



**... Fire Protection by Computer Design**

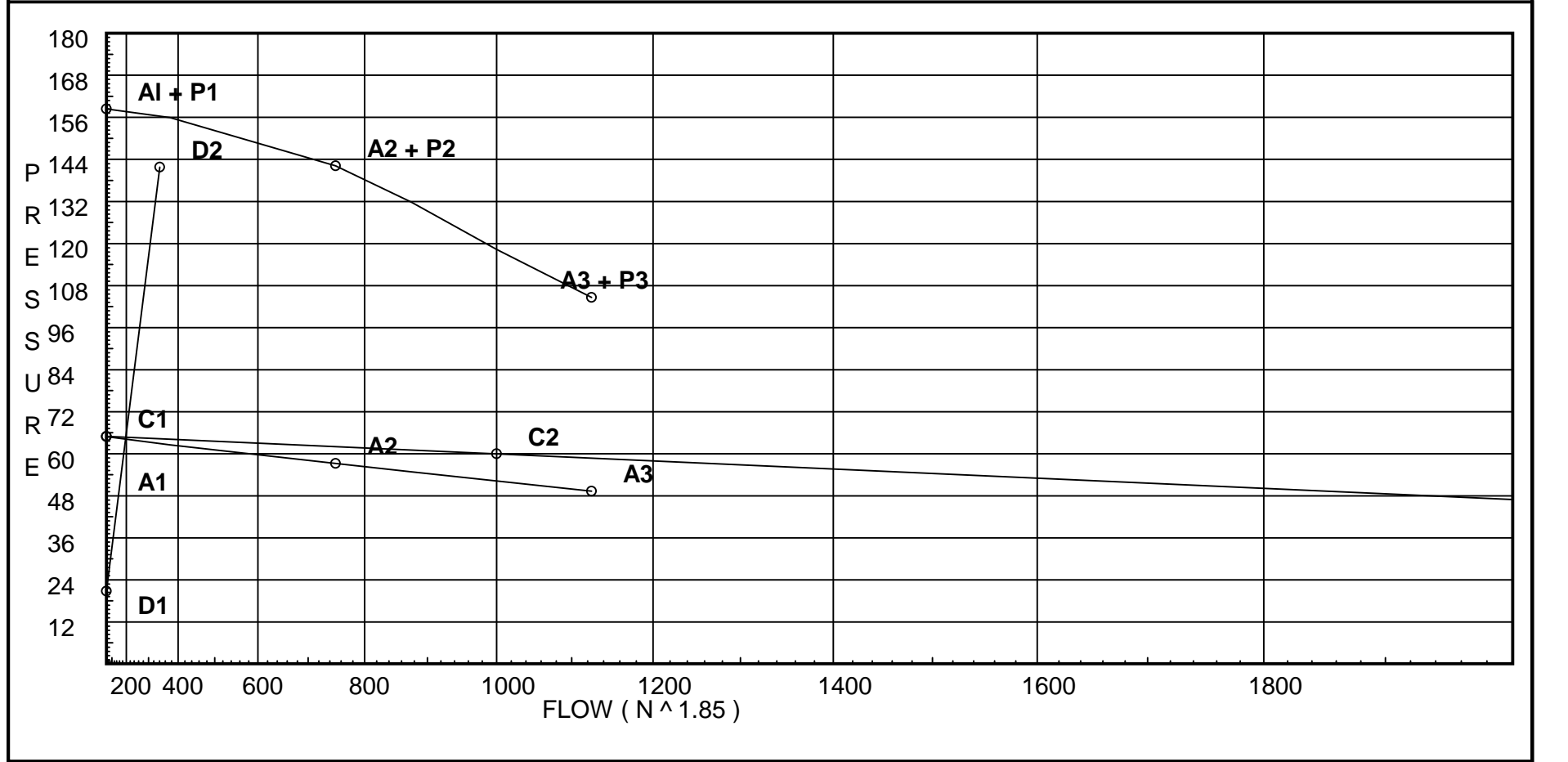
HIGH TECH FIRE PROTECTION  
PO BOX 156  
MINOT, ME 04258-156  
207-998-2551

Job Name : Mercy Hospital 3rd floor new feed for design area.  
Building :  
Location :  
System :  
Contract :  
Data File : 3rd FLOOR EX.WXF

