

Chapter 7

Hydraulic Calculation Results

Figure D7-1 Layout of D1 system for Hydraulic Calculation

Day 1, 12:00 AM

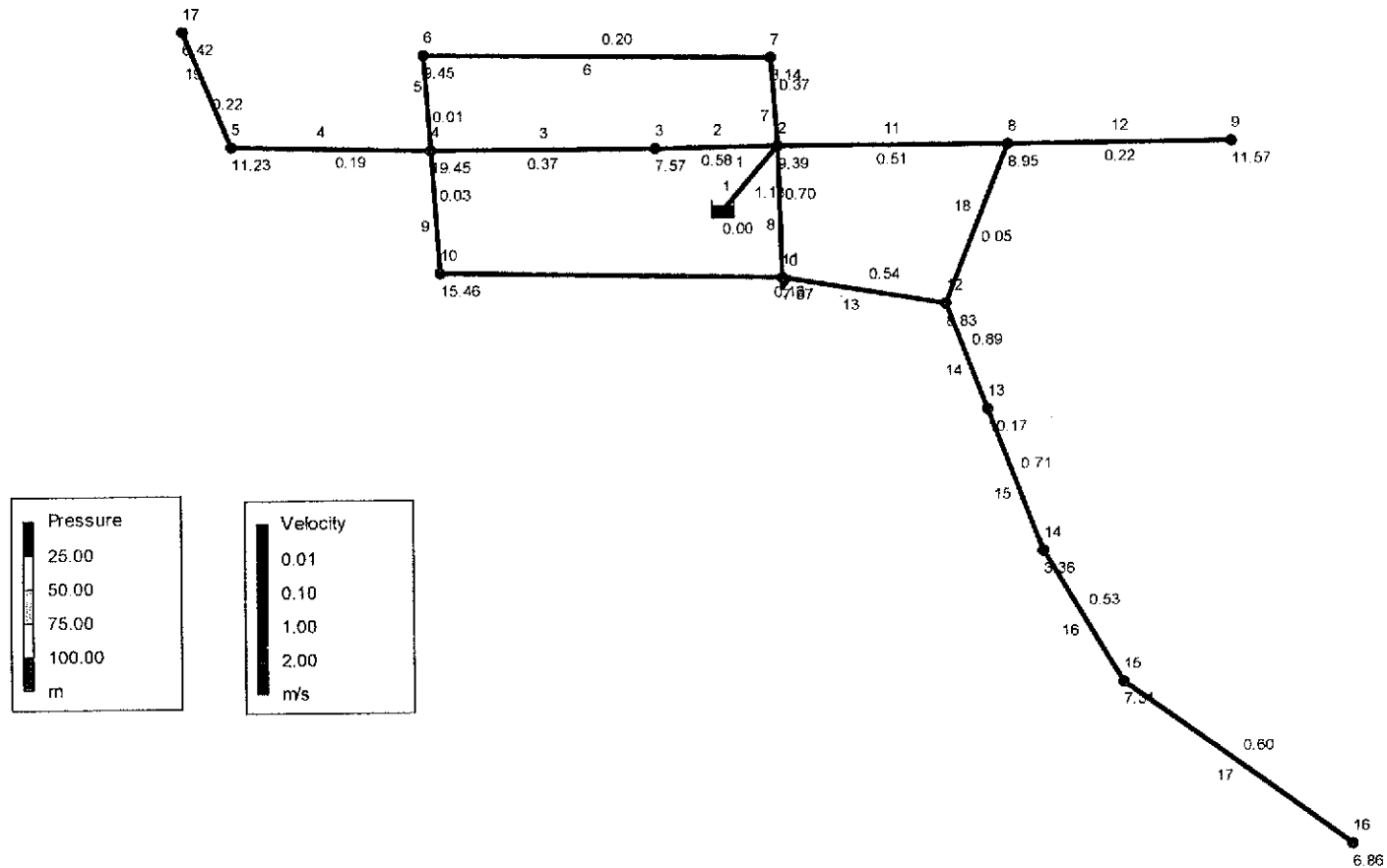


Table D7-1 Dimension of Network system (1/2)

Node ID	Elevation m	Demand LPS	Pressure m
Junc 2	500	1.91	9.39
Junc 3	501	1.69	7.57
Junc 4	488	1.69	19.45
Junc 5	496	0.39	11.23
Junc 6	498	0.90	9.45
Junc 7	500	1.91	8.14
Junc 8	498	2.61	8.95
Junc 9	495	1.13	11.57
Junc 10	492	0.79	15.46
Junc 11	500	3.94	7.67
Junc 12	498	1.60	8.83
Junc 13	495	3.15	10.17
Junc 14	500	3.15	3.36
Junc 15	495	4.72	7.31
Junc 16	490	4.72	6.86
Junc 17	500	1.13	6.42

Table D7-1 Dimension of Network system (2/2)

