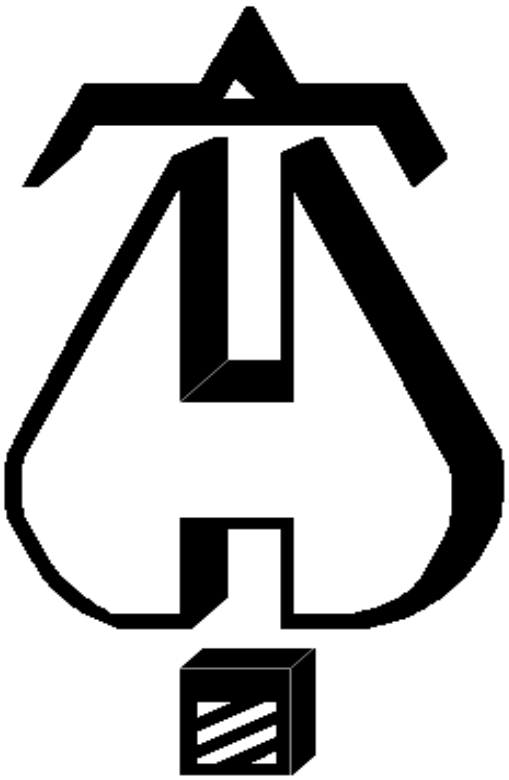


. . . Fire Protection by Computer Design

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

Job Name	:	465 CONGRESS THIRD FLOOR
Drawing	:	1 OF 1
Location	:	PORTLAND, ME
Remote Area	:	1
Contract	:	5019-13
Data File	:	465 CONGRESS 3rd floor withOUT pump 1.5 MAIN.WXF

HYDRAULIC CALCULATIONS
for

Project name: 465 CONGRESS THIRD FLOOR
Location: PORTLAND, ME
Drawing no: 1 OF 1
Date: 4/17/13

Design

Remote area number: 1
Remote area location: OFFICE SPACE
Occupancy classification: LIGHT HAZARD
Density: .1 - Gpm/SqFt
Area of application: 980 - SqFt
Coverage per sprinkler: 150/210 - SqFt
Type of sprinklers calculated: TYCO TY-FRB PENDENT K=5.6 200
No. of sprinklers calculated: 8
In-rack demand: - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 166.38 - GPM @ 70.397 - Psi
Type of system: WET CITY SUPPLY
Volume of dry or preaction system: - Gal

Water supply information

Date: 9/13/2011
Location: CONGRESS ST.
Source: PORTLAND WATER DISTRICT

Name of contractor: EASTERN FIRE PROTECTION
Address: 170 KITTY HAWK AVE / / AUBURN, ME 04210
Phone number: 207-784-1507
Name of designer: ROBERT PETERS
Authority having jurisdiction: STATE FIRE MARSHAL
Notes: (Include peaking information or gridded systems here.)
AREA REDUCTION TAKEN PER NFPA 13 2010 EDITION SECTION 11.2.3.2.3.1