# Water Supply Curve (C)

HIGH TECH FIRE PROTECTION  
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<b>City Water Supply:</b> C1 - Static Pressure : 65 C2 - Residual Pressure: 60 C2 - Residual Flow : 1000  <b>City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow</b> A1 - Adjusted Static: 64.894 A2 - Adj Resid : 57.205 @ 750 A3 - Adj Resid : 49.339 @ 1125	<b>Pump Data:</b> P1 - Pump Churn Pressure : 93.5 P2 - Pump Rated Pressure : 85 P2 - Pump Rated Flow : 750 P3 - Pump Pressure @ Max Flow : 55.25 P3 - Pump Max Flow : 1125 City Residual Flow @ 0 = 4000.66 City Residual Flow @ 20 = 3279.49 City Water @ 150% of Pump = 58.78	<b>Demand:</b> D1 - Elevation : 20.789 D2 - System Flow : 341.244 D2 - System Pressure : 141.771 Hose ( Adj City ) : 100 Hose ( Demand ) : D3 - System Demand : 341.244 Safety Margin : 14.546
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# Fittings Used Summary

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Fitting Legend		1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	
Abbrev.	Name																				
24																					
A	Generic Alarm Valve	0	0	0	0	0	0	7.7	21.5	0	17	17	27	29	0	0	0	0	0	0	0
B	Generic Butterfly Valve	0	0	0	0	0	0	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	0
61																					
G	Generic Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	0
13																					
S	Generic Swing Check Valve	4	5	5	7	9	11	14	16	19	22	27	32	45	55	65	76	87	98	109	0
130																					
T	90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	0
121																					
V	90' Ell Firelock #001	0	0	0	0	0	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
X	90'Tee-BranchFirelock002	0	0	0	0	0	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
Z	Generic Flow Switch	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	0
61																					

## Units Summary

Diameter Units           Inches  
 Length Units            Feet  
 Flow Units               US Gallons per Minute  
 Pressure Units          Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with \*. The fittings marked with a \* show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a \* will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
DP1	0.0	5.6	12.25	na	19.6	0.1	196	7.0
10	48.0	K = K @ EQ01	12.98	na	19.87			
11	48.0	K = K @ EQ01	12.63	na	19.6			
20	48.0	K = K @ EQ01	13.17	na	20.02			
21	48.0	K = K @ EQ01	12.82	na	19.75			
30	48.0	K = K @ EQ01	14.01	na	20.64			
31	48.0		15.1	na				
25	48.0	K = K @ EQ01	13.17	na	20.02			
35	48.0	K = K @ EQ01	14.97	na	21.34			
36	48.0	K = K @ EQ01	14.57	na	21.05			
50	48.0	K = K @ EQ01	12.73	na	19.68			
51	48.0	K = K @ EQ01	13.64	na	20.37			
52	48.0		14.38	na				
53	48.0	K = K @ EQ01	14.68	na	21.13			
54	48.0		15.61	na				
55	48.0	K = K @ EQ01	16.64	na	22.5			
40	48.0	K = K @ EQ01	16.48	na	22.39			
B1	48.0		17.3	na				
B2	48.0		17.45	na				
60	48.0	K = K @ EQ01	17.52	na	23.09			
B3	48.0		18.7	na				
65	48.0	K = K @ EQ01	19.22	na	24.18			
B4	48.0		20.51	na				
70	48.0	K = K @ EQ01	21.56	na	25.61			
B5	48.0		23.0	na				
B6	48.0		34.86	na				
B7	48.0		46.23	na				
B8	48.0		77.63	na				
B9	48.0		87.04	na				
A1	48.0		14.07	na				
A2	48.0		14.28	na				
A3	48.0		14.67	na				
A4	48.0		15.16	na				
A5	48.0		16.22	na				
A6	48.0		29.56	na				
B10	48.0		102.82	na				
A8	0.0		132.02	na				
A9	0.0		137.17	na				
A10	0.0		140.1	na				
A11	0.0		141.75	na				
PO	0.0		141.77	na				
PI	0.0		62.82	na				
BASE	0.0		63.34	na	100.0			
TEST	0.0		63.9	na				

