
98	7KA2	7KA1	0	1000	880	110	718.480	0.915	0.97	0.85	0.00	
99	7KA2	7LA1	0	400	1560	110	62.811	0.500	0.93	1.81	0.00	
100	7KA2	7KB1	0	1000	2730	110	1052.292	1.340	1.66	5.35	0.00	

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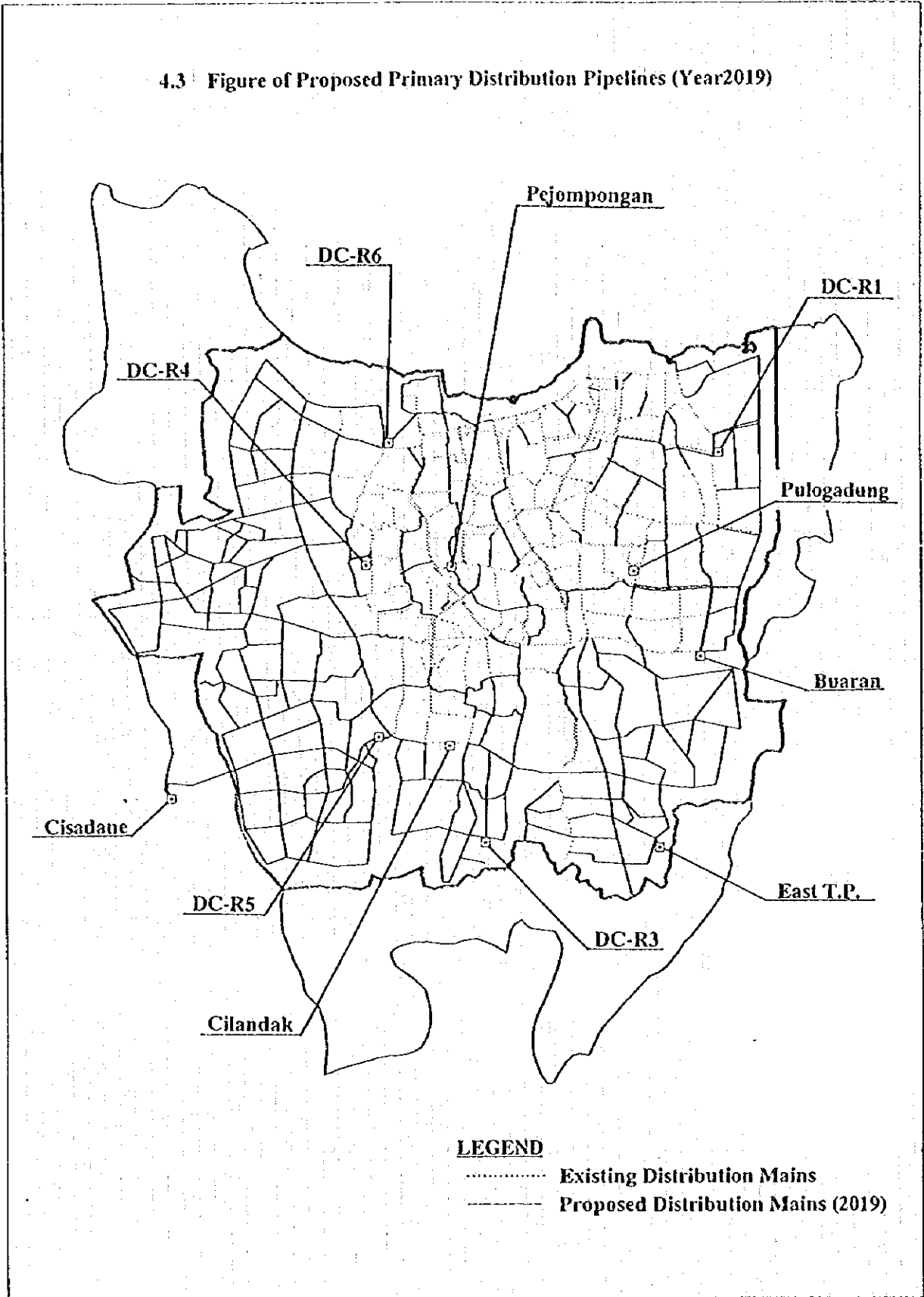
Pipe page : 3