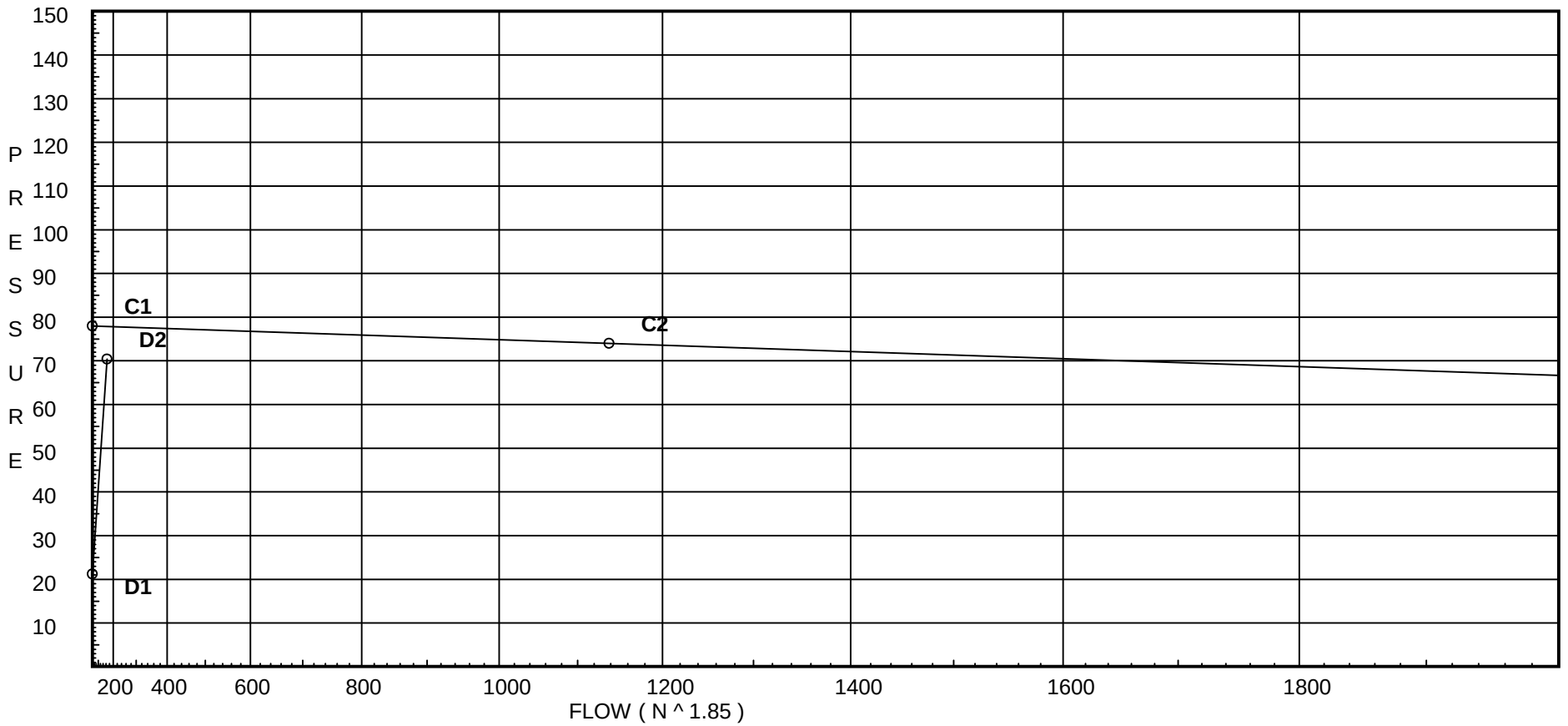
Water Supply Curve C

EASTERN FIRE PROTECTION
465 CONGRESS THIRD FLOOR

Date 4/17/13

City Water Supply:
- C1 - Static Pressure : 78
- C2 - Residual Pressure: 74
- C2 - Residual Flow : 1138

Demand:
- D1 - Elevation : 21.222
- D2 - System Flow : 166.372
- D2 - System Pressure : 70.397
- Hose (Demand) : _____
- D3 - System Demand : 166.372
- Safety Margin : 7.489



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
L	NFPA 13 Long Turn Elbow	0.5	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
S	NFPA 13 Swing Check Valve	4	5	5	7	9	11	14	16	19	22	27	32	45	55	65	76	87	98	109	130
T	NFPA 13 90' Flow thru Tee	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

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
TEST	78.0	74	1138.0	77.886	166.37	70.397

