

... Fire Protection by Computer Design

EASTERN FIRE PROTECTION
170 KITTY HAWK AVE
AUBURN, ME 04210
207-784-1507

Job Name : 465 CONGRESS TENTH FLOOR PENDENT
Drawing : 1 OF 1
Location : PORTLAND, ME
Remote Area : 1
Contract : 5057-13
Data File : 465 CONGRESS 10th floor PENDENT.WXF

Water Supply Curve C

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City Water Supply:

C1 - Static Pressure : 78
C2 - Residual Pressure: 74
C2 - Residual Flow : 1138

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow

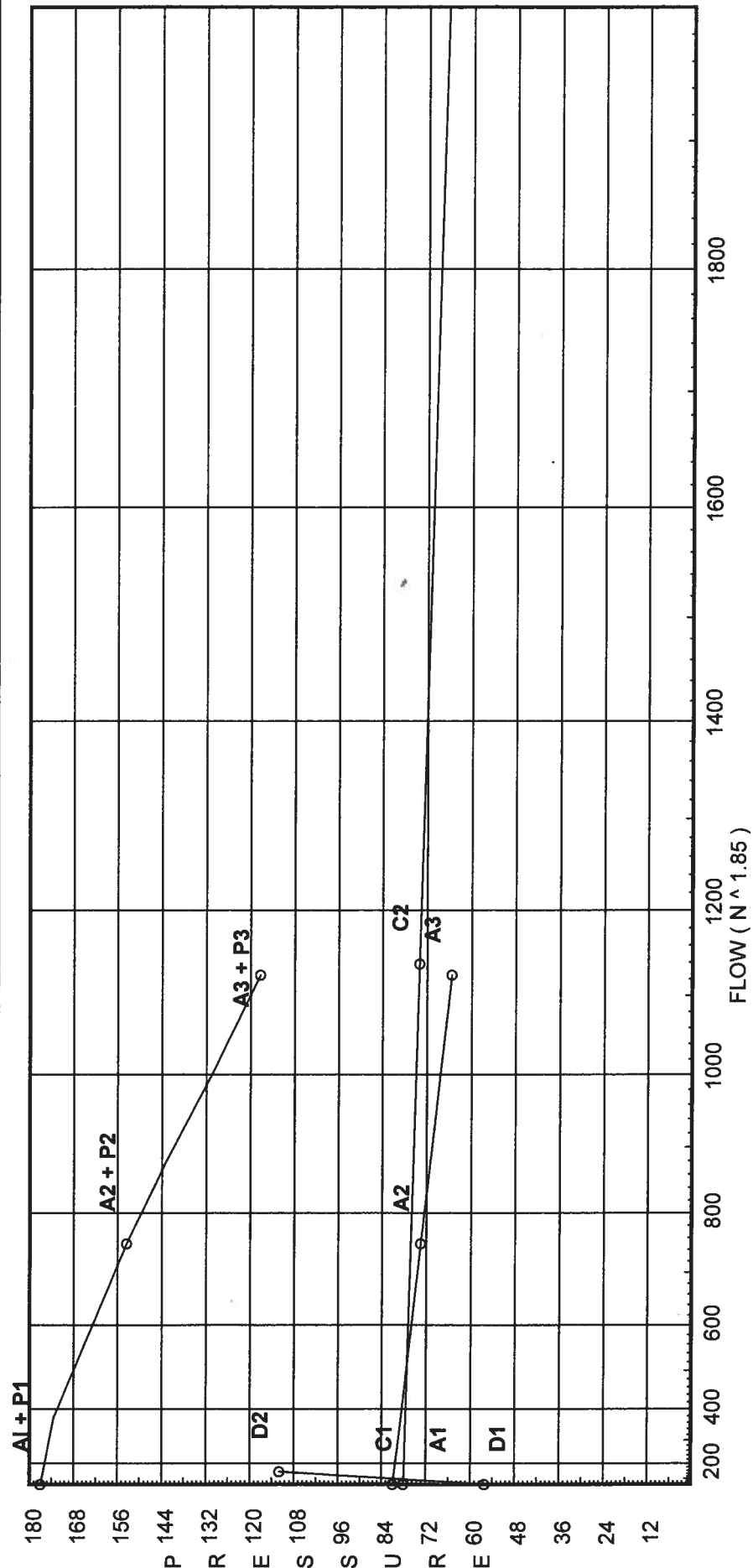
A1 - Adjusted Static: 80.987
A2 - Adj Resid : 73.464 @ 750
A3 - Adj Resid : 65.36 @ 1125

Pump Data:

P1 - Pump Churn Pressure : 96
P2 - Pump Rated Pressure : 80
P2 - Pump Rated Flow : 750
P3 - Pump Pressure @ Max Flow : 52
P3 - Pump Max Flow : 1125
City Residual Flow @ 0 = 5668.37
City Residual Flow @ 20 = 4829.57
City Water @ 150% of Pump = 74.08