NO	Node(U) ->	Node(D)	Type	Dia (mm)	Len (m)	C	Q (l/sec)	V (m/sec)	i (%)	dH (m)	f. dH (m)	Comments
101	7KB1	7KB5	0	800	1170	110	101.814	0.209	0.08	0.10	0.00	
102	7LB1	7KB5	0	800	1380	110	102.195	0.203	0.08	0.11	0.00	
103	7KB5	7KB3	0	350	1090	110	65.768	0.631	1.98	2.16	0.00	
104	7XB2	7KC2	0	800	690	110	318.035	0.633	0.61	0.41	0.00	
105	7XC2	7KC1	0	800	1090	110	116.501	0.232	0.10	0.11	0.00	
106	7KC1	7KC3	0	300	1760	110	26.411	0.374	0.76	1.33	0.00	
107	7XC2	7KC3	0	400	950	110	81.993	0.652	1.51	1.44	0.00	
108	7KC2	7KB1	0	400	1030	110	29.452	0.231	0.23	0.23	0.00	
109	7KC3	7XC1	0	350	3010	110	18.314	0.190	0.18	0.55	0.00	
110	7LA2	7KB5	0	300	1990	110	22.129	0.313	0.51	1.08	0.00	
111	7LA1	7NA1	0	300	2050	110	19.412	0.275	0.43	0.88	0.00	
112	7NA1	7NA2	0	300	1800	110	29.586	0.419	0.93	1.68	0.00	
113	7NA1	7NA2	0	600	1120	110	177.961	0.629	0.88	0.99	0.00	
114	7NA2	7NA3	0	600	1170	110	135.267	0.478	0.53	0.62	0.00	
115	7NB1	7NA3	0	600	2240	110	13.581	0.048	0.01	0.02	0.00	
116	7NB1	7LB1	0	800	1760	110	175.026	0.318	0.21	0.37	0.00	
117	7LA1	7LA2	0	600	1400	110	263.605	0.932	1.82	2.55	0.00	
118	7LA2	7LB1	0	600	1230	110	168.211	0.595	0.79	0.98	0.00	
119	7LA2	7NA2	0	300	1270	110	0.985	0.014	0.00	0.00	0.00	
120	7KA2	7NB1	0	800	730	110	366.710	0.730	0.83	0.60	0.00	
121	7NA1	7NA2	0	800	1460	110	438.065	0.872	1.15	1.68	0.00	
122	7NB1	7NB2	0	400	1450	110	105.883	0.843	2.43	3.52	0.00	
123	7KB1	7NB2	0	400	2840	110	33.885	0.270	0.30	0.81	0.00	
124	7LB1	7KB1	0	400	1650	110	78.673	0.626	1.40	2.31	0.00	
125	7NB2	7XC1	0	400	1520	110	49.678	0.395	0.60	0.91	0.00	
126	7NC1	7XC1	0	400	2310	110	4.288	0.031	0.01	0.02	0.00	
127	7NA3	7NC1	0	400	3300	110	76.568	0.609	1.33	4.40	0.00	