Node ID	Elevation m	Demand LPS	Pressure m
Resvr 1	510	-35.43	0.00

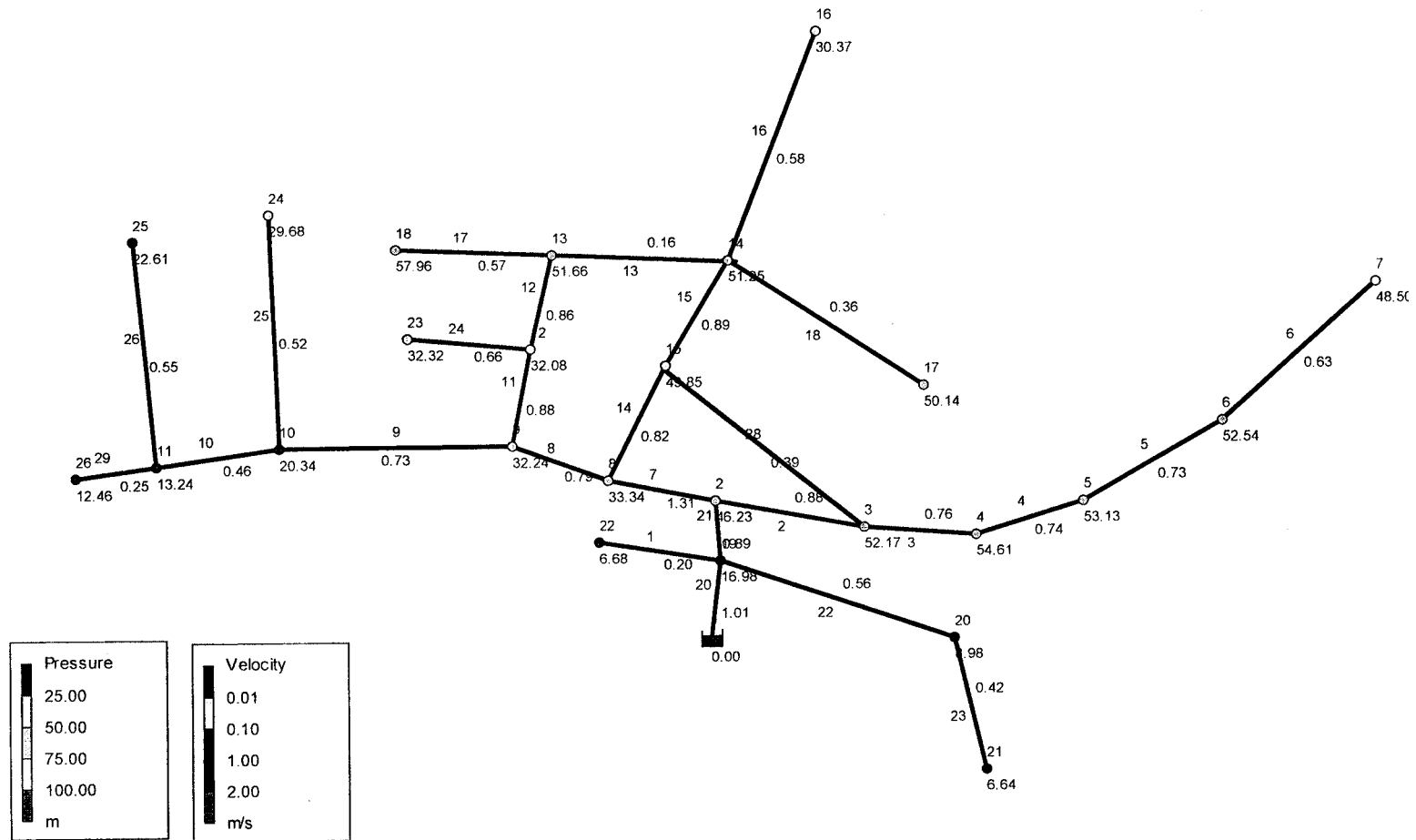
Table D7-3 Results of Network Link (1/2)

Link ID	Length m	Diameter mm	Flow LPS	Velocity m/s	Headloss m/km
Pipe 1	100	200	35.43	1.13	6.08
Pipe 2	200	100	4.56	0.58	4.09
Pipe 3	650	100	2.87	0.37	1.73
Pipe 4	400	100	1.52	0.19	0.54
Pipe 5	700	100	-0.11	0.01	0.00
Pipe 6	890	80	-1.01	0.20	0.77
Pipe 7	700	100	-2.92	0.37	1.79
Pipe 8	700	200	22.02	0.70	2.46
Pipe 9	700	100	-0.22	0.03	0.01
Pipe 10	800	100	-1.01	0.13	0.26
Pipe 11	760	100	4.01	0.51	3.22
Pipe 12	400	80	1.13	0.22	0.94
Pipe 13	550	200	17.07	0.54	1.52
Pipe 14	300	150	15.74	0.89	5.53
Pipe 15	500	150	12.59	0.71	3.62
Pipe 16	500	150	9.44	0.53	2.11

Table D7-3 Results of Network Link (2/2)

Link ID	Length m	Diameter mm	Flow LPS	Velocity m/s	Headloss m/km
Pipe 17	1250	100	4.72	0.60	4.36
Pipe 18	1500	80	0.27	0.05	0.08
Pipe 19	860	80	1.13	0.22	0.94

Figure D7-2 Layout of D2 system for Hydraulic Calculation



Day 1, 12:00

Table D7-5 Dimension of Network system (1/2)

Node ID	Elevation m	Demand LPS	Pressure m
Junc 2	620	5.16	46.23
Junc 3	610	4.30	52.17
Junc 4	605	0.20	54.61
Junc 5	605	3.42	53.13
Junc 6	600	3.60	52.54
Junc 7	590	2.10	48.50
Junc 8	630	2.87	33.34
Junc 9	630	1.25	32.24
Junc 10	635	1.71	20.34
Junc 11	640	0.00	13.24
Junc 12	627	1.30	32.08
Junc 13	600	1.90	51.66
Junc 14	600	2.80	51.25
Junc 15	610	1.40	49.85
Junc 16	615	2.90	30.37
Junc 17	600	1.80	50.14

Table D7-5 Dimension of Network system (2/2)

Node ID	Elevation m	Demand LPS	Pressure m
Junc 18	590	1.90	57.96
Junc 19	650	1.47	16.98
Junc 20	655	1.40	8.98
Junc 21	655	1.40	6.64
Junc 22	660	1.60	6.68
Junc 23	623	1.30	32.32
Junc 24	622	1.71	29.68
Junc 25	625	1.81	22.61
Junc 26	640	0.50	12.46
Resvr 1	670	-49.80	0.00