Demand:

D1 - Elevation : 56.086
D2 - System Flow : 153.127
D2 - System Pressure : 111.934
Hose (Demand) : 153.127
D3 - System Demand : 100
Hose (Adj City) : 64.319
Safety Margin : 64.319



Fittings Used Summary

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Fitting Legend Abbrev. Name	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	24
B	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
L	0.5	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
S	4	5	5	7	9	11	14	16	19	22	27	32	45	55	65	76	87	98	109	130
T	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Zac	Ames 2000SS																			
	Fitting generates a Fixed Loss Based on Flow																			

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.

SUPPLY ANALYSIS

<i>Node at Source</i>	<i>Static Pressure</i>	<i>Residual Pressure</i>	<i>Flow</i>	<i>Available Pressure</i>	<i>Total Demand</i>	<i>Required Pressure</i>
PO	See Information on Pump Curve			176.253	153.13	111.934
TEST	78.0	74	1138.0	77.752	253.13	77.752

NODE ANALYSIS

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
LIN	100.0	5.6	8.16	16.0	
LIN1	100.0	5.6	11.51	19.0	
1	229.5	5.4	8.77	16.0	K=K @ DRP
2	229.5	5.4	9.3	16.48	K=K @ DRP
3	229.5	5.4	11.62	18.42	K=K @ DRP
A	229.5		12.1		
4	229.5	5.4	15.76	21.45	K=K @ DRP
5	229.5	5.4	23.36	26.12	K=K @ DRP
C	229.5		26.6		
B	229.5		26.6		
M	229.5		31.0		
JJ	229.5		38.07		
6	229.5	5.54	24.69	27.54	K=K @ DRP1
6A	229.5		26.64		
7	229.5	5.54	23.93	27.12	K=K @ DRP1
D	229.5		26.9		
E	229.5		30.11		
F	229.5		35.19		
G	229.5		40.8		
H	229.5		42.66		
FCV	227.25		48.13		
J	129.667		91.16		
K	107.167		101.88		
L	107.167		102.1		
BFP	93.0		108.32		
PO	93.0		111.93		
PI	93.0		80.51		
BASE	93.0		80.7		
TEST	100.0		77.75	100.0	

Final Calculations - Hazen-Williams - 2007

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
LIN to DRP	100 100	5.60	16.00 16.0	1 1.049	1T	5.0 0.0 0.0	2.000 5.000 7.000	120 0.0861	8.163 0.0 0.603			Vel = 5.94
DRP			0.0 16.00						8.766			K Factor = 5.40
LIN1 to DRP1	100 100	5.60	19.00 19.0	1 1.049		0.0 0.0 0.0	2.000 0.0 2.000	120 0.1180	11.512 0.0 0.236			Vel = 7.05
DRP1			0.0 19.00						11.748			K Factor = 5.54
1 to 2	229.500 229.500	5.4	16.00 16.0	1 1.101	1E	3.825 0.0 0.0	8.000 3.825 11.825	150 0.0451	8.766 0.0 0.533			K = K @ DRP Vel = 5.39
2 to A	229.500 229.500	5.4	16.48 32.48	1 1.101	1T	9.563 0.0 0.0	7.250 9.562 16.812	150 0.1668	9.299 0.0 2.805			K = K @ DRP Vel = 10.95
A			0.0 32.48						12.104			K Factor = 9.34
3 to A	229.500 229.500	5.4	18.42 18.42	1 1.101	1E	3.825 0.0 0.0	4.458 3.825 8.283	150 0.0584	11.620 0.0 0.484			K = K @ DRP Vel = 6.21
A to 4	229.500 229.500		32.48 50.9	1 1.101		0.0 0.0 0.0	9.542 0.0 9.542	150 0.3830	12.104 0.0 3.655			Vel = 17.15
4 to B	229.500 229.500	5.4	21.45 72.35	1 1.101	1T	9.563 0.0 0.0	5.208 9.562 14.770	150 0.7343	15.759 0.0 10.845			K = K @ DRP Vel = 24.38
B			0.0 72.35						26.604			K Factor = 14.03
5 to C	229.500 229.500	5.4	26.12 26.12	1 1.101	2E 1T	7.65 9.563 0.0	11.917 17.212 29.129	150 0.1115	23.355 0.0 3.247			K = K @ DRP Vel = 8.80
C to B	229.500 229.500		-14.17 11.95	1.5 1.598		0.0 0.0 0.0	0.500 0.0 0.500	150 0.0040	26.602 0.0 0.002			Vel = 1.91
B to M	229.500 229.500		72.36 84.31	1.5 1.598		0.0 0.0 0.0	27.708 0.0 27.708	150 0.1588	26.604 0.0 4.400			Vel = 13.49
M to JJ	229.500 229.500		0.0 84.31	1.5 1.598	1T	11.656 0.0 0.0	32.875 11.656 44.531	150 0.1588	31.004 0.0 7.070			Vel = 13.49
JJ to H	229.500 229.500		0.0 84.31	1.5 1.598	1T	11.656 0.0 0.0	17.208 11.656 28.864	150 0.1588	38.074 0.0 4.583			Vel = 13.49
H			0.0 84.31						42.657			K Factor = 12.91
C to 6A	229.500 229.500		14.16 14.16	1.5 1.598		0.0 0.0 0.0	6.792 0.0 6.792	150 0.0059	26.602 0.0 0.040			Vel = 2.27