4.2 Proposed Primary Pipe Length in East and West Concessional Areas

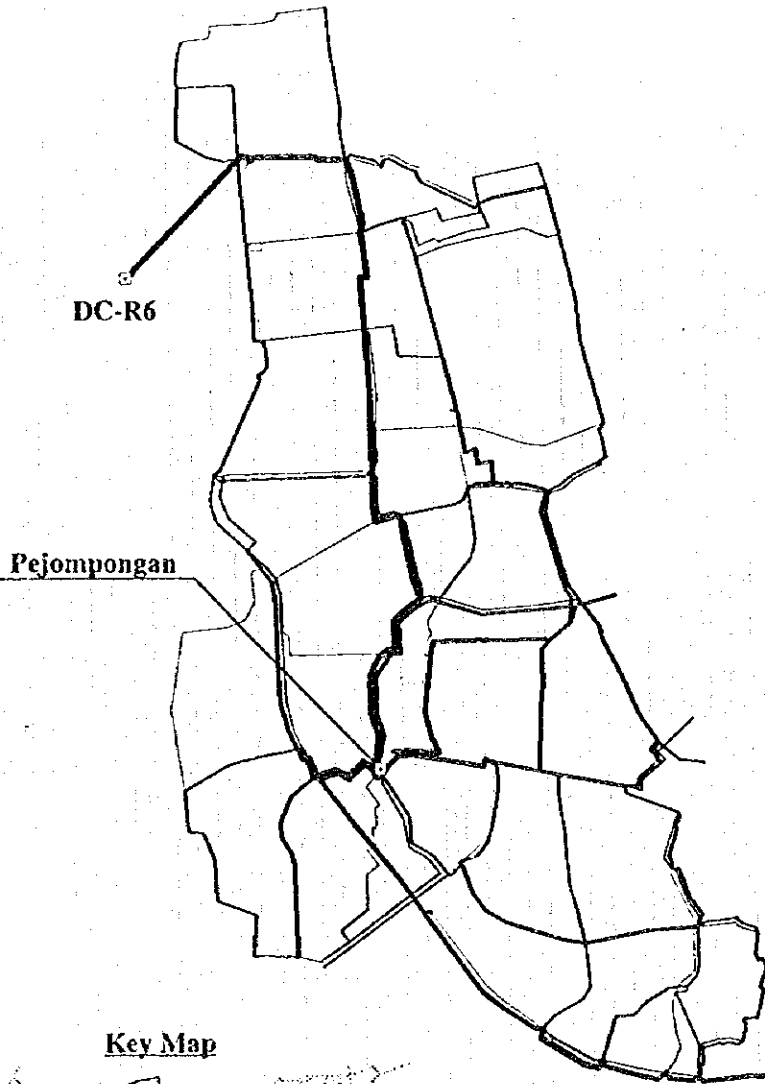
PIPE LENGTH (before 2009)				PIPE LENGTH (up to 2019)			
Dia mm	EAST	WEST	TOTAL	Dia mm	EAST	WEST	TOTAL
300	87,608	37,772	125,380	300	154,728	120,908	275,636
350	190	0	190	350	190	2,380	2,570
400	26,329	8,815	35,144	400	32,849	45,115	77,964
500	0	0	0	500	0	0	0
500	9,612	9,990	19,602	500	23,299	18,363	41,662
600	0	0	0	600	0	0	0
600	21,435	75,322	96,757	600	28,667	125,070	153,737
700	3,290	9,610	12,900	700	3,290	9,610	12,900
800	32,960	51,210	84,170	800	36,699	71,553	108,252
900	3,850	6,190	10,040	900	3,888	6,252	10,140
1000	9,670	21,584	31,254	1000	9,937	46,480	56,417
1100	0	0	0	1100	0	1,370	1,370
1200	6,180	10,750	16,930	1200	8,710	23,560	32,270
1350	0	9,100	9,100	1350	0	10,330	10,330
1500	12,332	4,060	16,392	1500	12,332	4,060	16,392
1650	1,710	2,250	3,960	1650	1,710	2,250	3,960
1800	4,514	3,700	8,214	1800	4,638	11,486	16,124
2200	0	0	0	2200	0	8,820	8,820
Total	219,680	250,353	470,033	Total	320,938	507,606	828,544

4.3 Figure of Proposed Primary Distribution Pipelines (Year2019)

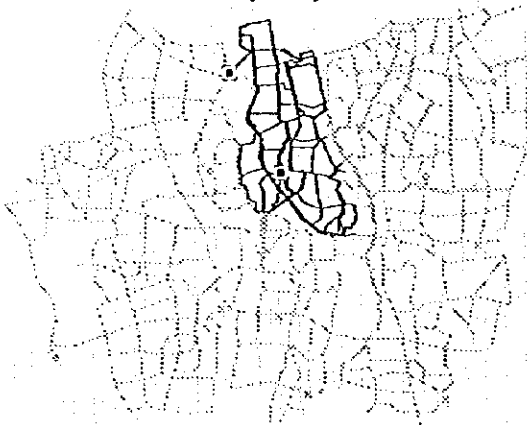


ZONE-1(2019)