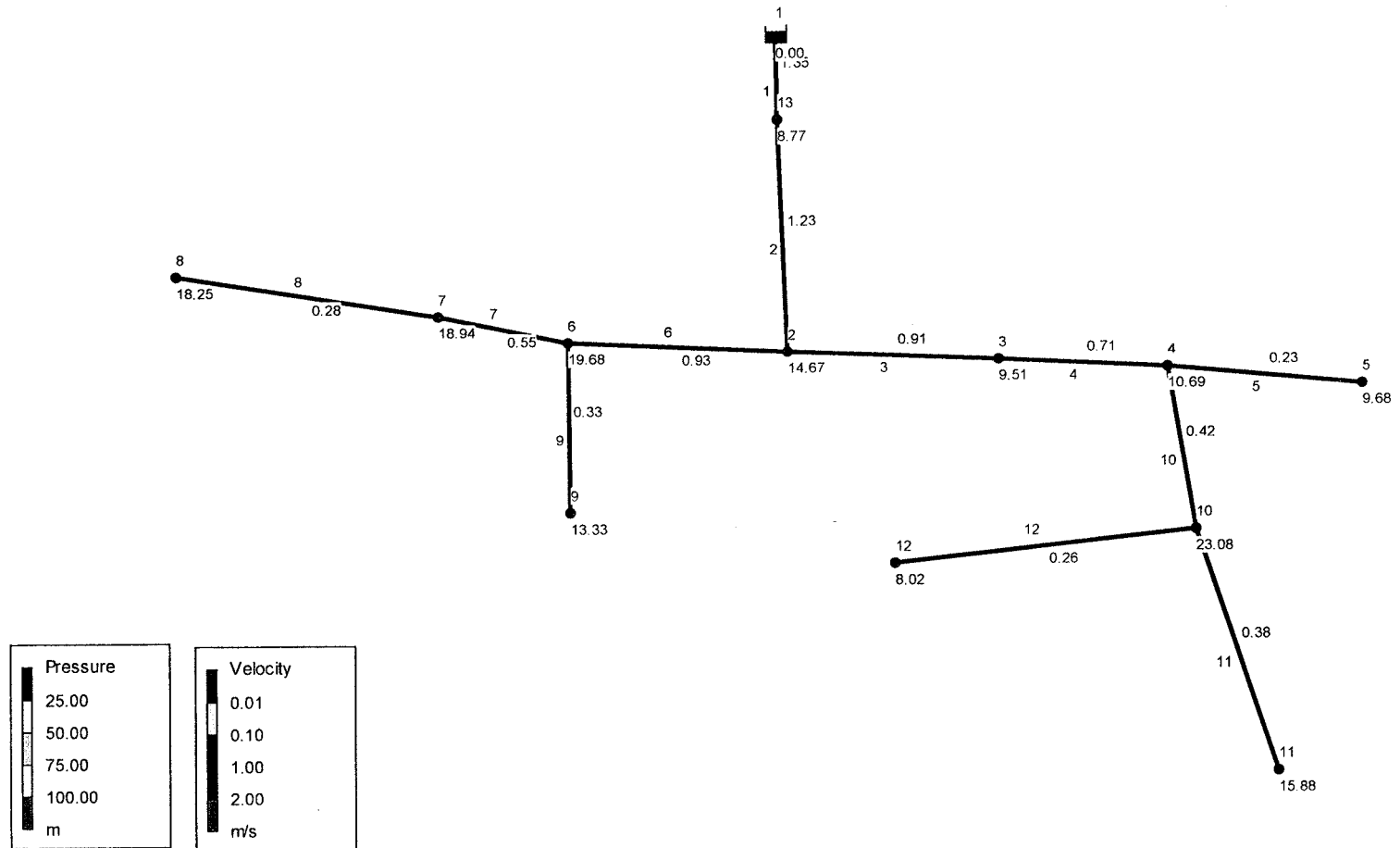
Table D7-7 Results of Network Link (1/2)

Link ID	Length m	Diameter mm	Flow LPS	Velocity m/s	Headloss m/km
Pipe 2	750	150	15.58	0.88	5.42
Pipe 3	500	125	9.32	0.76	5.12
Pipe 4	300	125	9.12	0.74	4.92
Pipe 5	900	100	5.70	0.73	6.21
Pipe 6	1700	65	2.10	0.63	8.26
Pipe 7	250	150	23.19	1.31	11.60
Pipe 8	250	150	13.92	0.79	4.38
Pipe 9	1100	100	5.73	0.73	6.27
Pipe 10	600	80	2.31	0.46	3.50
Pipe 11	350	100	6.94	0.88	9.02
Pipe 12	650	80	4.34	0.86	11.42
Pipe 13	600	65	0.54	0.16	0.69
Pipe 14	450	100	6.40	0.82	7.74
Pipe 15	950	100	6.96	0.89	9.06
Pipe 16	1100	80	2.90	0.58	5.34
Pipe 17	540	65	1.90	0.57	6.85

Table D7-7 Results of Network Link (2/2)

Link ID	Length m	Diameter mm	Flow LPS	Velocity m/s	Headloss m/km
Pipe 20	800	250	49.80	1.01	3.78
Pipe 21	250	250	43.93	0.89	2.97
Pipe 22	600	80	2.80	0.56	5.00
Pipe 23	600	65	1.40	0.42	3.89
Pipe 1	500	100	1.60	0.20	0.59
Pipe 24	300	50	1.30	0.66	12.55
Pipe 25	650	65	1.71	0.52	5.63
Pipe 26	900	65	1.81	0.55	6.26
Pipe 28	900	80	1.96	0.39	2.57
Pipe 29	360	50	0.50	0.25	2.16
Pipe 18	500	80	1.80	0.36	2.21