The maximum velocity is 32.63 and it occurs in the pipe between nodes B6 and B7

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa  Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	***** Notes *****
DP1 to EQ01	19.60  19.6	1.049 120.0 0.1253	1E  0.0 0.0	2.0  2.000 3.000	1.000  2.000 0.376	12.250  0.0	K Factor = 5.60  Vel = 7.28
	0.0 19.60					12.626	K Factor = 5.52
10 to A1	19.87  19.87	1.049 120.0 0.1286	1T  0.0 0.0	5.0  5.000 8.500	3.500  5.000	12.975  0.0 1.093	K Factor @ node EQ01  Vel = 7.38
	0.0 19.87					14.068	K Factor = 5.30
11 to A1	19.60  19.6	1.049 120.0 0.1254	1T  0.0 0.0	5.0  5.000 11.500	6.500  5.000	12.626  0.0 1.442	K Factor @ node EQ01  Vel = 7.28
	0.0 19.60					14.068	K Factor = 5.23
20 to A2	20.02  20.02	1.049 120.0 0.1304	1T  0.0 0.0	5.0  5.000 8.500	3.500  5.000	13.168  0.0 1.108	K Factor @ node EQ01  Vel = 7.43
	0.0 20.02					14.276	K Factor = 5.30
21 to A2	19.75  19.75	1.049 120.0 0.1270	1T  0.0 0.0	5.0  5.000 11.500	6.500  5.000	12.815  0.0 1.461	K Factor @ node EQ01  Vel = 7.33
	0.0 19.75					14.276	K Factor = 5.23
30 to 31	20.64  20.64	1.049 120.0 0.1380	1T  0.0 0.0	5.0  5.000 7.900	2.900  5.000	14.006  0.0 1.090	K Factor @ node EQ01  Vel = 7.66
31 to A4	0.0  20.64	2.067 120.0 0.0050	1T  0.0 0.0	10.0  10.000 13.500	3.500  10.000	15.096  0.0 0.068	Vel = 1.97
	0.0 20.64					15.164	K Factor = 5.30
25 to A3	20.02  20.02	1.049 120.0 0.1303	1T  0.0 0.0	5.0  5.000 11.500	6.500  5.000	13.174  0.0 1.499	K Factor @ node EQ01  Vel = 7.43
	0.0 20.02					14.673	K Factor = 5.23
35 to A5	21.34  21.34	1.049 120.0 0.1467	1T  0.0 0.0	5.0  5.000 8.500	3.500  5.000	14.969  0.0 1.247	K Factor @ node EQ01  Vel = 7.92

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	***** Notes *****
	0.0 21.34					16.216	K Factor = 5.30
36 to A5	21.06 120.0 21.06	1.049 Pf/Ft	1T 0.0 0.0	5.0 5.000 11.500	6.500 0.0 1.646	14.570 0.0	K Factor @ node EQ01 Vel = 7.82
	0.0 21.06					16.216	K Factor = 5.23
50 to 52	19.68 120.0 19.68	1.049 Pf/Ft	1T 0.0 0.0	5.0 5.000 13.000	8.000 0.0 1.643	12.733 0.0	K Factor @ node EQ01 Vel = 7.31
	0.0 19.68					14.376	K Factor = 5.19
51 to 52	20.37 120.0 20.37	1.049 Pf/Ft	1E 0.0 0.0	2.0 2.000 5.500	3.500 0.0 0.741	13.635 0.0	K Factor @ node EQ01 Vel = 7.56
52 to 54	19.68 120.0 40.05	1.38 Pf/Ft	0.0 0.0 0.0	0.0 0.0 10.000	10.000 0.0 1.236	14.376 0.0	Vel = 8.59
	0.0 40.05					15.612	K Factor = 10.14
53 to 54	21.13 120.0 21.13	1.049 Pf/Ft	1T 0.0 0.0	5.0 5.000 6.500	1.500 0.0 0.936	14.676 0.0	K Factor @ node EQ01 Vel = 7.84
54 to 55	40.05 120.0 61.18	1.61 Pf/Ft	0.0 0.0 0.0	0.0 0.0 8.000	8.000 0.0 1.023	15.612 0.0	Vel = 9.64
55 to B2	22.50 120.0 83.68	2.067 Pf/Ft	1T 0.0 0.0	10.0 10.000 12.000	2.000 0.0 0.811	16.635 0.0	K Factor @ node EQ01 Vel = 8.00
	0.0 83.68					17.446	K Factor = 20.03
40 to B1	22.39 120.0 22.39	1.049 Pf/Ft	1T 0.0 0.0	5.0 5.000 5.100	0.100 0.0 0.818	16.480 0.0	K Factor @ node EQ01 Vel = 8.31
B1 to B2	0.0 120.0 22.39	1.38 Pf/Ft	0.0 0.0 0.0	0.0 0.0 3.500	3.500 0.0 0.148	17.298 0.0	Vel = 4.80
B2 to B3	83.68 120.0 106.07	2.067 Pf/Ft	0.0 0.0 0.0	0.0 0.0 12.000	12.000 0.0 1.258	17.446 0.0	Vel = 10.14