4.4.1 Figure of Proposed Primary Distribution System for Zone 1



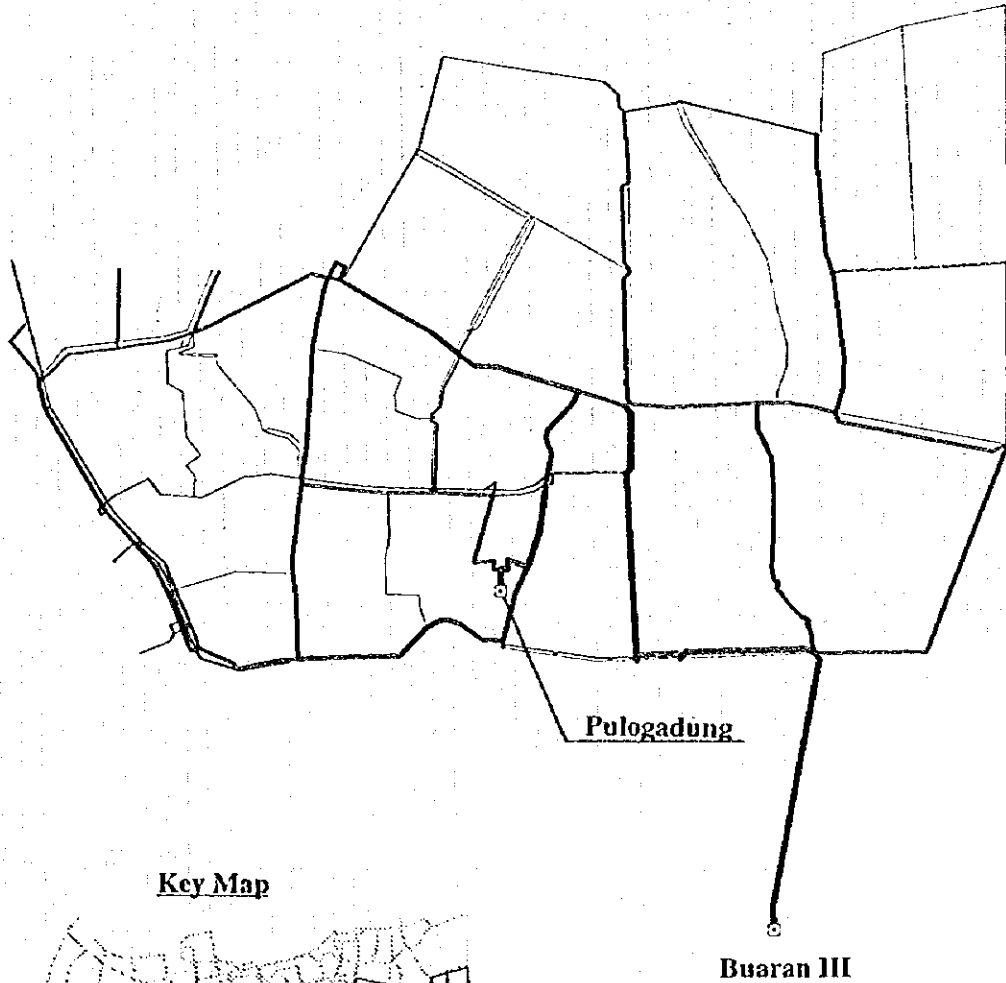
Key Map



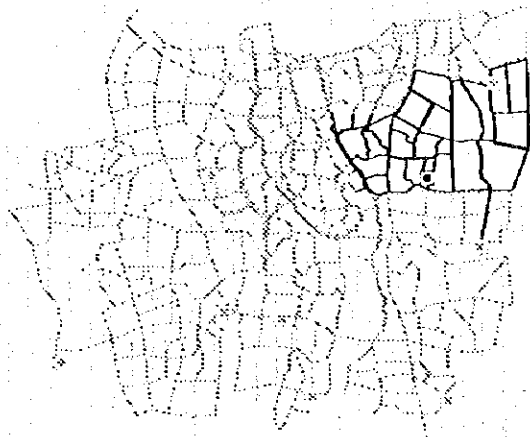
Pipe Diameter

250	— <	400
400	— <	600
600	— <	800
800	— <	1000
1000	— <	1200
1200	— <	1501

4.4.2 Figure of Proposed Primary Distribution System for Zone 2



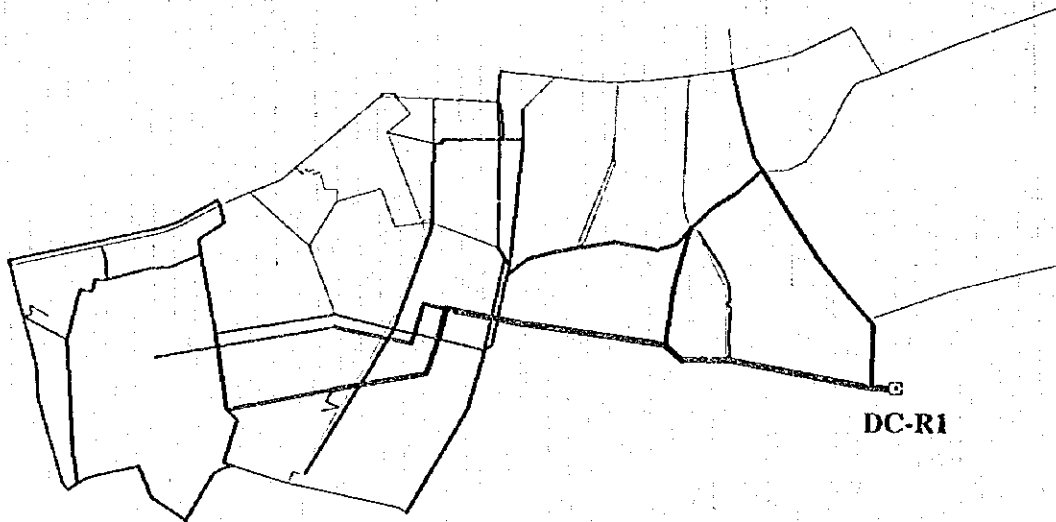
Key Map



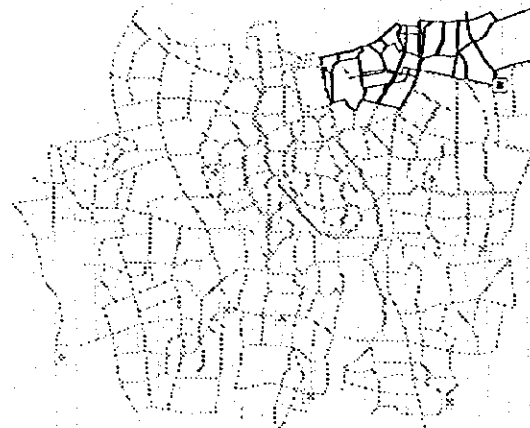
Pipe Diameter

- 200 ≤ — < 400
- 400 ≤ — < 600
- 600 ≤ — < 800
- 800 ≤ — < 1000
- 1000 ≤ — < 1200
- 1200 ≤ — < 1801