Figure D7-3 Layout of D3-1 system for Hydraulic Calculation



Day 1, 12:00 AM

D7-11

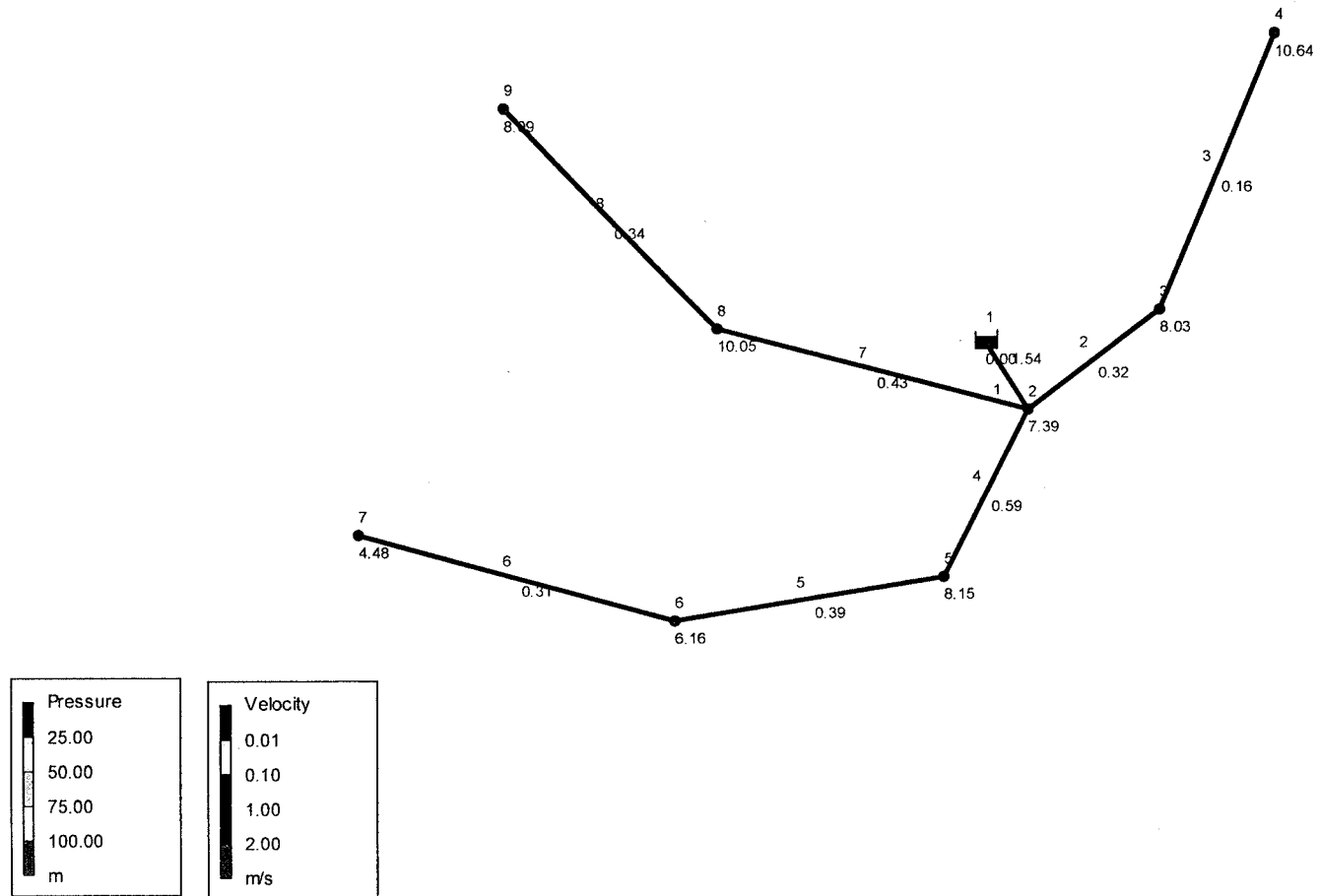
Table D7-9 Dimension of Network system

Node ID	Elevation m	Demand LPS	Pressure m
Junc 2	500	3.31	14.67
Junc 3	503	2.38	9.51
Junc 4	500	2.43	10.69
Junc 5	500	1.17	9.68
Junc 6	490	2.87	19.68
Junc 7	490	1.39	18.94
Junc 8	490	1.39	18.25
Junc 9	495	1.67	13.33
Junc 10	486	2.58	23.08
Junc 11	490	1.26	15.88
Junc 12	500	1.32	8.02
Junc 13	510	2.10	8.77
Resvr 1	520	-23.87	0.00

Table D7-10 Results of Network Link

Link ID	Length m	Diameter mm	Flow LPS	Velocity m/s	Headloss m/km
Pipe 1	100	150	23.87	1.35	12.25
Pipe 2	400	150	21.77	1.23	10.27
Pipe 3	300	125	11.14	0.91	7.18
Pipe 4	400	125	8.76	0.71	4.56
Pipe 5	1000	80	1.17	0.23	1.01
Pipe 6	500	100	7.32	0.93	9.98
Pipe 7	150	80	2.78	0.55	4.94
Pipe 8	500	80	1.39	0.28	1.37
Pipe 9	700	80	1.67	0.33	1.92
Pipe 10	950	125	5.16	0.42	1.69
Pipe 11	1000	65	1.26	0.38	3.20
Pipe 12	850	80	1.32	0.26	1.25

Figure D7-4 Layout of D3-2 system for Hydraulic Calculation



Day 1, 12:00 AM

Table D7-11 Dimension of Network system

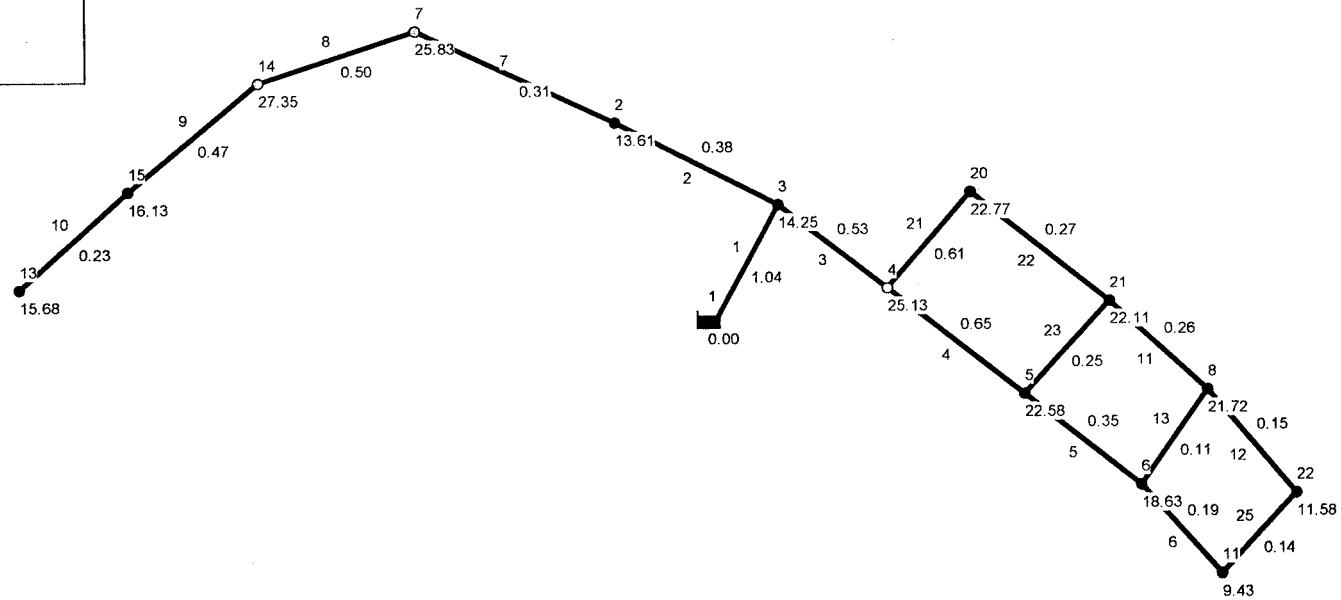
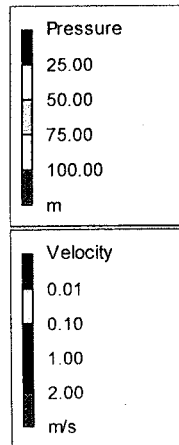
Node ID	Elevation m	Demand LPS	Pressure m
Junc 2	530	1.55	7.39
Junc 3	528	1.26	8.03
Junc 4	525	1.26	10.64
Junc 5	525	1.55	8.15
Junc 6	525	1.55	6.16
Junc 7	525	1.55	4.48
Junc 8	525	1.69	10.05
Junc 9	525	1.69	8.09
Resvr 1	540	-12.10	0.00

Table D7-12 Results of Network Link

Link ID	Length m	Diameter mm	Flow LPS	Velocity m/s	Headloss m/km
Pipe 1	100	100	12.10	1.54	26.11
Pipe 2	1000	100	2.52	0.32	1.36
Pipe 3	1000	100	1.26	0.16	0.39
Pipe 4	1000	100	4.65	0.59	4.24
Pipe 5	1000	100	3.10	0.39	1.99
Pipe 6	1000	80	1.55	0.31	1.68
Pipe 7	1000	100	3.38	0.43	2.34
Pipe 8	1000	80	1.69	0.34	1.97