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
LIN	100.0	5.6	14.06	21.0	
LIN2	100.0	5.6	7.0	14.82	
1	149.0	5.44	11.47	18.43	K=K @ DRP1
2	149.0	5.44	12.04	18.89	K=K @ DRP1
2A	149.0		14.32		
3	149.0	5.45	16.25	21.97	K=K @ DRP
4	149.0	5.45	17.39	22.73	K=K @ DRP
5	149.0	5.44	14.09	20.43	K=K @ DRP1
6	149.0	5.44	15.18	21.2	K=K @ DRP1
7	149.0	5.45	14.85	21.0	K=K @ DRP
7A	149.0		15.74		
8	149.0	5.45	15.9	21.73	K=K @ DRP
#	100.0		36.07		
B	149.0		18.14		
A	149.0		18.18		
C	149.0		21.52		
I	149.0		34.3		
D	149.0		20.76		
E	149.0		20.91		
F	149.0		23.9		
G	149.0		33.34		
H	146.833		38.16		
FCV	146.833		44.06		
J	129.667		51.8		
K	107.167		62.68		
L	107.167		62.93		
BFP	93.0		69.65		
BASE	93.0		73.33		
TEST	100.0		70.4		

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	100	5.60	21.00	1	1T	9.563	1.000	150	14.062	
to						0.0	9.562		0.0	
DRP	100		21.0	1.101		0.0	10.562	0.0745	0.787	Vel = 7.08
			0.0							
DRP			21.00						14.849	K Factor = 5.45
LIN2	100	5.60	14.82	1	1T	9.563	1.000	150	7.000	
to						0.0	9.562		0.0	
DRP1	100		14.82	1.101		0.0	10.562	0.0391	0.413	Vel = 4.99
			0.0							
DRP1			14.82						7.413	K Factor = 5.44
1	149	5.44	18.43	1		0.0	9.875	150	11.467	K = K @ DRP1
to						0.0	0.0		0.0	
2	149		18.43	1.101		0.0	9.875	0.0584	0.577	Vel = 6.21
2	149	5.44	18.88	1	1T	9.563	1.000	150	12.044	K = K @ DRP1
to						0.0	9.562		0.0	
2A	149		37.31	1.101		0.0	10.562	0.2157	2.278	Vel = 12.57
2A	149		0.0	1	1T	9.563	8.333	150	14.322	
to						0.0	9.562		0.0	
A	149		37.31	1.101		0.0	17.895	0.2157	3.860	Vel = 12.57
			0.0							
A			37.31						18.182	K Factor = 8.75
3	149	5.45	21.97	1		0.0	14.083	150	16.253	K = K @ DRP
to						0.0	0.0		0.0	
4	149		21.97	1.101		0.0	14.083	0.0809	1.140	Vel = 7.40
4	149	5.45	22.73	1	1T	9.563	4.125	150	17.393	K = K @ DRP
to						0.0	9.562		0.0	
C	149		44.7	1.101		0.0	13.687	0.3012	4.123	Vel = 15.06
			0.0							
C			44.70						21.516	K Factor = 9.64
5	149	5.44	20.43	1	2E	7.65	7.667	150	14.092	K = K @ DRP1
to						0.0	7.650		0.0	
6	149		20.43	1.101		0.0	15.317	0.0708	1.084	Vel = 6.88
6	149	5.44	21.20	1	1T	9.563	1.667	150	15.176	K = K @ DRP1
to						0.0	9.562		0.0	
B	149		41.63	1.101		0.0	11.229	0.2640	2.965	Vel = 14.03
			0.0							
B			41.63						18.141	K Factor = 9.77
7	149	5.45	21.00	1	1T	9.563	2.417	150	14.849	K = K @ DRP
to						0.0	9.562		0.0	
7A	149		21.0	1.101		0.0	11.979	0.0745	0.892	Vel = 7.08
7A	149		0.0	1		0.0	2.167	150	15.741	
to						0.0	0.0		0.0	
8	149		21.0	1.101		0.0	2.167	0.0743	0.161	Vel = 7.08
8	149	5.45	21.73	1	1T	9.563	8.500	150	15.902	K = K @ DRP
to						0.0	9.562		0.0	
E	149		42.73	1.101		0.0	18.062	0.2772	5.007	Vel = 14.40
			0.0							
E			42.73						20.909	K Factor = 9.34