4.4.3 Figure of Proposed Primary Distribution System for Zone 3



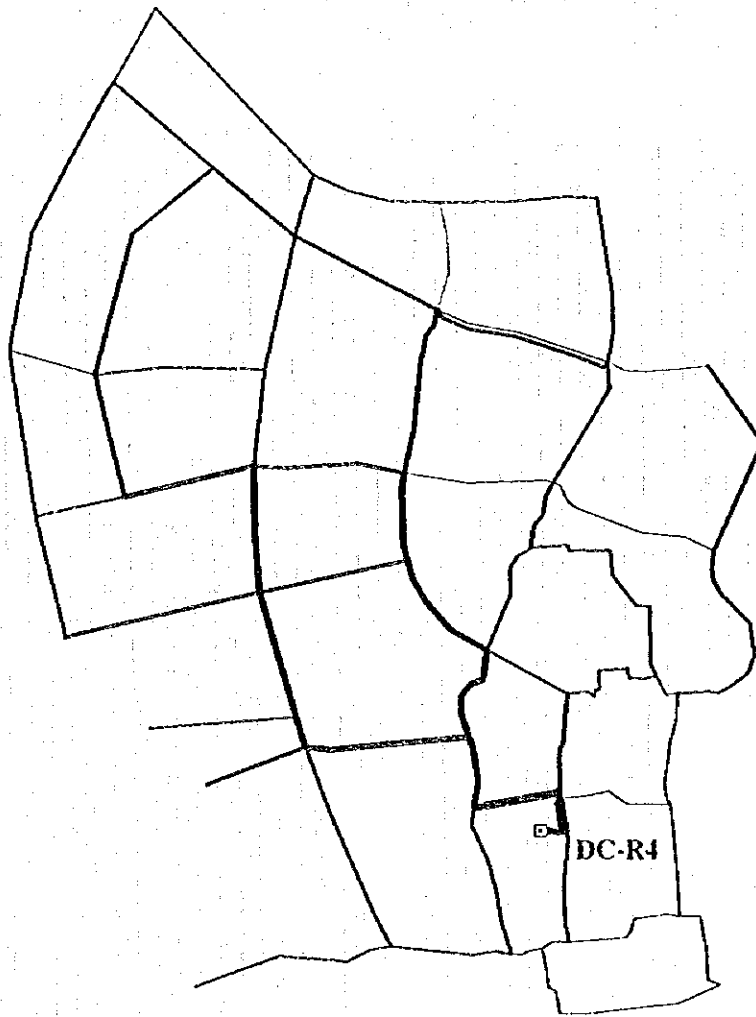
Key Map



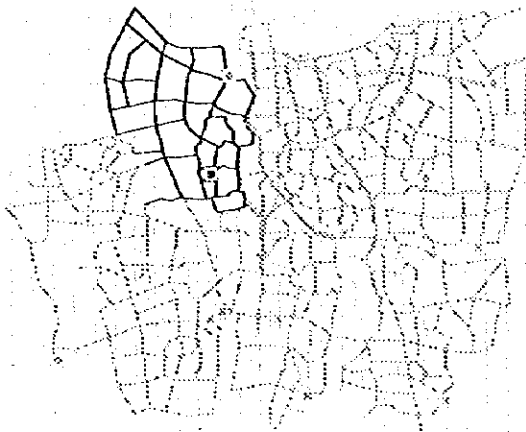
Pipe Diameter

- 250 < 400
- 400 < 600
- 600 < 800
- 800 < 1000
- 1000 < 1200
- 1200 < 1601

4.4.4 Figure of Proposed Primary Distribution System for Zone 4