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
			0.0 14.16						26.642		K Factor = 2.74	
6 to 6A	229.500 229.500	5.54	27.54	1	1E 1T	3.825 9.563	2.500 13.387	150	24.688 0.0		K = K @ DRP1	
			27.54	1.101		0.0	15.887	0.1230	1.954		Vel = 9.28	
6A to D	229.500 229.500		14.16	1.5		0.0 0.0	6.000 0.0	150	26.642 0.0			
			41.7	1.598		0.0	6.000	0.0432	0.259		Vel = 6.67	
			0.0 41.70						26.901		K Factor = 8.04	
7 to D	229.500 229.500	5.54	27.12	1	1E 1T	3.825 9.563	11.500 13.387	150	23.927 0.0		K = K @ DRP1	
			27.12	1.101		0.0	24.887	0.1195	2.974		Vel = 9.14	
D to E	229.500 229.500		41.70	1.5	1T	11.656 0.0	17.792 11.656	150	26.901 0.0			
			68.82	1.598		0.0	29.448	0.1091	3.212		Vel = 11.01	
E to F	229.500 229.500		0.0	1.5	1T	11.656 0.0	34.875 11.656	150	30.113 0.0			
			68.82	1.598		0.0	46.531	0.1091	5.075		Vel = 11.01	
F to G	229.500 229.500		0.0	1.5	1E 1T	5.828 11.656	34.000 17.484	150	35.188 0.0			
			68.82	1.598		0.0	51.484	0.1091	5.616		Vel = 11.01	
G to H	229.500 229.500		0.0	1.5	1T	11.656 0.0	5.333 11.656	150	40.804 0.0			
			68.82	1.598		0.0	16.989	0.1091	1.853		Vel = 11.01	
H to FCV	229.500 227.250		84.31	2.5	1S 1T	19.22 16.474	18.792 52.168	120	42.657 0.974			
			153.13	2.635	2E	16.474	70.960	0.0634	4.496		Vel = 9.01	
FCV to J	227.250 129.667		0.0	4	1T	26.334 0.0	99.834 26.334	120	48.127 42.263			
			153.13	4.26		0.0	126.168	0.0061	0.771		Vel = 3.45	
J to K	129.667 107.167		0.0	4	8E	105.337 0.0	54.250 105.337	120	91.161 9.745			
			153.13	4.26		0.0	159.587	0.0061	0.974		Vel = 3.45	
K to L	107.167 107.167		0.0	4	1E	13.167 0.0	22.500 13.167	120	101.880 0.0			
			153.13	4.26		0.0	35.667	0.0061	0.218		Vel = 3.45	
L to BFP	107.167 93		0.0	6	3E	52.808 0.0	41.250 52.808	120	102.098 6.136			
			153.13	6.357		0.0	94.058	0.0009	0.081		Vel = 1.55	
BFP to PO	93 93		0.0	6	1Zac 1S	0.0 40.235	10.000 52.808	120	108.315 3.564		** Fixed Loss = 3.564	
			153.13	6.357	1B	12.573	62.808	0.0009	0.055		Vel = 1.55	
			0.0 153.13						111.934		K Factor = 14.47	
System Demand Pressure									111.934			
Safety Margin									64.319			
Continuation Pressure									176.253			

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
Pressure @ Pump Outlet									176.253			
Pressure From Pump Curve									-95.746			
Pressure @ Pump Inlet									80.507			
PI	93		0.0	6	1G	3.772	74.958	120	80.507			
to					1T	37.72	147.108		0.0			
BASE	93		153.13	6.357	6E	105.616	222.066	0.0009	0.193	Vel =	1.55	
BASE	93		0.0	6	1L	12.911	50.000	140	80.700			
to					1G	4.304	60.252		-3.032			
TEST	100		153.13	6.16	1T	43.037	110.252	0.0008	0.084	Vel =	1.65	
			100.00							Qa =	100.00	
TEST			253.13						77.752	K Factor =	28.71	