Figure D7-5 Layout of D4 system for Hydraulic Calculation

Day 1, 12:00 AM



D7-17

Table D7-13 Dimension of Network system

Node ID	Elevation m	Demand LPS	Pressure m
Junc 2	607	1.30	13.61
Junc 3	607	2.39	14.25
Junc 4	595	1.09	25.13
Junc 5	595	1.09	22.58
Junc 6	598	2.16	18.63
Junc 7	594	1.56	25.83
Junc 11	607	2.16	9.43
Junc 13	600	1.18	15.68
Junc 14	591	1.56	27.35
Junc 15	600	1.18	16.13
Junc 20	595	0.91	22.77
Junc 21	595	1.39	22.11
Junc 22	605	0.48	11.58
Junc 8	595	0.00	21.72
Resvr 1	622	-18.45	0.00

Table D7-14 Results of Network Link (1/2)

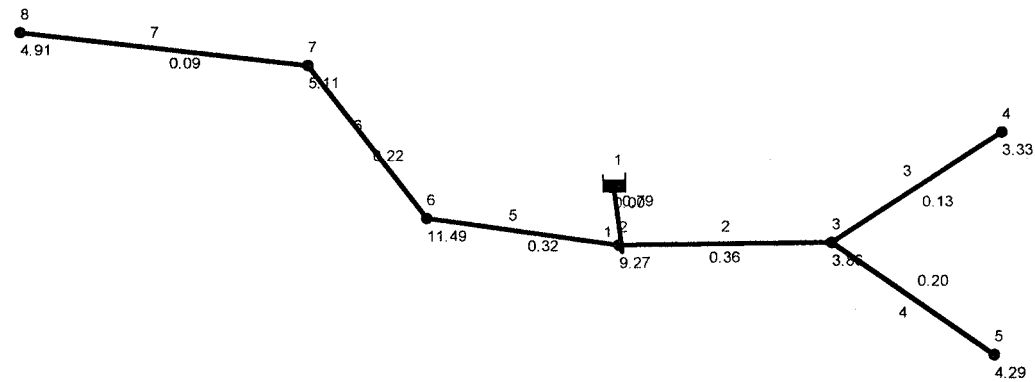
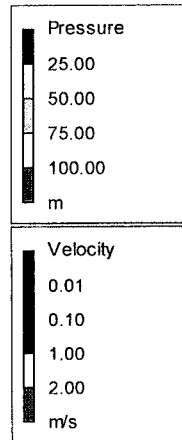
Link ID	Length m	Diameter mm	Flow LPS	Velocity m/s	Headloss m/km
Pipe 2	565	150	-6.78	0.38	1.14
Pipe 3	550	150	9.28	0.53	2.04
Pipe 4	500	100	5.13	0.65	5.10
Pipe 5	590	100	2.76	0.35	1.61
Pipe 6	400	100	1.48	0.19	0.52
Pipe 7	1020	150	5.48	0.31	0.77
Pipe 8	480	100	3.92	0.50	3.08
Pipe 9	610	80	2.36	0.47	3.64
Pipe 10	435	80	1.18	0.23	1.02
Pipe 21	400	80	3.06	0.61	5.90
Pipe 22	650	100	2.15	0.27	1.02
Pipe 23	400	80	-1.28	0.25	1.19
Pipe 25	400	80	0.68	0.14	0.38
Pipe 11	420	100	2.04	0.26	0.92
Pipe 12	420	100	1.16	0.15	0.33
Pipe 13	420	100	0.88	0.11	0.20

Table D7-14 Results of Network Link (2/2)

Link ID	Length m	Diameter mm	Flow LPS	Velocity m/s	Headloss m/km
Pipe 1	100	150	-18.45	1.04	7.48

Figure D7-6 Layout of D4-2 system for Hydraulic Calculation

Day 1, 12:00 AM



D7-21

Table D7-16 Dimension of Network system

Node ID	Elevation m	Demand LPS	Pressure m
Junc 2	600	0.81	9.27
Junc 3	602	0.81	3.86
Junc 4	602	1.02	3.33
Junc 5	600	1.02	4.29
Junc 6	595	0.81	11.49
Junc 7	600	1.27	5.11
Junc 8	600	0.47	4.91
Resvr 1	610	-6.21	0.00

Table D7-17 Results of Network Link

Link ID	Length m	Diameter mm	Flow LPS	Velocity m/s	Headloss m/km	Reaction Rate mg/L/d
Pipe 1	100	100	6.21	0.79	7.30	0.00
Pipe 2	2000	100	2.85	0.36	1.71	0.00
Pipe 3	2000	100	1.02	0.13	0.27	0.00
Pipe 4	2000	80	1.02	0.20	0.78	0.00
Pipe 5	2000	100	2.55	0.32	1.39	0.00
Pipe 6	2000	100	1.74	0.22	0.69	0.00
Pipe 7	1000	80	0.47	0.09	0.20	0.00