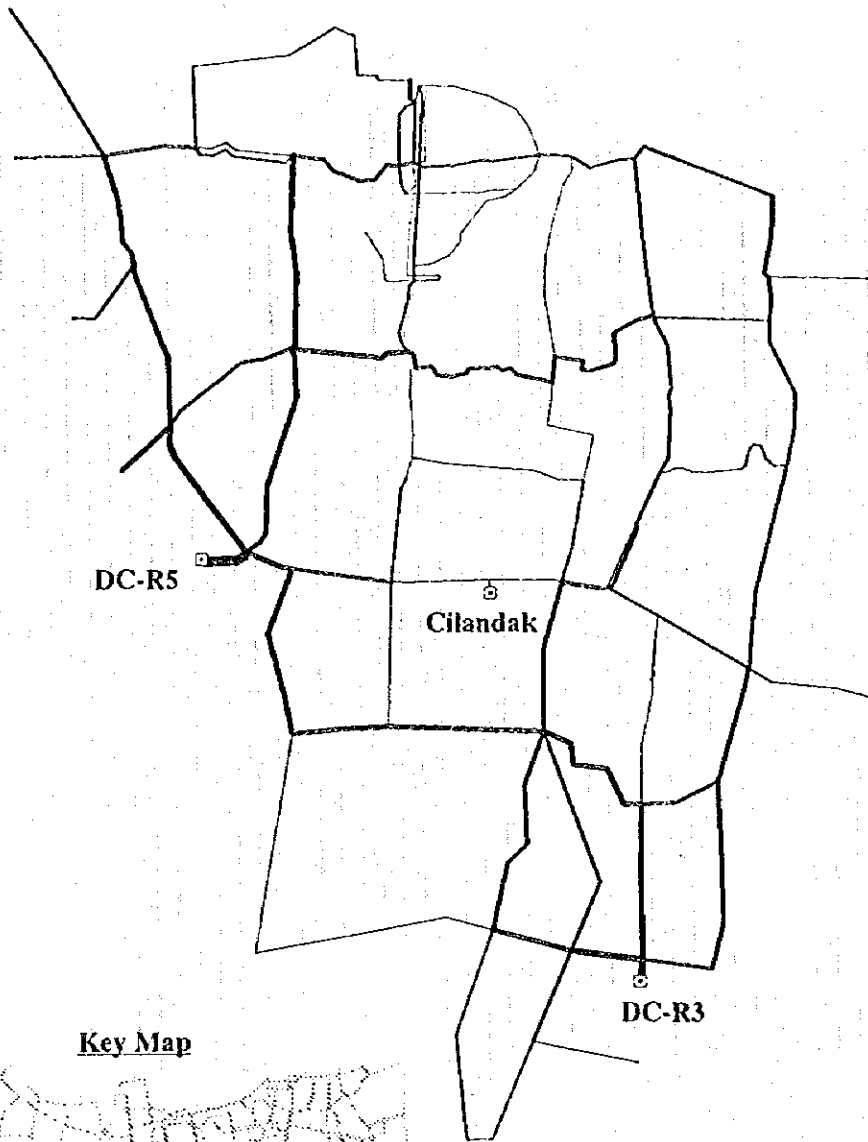
Key Map



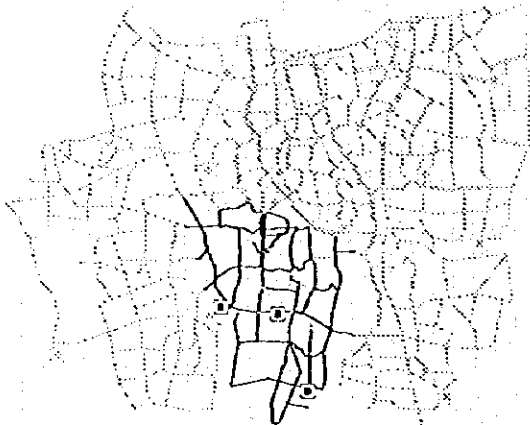
Pipe Diameter

- 300 \varnothing — < 400
- 400 \varnothing — < 600
- 600 \varnothing — < 800
- 800 \varnothing — < 1000
- 1000 \varnothing — < 1200
- 1200 \varnothing — < 1800