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 ******
B	149		41.63	1.5		0.0	0.960	150	18.141	
to						0.0	0.0		0.0	
A	149		41.63	1.598		0.0	0.960	0.0427	0.041	Vel = 6.66
A	149		37.31	1.5	1T	11.656	6.667	150	18.182	
to						0.0	11.656		0.0	
D	149		78.94	1.598		0.0	18.323	0.1406	2.576	Vel = 12.63
			0.0							
D			78.94						20.758	K Factor = 17.33
C	149		-46.19	1.5	1T	11.656	2.875	150	21.516	
to						0.0	11.656		0.0	
D	149		-46.19	1.598		0.0	14.531	-0.0522	-0.758	Vel = 7.39
			0.0							
D			-46.19						20.758	K Factor = -10.14
C	149		90.89	1.5	1T	11.656	58.417	150	21.516	
to						0.0	11.656		0.0	
I	149		90.89	1.598		0.0	70.073	0.1825	12.787	Vel = 14.54
I	149		0.0	1.5	1T	11.656	4.333	150	34.303	
to						0.0	11.656		0.939	
H	146.833		90.89	1.598		0.0	15.989	0.1825	2.918	Vel = 14.54
			0.0							
H			90.89						38.160	K Factor = 14.71
D	149		32.75	1.5		0.0	5.458	150	20.758	
to						0.0	0.0		0.0	
E	149		32.75	1.598		0.0	5.458	0.0277	0.151	Vel = 5.24
E	149		42.73	1.5	1E	5.828	17.250	150	20.909	
to						0.0	5.828		0.0	
F	149		75.48	1.598		0.0	23.078	0.1294	2.986	Vel = 12.07
F	149		0.0	1.5	1T	11.656	61.292	150	23.895	
to						0.0	11.656		0.0	
G	149		75.48	1.598		0.0	72.948	0.1294	9.440	Vel = 12.07
G	149		0.0	1.5	1T	11.656	18.375	150	33.335	
to						0.0	11.656		0.939	
H	146.833		75.48	1.598		0.0	30.031	0.1294	3.886	Vel = 12.07
			0.0							
H			75.48						38.160	K Factor = 12.22
H	146.833		166.37	2.5	2E	16.474	18.042	120	38.160	
to					1S	19.22	61.778		0.0	
FCV	146.833		166.37	2.635	1T	16.474	79.820	0.0739	5.896	Vel = 9.79
					1B	9.61				
FCV	146.833		0.0	4	1T	26.334	17.167	120	44.056	
to						0.0	26.334		7.435	
J	129.667		166.37	4.26		0.0	43.501	0.0071	0.309	Vel = 3.74
J	129.667		0.0	4	8E	105.337	54.250	120	51.800	
to						0.0	105.337		9.745	
K	107.167		166.37	4.26		0.0	159.587	0.0071	1.136	Vel = 3.74
K	107.167		0.0	4	1E	13.167	22.500	120	62.681	
to						0.0	13.167		0.0	
L	107.167		166.37	4.26		0.0	35.667	0.0071	0.254	Vel = 3.74

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 ******
L	107.167		0.0	4	3E	39.501	41.250	120	62.935	
to						0.0	39.501		6.136	
BFP	93		166.37	4.26		0.0	80.751	0.0071	0.574	Vel = 3.74
BFP	93		0.0	6	1Zac	0.0	82.875	120	69.645	
to					1S	40.235	191.115		3.408	* * Fixed Loss = 3.408
BASE	93		166.37	6.357	2G	7.544	273.990	0.0010	0.278	Vel = 1.68
					1T	37.72				
					6E	105.616				
BASE	93		0.0	6	1L	12.911	50.000	140	73.331	
to					1G	4.304	60.252		-3.032	
TEST	100		166.37	6.16	1T	43.037	110.252	0.0009	0.098	Vel = 1.79
			0.0							
TEST			166.37						70.397	K Factor = 19.83