Figure D7-7 Layout of D5 system for Hydraulic Calculation

Day 1, 12:00 AM

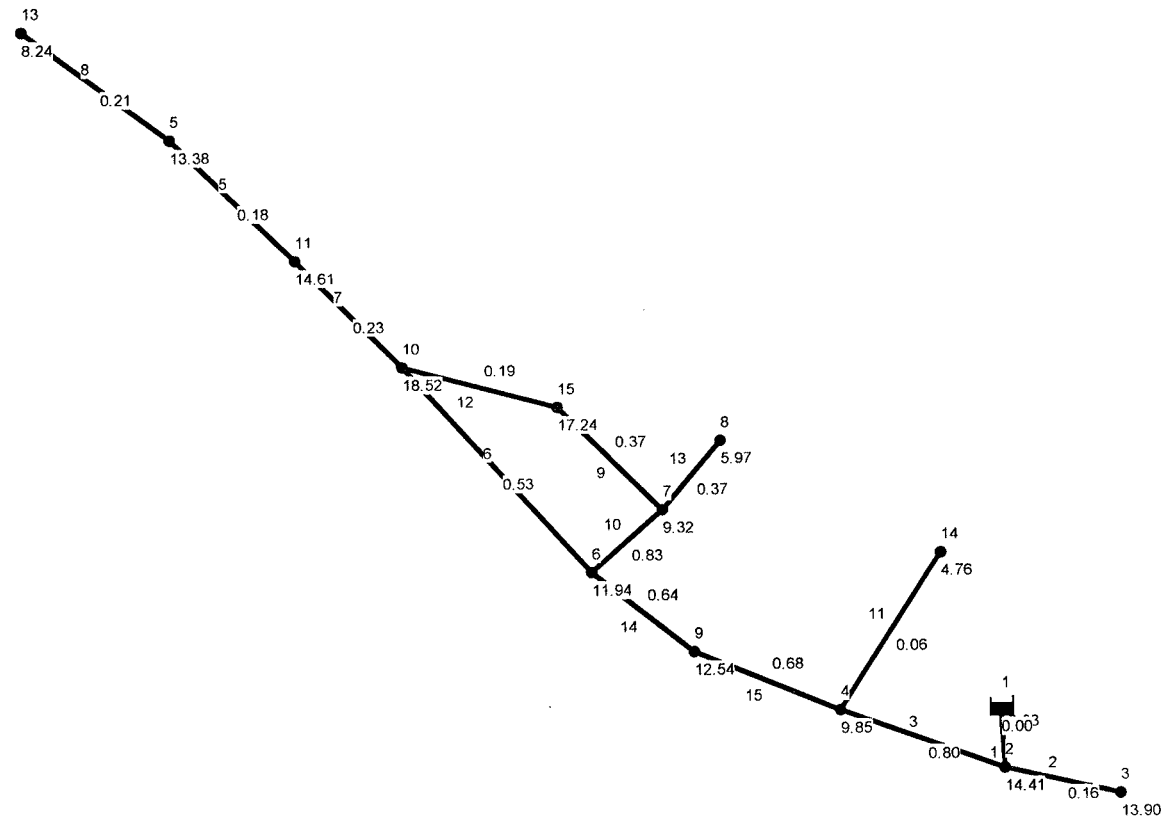
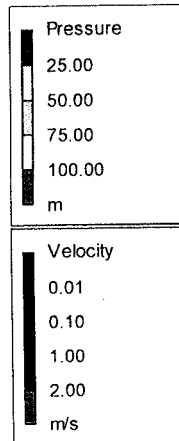


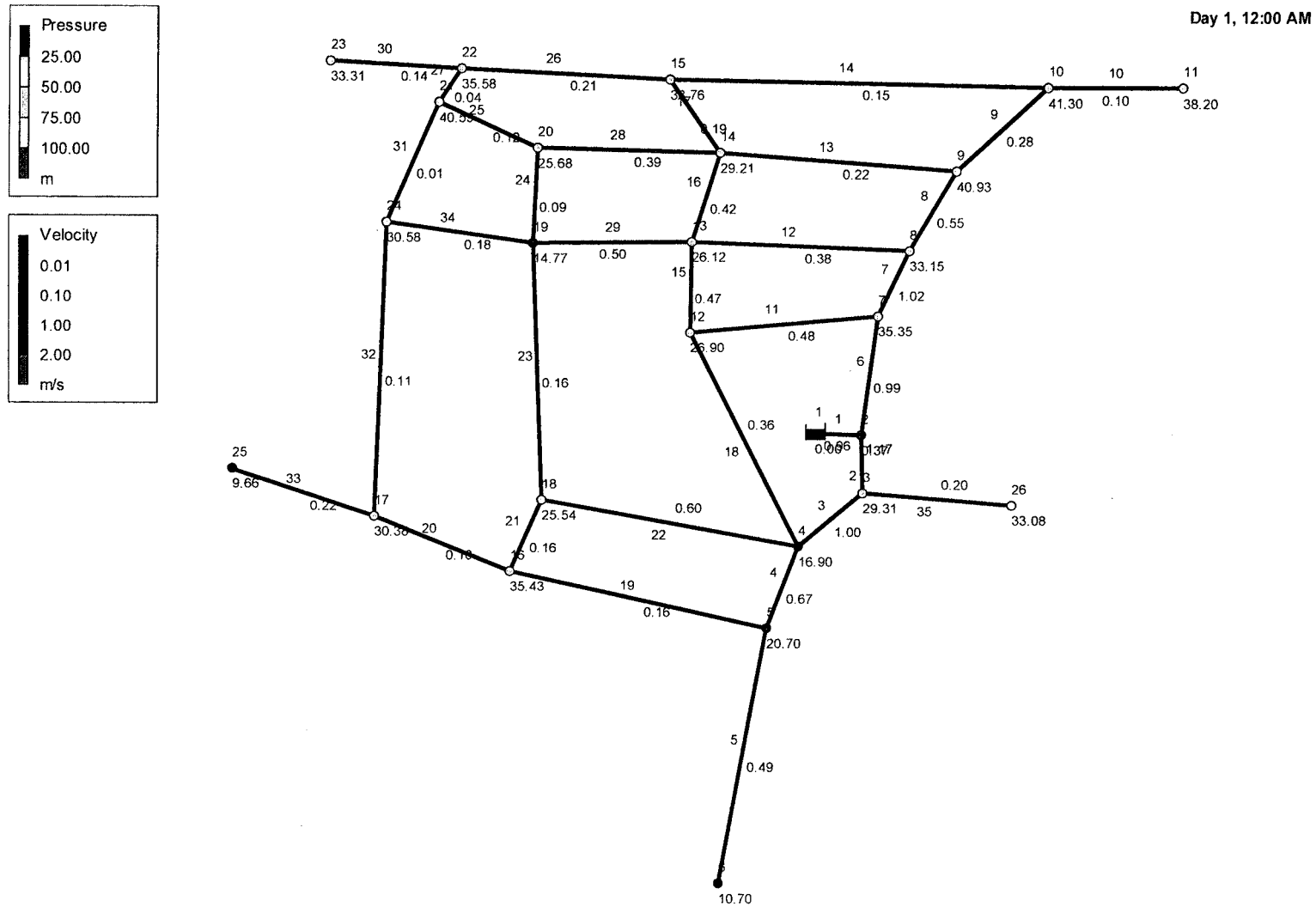
Table D7-18 Dimension of Network system

Node ID	Elevation m	Demand LPS	Pressure m
Junc 2	240	1.35	14.41
Junc 3	240	0.80	13.90
Junc 4	240	1.72	9.85
Junc 6	235	2.97	11.94
Junc 10	223	3.38	18.52
Junc 11	226	0.41	14.61
Junc 13	230	0.69	8.24
Junc 14	245	0.48	4.76
Junc 15	225	0.87	17.24
Junc 5	227	0.69	13.38
Junc 7	235	1.59	9.32
Junc 8	237	0.72	5.97
Junc 9	235	0.69	12.54
Resvr 1	255	-16.36	0.00