4.4.5 Figure of Proposed Primary Distribution System for Zone 5



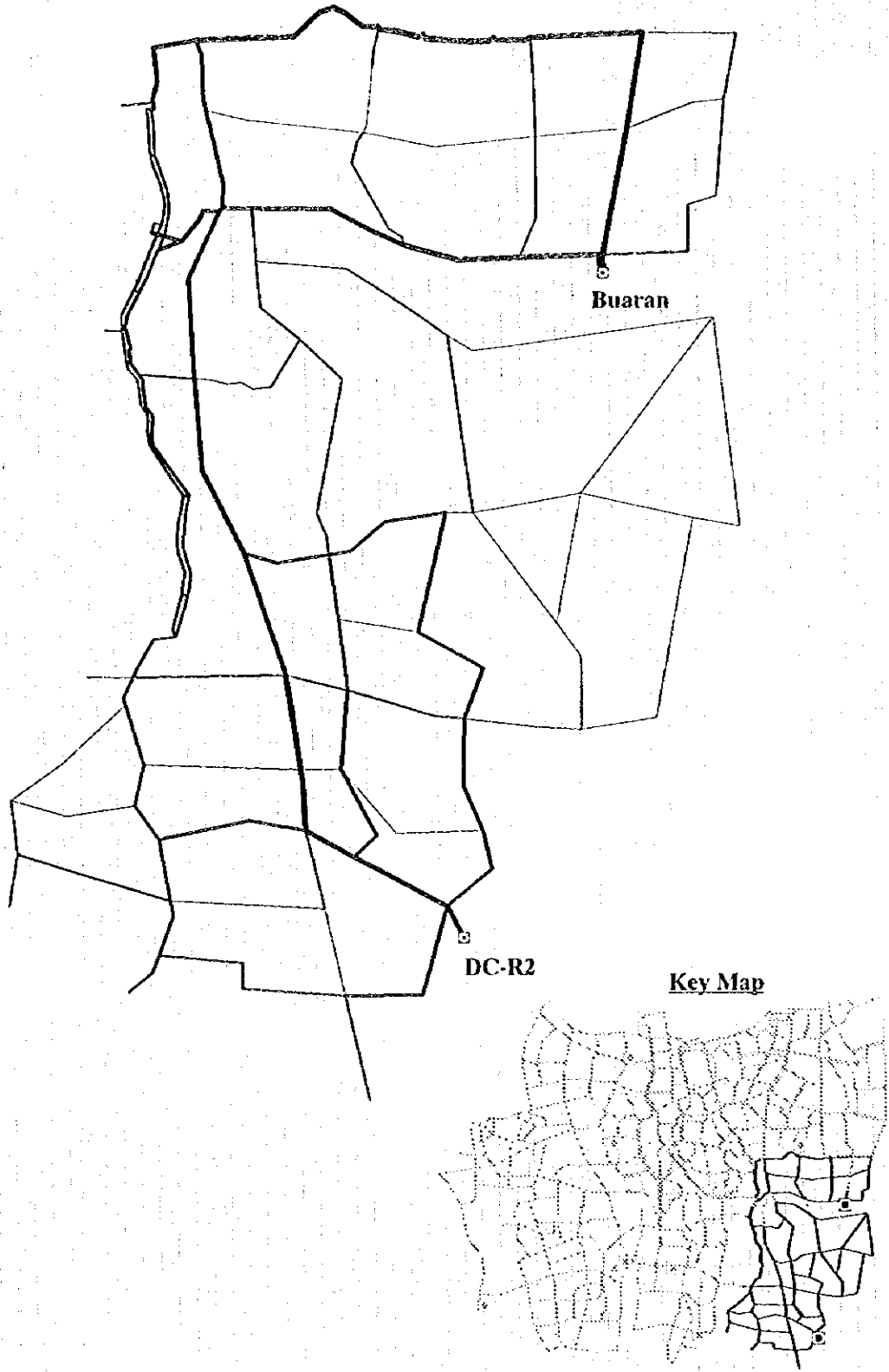
Key Map



Pipe Diameter

- 300 ≤ — < 400
- 400 ≤ — < 500
- 500 ≤ — < 600
- 600 ≤ — < 800
- 800 ≤ — < 1000
- 1000 ≤ — < 1200
- 1200 ≤ — < 1801