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	0.0 106.07					18.704	K Factor = 24.53
60 to B3	23.08	1.049 120.0	1T 5.0 0.0	2.000 5.000	17.516 0.0		K Factor @ node EQ01
B3 to B4	23.08 106.08	0.1697 2.067	0.0 0.0	7.000 12.000	1.188 18.704		Vel = 8.57
B4	129.16	0.1508	0.0	12.000	1.810		Vel = 12.35
	0.0 129.16					20.514	K Factor = 28.52
65 to B4	24.18	1.049 120.0	1T 5.0 0.0	2.000 5.000	19.219 0.0		K Factor @ node EQ01
B4 to B5	24.18 129.16	0.1850 2.067	0.0 0.0	7.000 12.000	1.295 20.514		Vel = 8.98
B5	153.34	0.2072	0.0	12.000	2.486		Vel = 14.66
	0.0 153.34					23.000	K Factor = 31.97
70 to B5	25.61	1.049 120.0	1T 5.0 0.0	2.000 5.000	21.561 0.0		K Factor @ node EQ01
B5 to B6	25.61 153.34	0.2056 2.067	0.0 2E 10.0	7.000 33.000	1.439 23.000		Vel = 9.51
B6 to B7	178.95 162.29	0.2757 2.067	0.0 1T 10.0	43.000 2.500	11.857 34.857		Vel = 17.11
B7 to B8	341.24 0.0	0.9102 2.635	0.0 1X 14.827	12.500 80.000	11.377 46.234		Vel = 32.63
B8 to B9	341.24 0.0	0.2790 2.635	0.0 3V 17.71	112.537 32.537	31.400 0.0		Vel = 20.08
B9 to B10	341.24 0.0	0.2790 2.635	0.0 1V 5.903	33.730 13.000	9.411 77.634		Vel = 20.08
B10	341.24	0.2790	1Z 8.237 1B 9.61 1T 16.474	53.541 56.541	0.0 15.775		Vel = 20.08
	0.0 341.24					102.820	K Factor = 33.65
A1 to A2	39.47	2.067 120.0	0.0 0.0	12.400 0.0	14.068 0.0		Vel = 3.77

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes *****
A2	39.76	2.067		6.500	14.276			
to		120.0		0.0	0.0			
A3	79.23	0.0611		6.500	0.397		Vel = 7.58	
A3	20.02	2.067		5.300	14.673			
to		120.0		0.0	0.0			
A4	99.25	0.0926		5.300	0.491		Vel = 9.49	
A4	20.65	2.067		8.000	15.164			
to		120.0		0.0	0.0			
A5	119.9	0.1315		8.000	1.052		Vel = 11.46	
A5	42.39	2.067	2E 10.0	38.000	16.216			
to		120.0	1T 10.0	20.000	0.0			
A6	162.29	0.2301		58.000	13.348		Vel = 15.52	
A6	0.0	2.067	1E 5.0	8.000	29.564			
to		120.0	1T 10.0	15.000	0.0			
B6	162.29	0.2301		23.000	5.293		Vel = 15.52	
	0.0							
	162.29				34.857		K Factor = 27.49	
B10	341.24	4.26	1T 26.334	260.000	102.820			
to		120.0	2E 26.334	52.668	20.789			
A8	341.24	0.0269		312.668	8.408		Vel = 7.68	
A8	0.0	4.26	2T 52.668	60.000	132.017			
to		120.0	6E 79.002	131.670	0.0			
A9	341.24	0.0269		191.670	5.154		Vel = 7.68	
A9	0.0	4.26	4E 52.668	30.000	137.171			
to		120.0	1T 26.334	79.002	0.0			
A10	341.24	0.0269		109.002	2.931		Vel = 7.68	
A10	0.0	4.26	1A 22.384	10.000	140.102			
to		120.0	1G 2.633	51.351	0.0			
A11	341.24	0.0269	1T 26.334	61.351	1.650		Vel = 7.68	
A11	0.0	6.357		5.000	141.752			
to		120.0		0.0	0.0			
PO	341.24	0.0038		5.000	0.019		Vel = 3.45	
	0.0							
	341.24				141.771		K Factor = 28.66	
System Demand Pressure					141.771			
Safety Margin					14.546			
Continuation Pressure					156.317			
Pressure @ Pump Outlet					156.317			
Pressure From Pump Curve					-93.492			
Pressure @ Pump Inlet					62.825			



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Hyd. Ref. Point	Qa  Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****  Notes  *****
PI	0.0	6.357	6E 105.616	22.000	62.825		
to		120.0	2G 7.544	113.160	0.0		
BASE	341.24	0.0038	0.0	135.160	0.518		Vel = 3.45
BASE	100.00	6.16	1E 20.084	40.000	63.343		Qa = 100
to		140.0	1T 43.037	63.121	0.0		
TEST	441.24	0.0054	0.0	103.121	0.556		Vel = 4.75
	0.0						
	441.24				63.899		K Factor = 55.20