Table D7-19 Results of Network Link

Link ID	Length m	Diameter mm	Flow LPS	Velocity m/s	Headloss m/km
Pipe 1	100	150	16.36	0.93	5.95
Pipe 2	1000	80	-0.80	0.16	0.51
Pipe 3	1000	150	14.21	0.80	4.55
Pipe 6	1550	100	4.20	0.53	3.50
Pipe 7	1250	100	1.79	0.23	0.73
Pipe 11	1350	100	0.48	0.06	0.07
Pipe 12	1000	80	-0.97	0.19	0.72
Pipe 5	500	100	1.38	0.18	0.46
Pipe 8	2000	65	0.69	0.21	1.07
Pipe 9	900	80	-1.84	0.37	2.30
Pipe 10	250	80	-4.15	0.83	10.50
Pipe 13	320	50	-0.72	0.37	4.20
Pipe 14	200	150	-11.32	0.64	2.96
Pipe 15	700	150	-12.01	0.68	3.31

Figure D7-8 Layout of D6 system for Hydraulic Calculation



D7-27

Table D7-20 Dimension of Network system (1/2)

Node ID	Elevation m	Demand LPS	Pressure m
Junc 2	770	0.00	0.37
Junc 3	738	0.66	29.31
Junc 4	747	0.66	16.90
Junc 5	740	1.63	20.70
Junc 6	730	0.97	10.70
Junc 7	730	1.05	35.35
Junc 8	730	0.45	33.15
Junc 9	721	0.92	40.93
Junc 10	720	0.92	41.30
Junc 11	723	0.20	38.20
Junc 12	736	1.05	26.90
Junc 13	736	0.45	26.12
Junc 14	732	0.92	29.21
Junc 15	722	0.25	38.76
Junc 16	725	1.10	35.43
Junc 17	730	0.44	30.38

Table D7-20 Dimension of Network system (2/2)

Node ID	Elevation m	Demand LPS	Pressure m
Junc 18	735	1.70	25.54
Junc 19	746	0.25	14.77
Junc 20	735	1.17	25.68
Junc 21	720	0.25	40.59
Junc 22	725	0.25	35.58
Junc 23	727	0.28	33.31
Junc 24	730	0.25	30.58
Junc 25	750	0.44	9.66
Junc 26	734	0.66	33.08
Resvr 1	771	-16.92	0.00

Table D7-22 Results of Network Link (1/3)

Link ID	Length m	Diameter mm	Flow LPS	Velocity m/s	Headloss m/km
Pipe 1	100	150	16.92	0.96	6.34
Pipe 2	200	100	9.16	1.17	15.29
Pipe 3	300	100	7.84	1.00	11.36
Pipe 4	450	80	3.38	0.67	7.12
Pipe 5	2750	50	0.97	0.49	7.27
Pipe 6	450	100	7.76	0.99	11.16
Pipe 7	140	80	5.13	1.02	15.67
Pipe 8	250	80	2.77	0.55	4.89
Pipe 9	450	80	1.41	0.28	1.41
Pipe 10	230	50	0.20	0.10	0.43
Pipe 11	500	65	1.58	0.48	4.89
Pipe 12	420	80	1.91	0.38	2.47
Pipe 13	420	50	0.44	0.22	1.71
Pipe 14	670	50	0.29	0.15	0.81
Pipe 15	220	80	2.34	0.47	3.58
Pipe 16	300	80	2.13	0.42	3.01

Table D7-22 Results of Network Link (2/3)

Link ID	Length m	Diameter mm	Flow LPS	Velocity m/s	Headloss m/km
Pipe 17	370	50	0.37	0.19	1.23
Pipe 18	450	80	-1.81	0.36	2.22
Pipe 19	550	80	0.78	0.16	0.49
Pipe 20	210	80	0.51	0.10	0.23
Pipe 21	200	80	-0.83	0.16	0.54
Pipe 22	450	65	-1.99	0.60	7.48
Pipe 23	340	65	-0.53	0.16	0.68
Pipe 24	350	65	0.30	0.09	0.24
Pipe 25	220	65	0.41	0.12	0.43
Pipe 26	120	50	0.40	0.21	1.47
Pipe 27	200	65	-0.13	0.04	0.03
Pipe 28	160	65	1.28	0.39	3.31
Pipe 29	250	65	1.67	0.50	5.39
Pipe 30	350	50	0.28	0.14	0.77
Pipe 31	480	65	0.04	0.01	0.01
Pipe 32	560	65	0.37	0.11	0.36
Pipe 33	420	50	0.44	0.22	1.72

Table D7-22 Results of Network Link (3/3)

Link ID	Length m	Diameter mm	Flow LPS	Velocity m/s	Headloss m/km
Pipe 34	230	65	0.59	0.18	0.80
Pipe 35	235	65	0.66	0.20	0.99