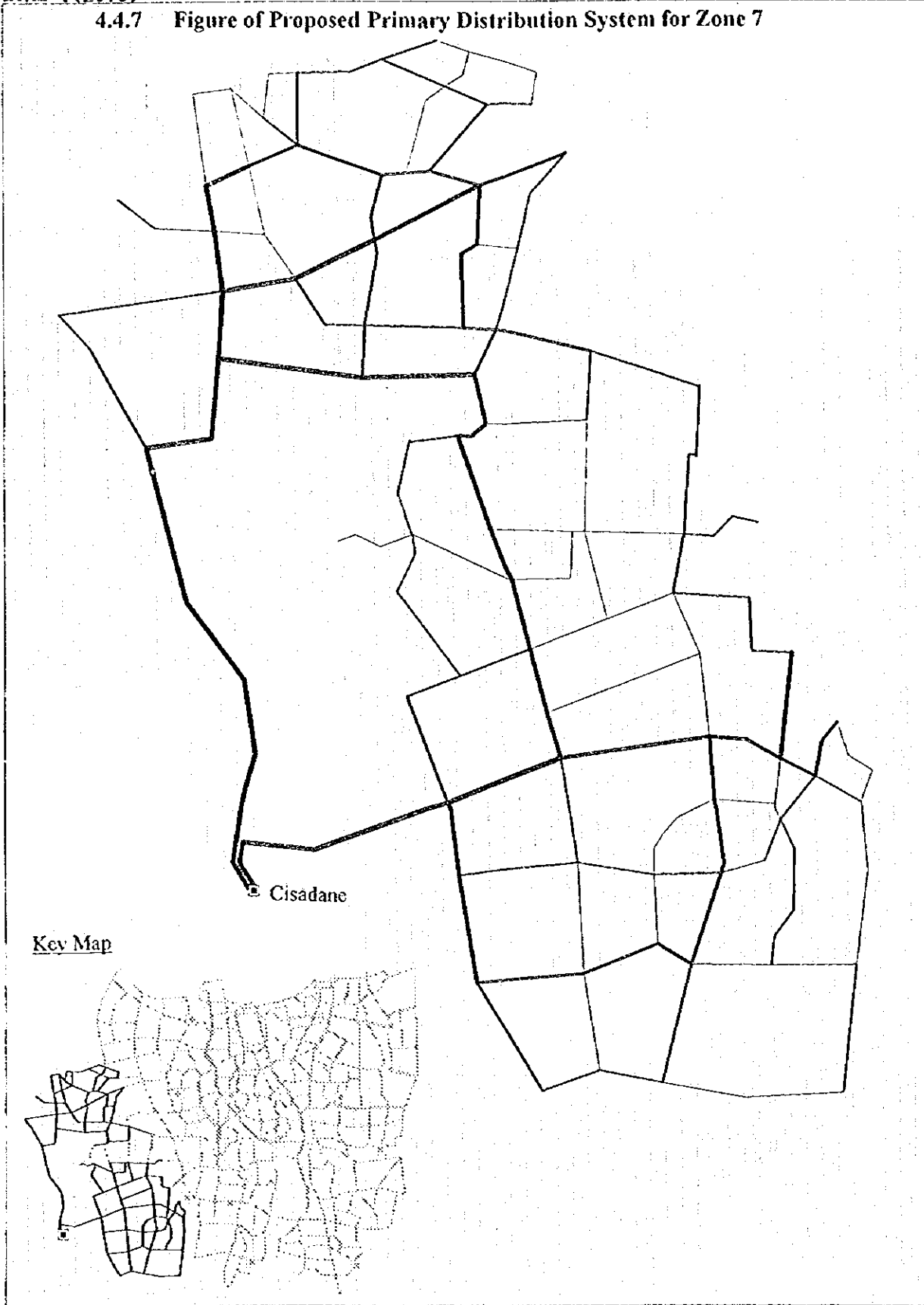
4.4.6 Figure of Proposed Primary Distribution System for Zone 6



Pipe Diameter

- 250 \leq --- < 400
- 400 \leq --- < 600
- 600 \leq --- < 800
- 800 \leq --- < 1000
- 1000 \leq --- < 1200
- 1200 \leq --- < 1800

4.4.7 Figure of Proposed Primary Distribution System for Zone 7



Pipe Diameter

300	≦	—	<	400
400	≦	—	<	500
500	≦	—	<	600
600	≦	—	<	800
800	≦	—	<	1000
1000	≦	—	<	1200
1200	≦	—	<	