Figure D7-9 Layout of D7 system for Hydraulic Calculation

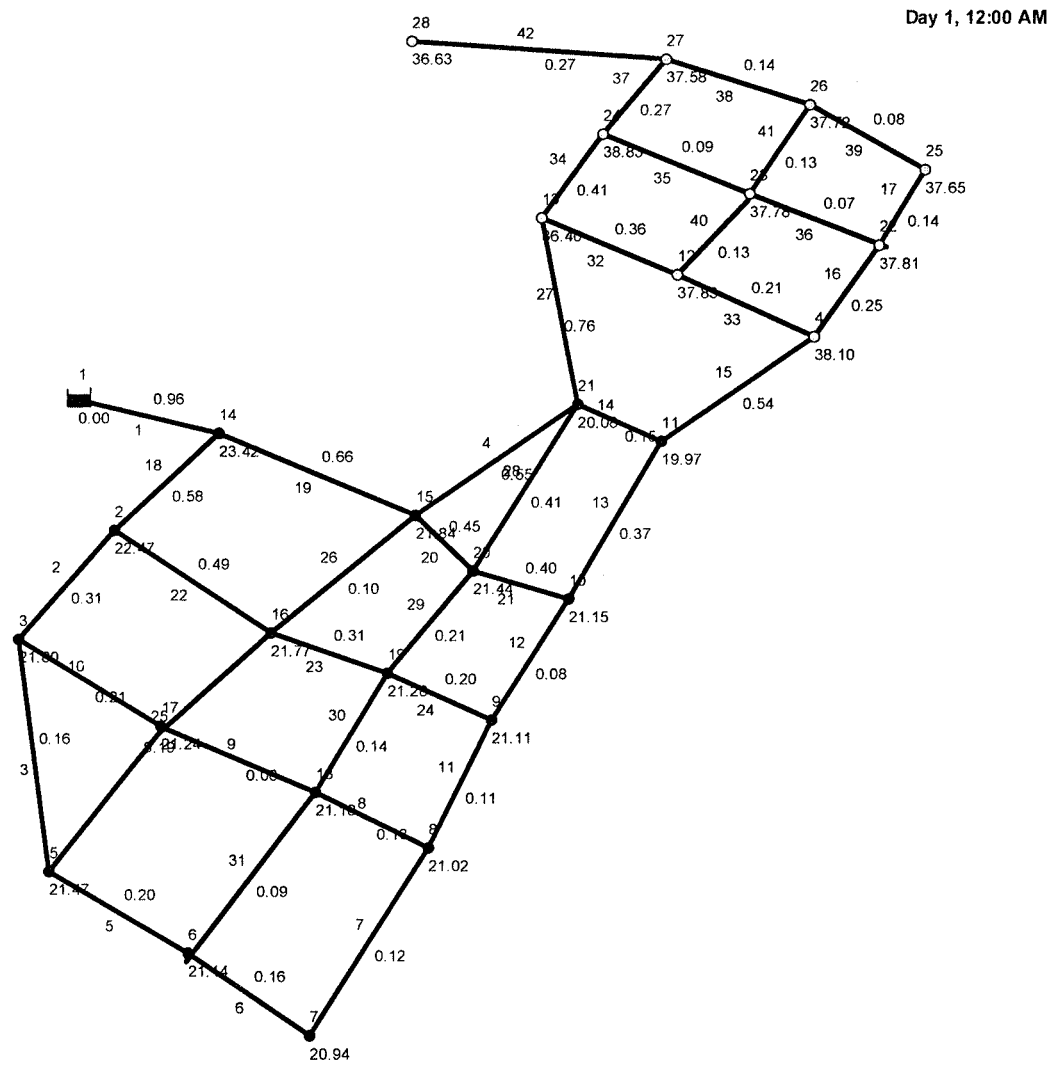
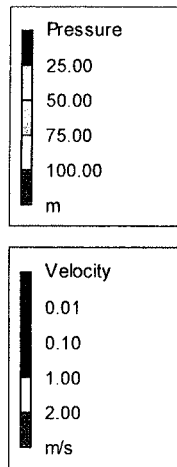


Table D7-25 Dimension of Network system (1/2)

Node ID	Elevation m	Base Demand LPS	Demand LPS	Pressure m
Junc 2	470	0.58	0.58	22.47
Junc 3	470	0.55	0.55	21.80
Junc 5	470	0.55	0.55	21.47
Junc 6	470	0.55	0.55	21.14
Junc 7	470	0.55	0.55	20.94
Junc 8	470	0.55	0.55	21.02
Junc 9	470	0.885	0.88	21.11
Junc 10	470	0.885	0.88	21.15
Junc 11	470	0.55	0.55	19.97
Junc 14	470	0.58	0.58	23.42
Junc 15	470	0.58	0.58	21.84
Junc 16	470	0.58	0.58	21.77
Junc 17	470	0.55	0.55	21.24
Junc 18	470	0.55	0.55	21.18
Junc 19	470	1.12	1.12	21.28
Junc 20	470	1.12	1.12	21.44

Table D7-25 Dimension of Network system (2/2)

Node ID	Elevation m	Base Demand LPS	Demand LPS	Pressure m
June 21	470	0.55	0.55	20.08
June 4	450	0.55	0.55	38.10
June 12	450	0.55	0.55	37.83
June 13	452	0.55	0.55	36.40
June 22	450	0.43	0.43	37.81
June 23	450	0.43	0.43	37.78
June 24	449	0.43	0.43	38.83
June 25	450	0.43	0.43	37.65
June 26	450	0.43	0.43	37.72
June 27	450	0.9	0.90	37.58
June 28	450	0.9	0.90	36.63
Resvr 1	495	#N/A	-16.88	0.00

Table D7-27 Results of Network Link (1/3)

Link ID	Length m	Diameter mm	Flow LPS	Velocity m/s	Headloss m/km
Pipe 2	390	80	1.57	0.31	1.72
Pipe 5	230	50	0.40	0.20	1.42
Pipe 6	230	50	0.30	0.16	0.89
Pipe 7	140	50	-0.25	0.12	0.61
Pipe 8	250	50	-0.25	0.13	0.62
Pipe 9	230	50	-0.16	0.08	0.27
Pipe 10	500	65	-0.71	0.21	1.11
Pipe 11	350	80	-0.55	0.11	0.26
Pipe 12	220	80	-0.42	0.08	0.16
Pipe 13	510	80	1.85	0.37	2.32
Pipe 14	190	65	-0.50	0.15	0.61
Pipe 18	230	100	4.59	0.58	4.14
Pipe 19	500	150	11.71	0.66	3.16
Pipe 20	260	150	8.03	0.45	1.56
Pipe 21	140	100	3.16	0.40	2.06
Pipe 22	180	80	2.44	0.49	3.88

Table D7-27 Results of Network Link (2/3)

Link ID	Length m	Diameter mm	Flow LPS	Velocity m/s	Headloss m/km
Pipe 23	290	80	1.56	0.31	1.70
Pipe 24	210	80	1.01	0.20	0.77
Pipe 25	330	65	-0.63	0.19	0.91
Pipe 26	260	65	-0.33	0.10	0.28
Pipe 28	470	80	-2.08	0.41	2.89
Pipe 29	250	100	1.67	0.21	0.65
Pipe 30	320	100	1.10	0.14	0.30
Pipe 31	190	80	0.46	0.09	0.19
Pipe 1	250	150	16.88	0.96	6.31
Pipe 3	350	50	0.31	0.16	0.94
Pipe 4	360	80	2.77	0.55	4.89
Pipe 15	300	65	1.80	0.54	6.22
Pipe 16	190	65	0.84	0.25	1.51
Pipe 17	220	50	0.27	0.14	0.73
Pipe 27	190	80	3.80	0.76	8.86
Pipe 32	200	65	1.18	0.36	2.84
Pipe 33	170	50	-0.42	0.21	1.58

Table D7-27 Results of Network Link (3/3)

Link ID	Length m	Diameter mm	Flow LPS	Velocity m/s	Headloss m/km
Pipe 34	200	80	2.07	0.41	2.84
Pipe 35	240	65	0.29	0.09	0.23
Pipe 36	210	50	-0.13	0.07	0.18
Pipe 37	190	80	1.35	0.27	1.30
Pipe 38	280	65	-0.45	0.14	0.50
Pipe 39	260	50	0.16	0.08	0.28
Pipe 40	200	100	1.05	0.13	0.28
Pipe 41	190	100	1.04	0.13	0.27
Pipe 42	550	65	0.90	0.27	1.73