



... Fire Protection by Computer Design

HIGH TECH FIRE PROTECTION
84 HACKETT MILLS ROAD
P.O. BOX 156
POLAND, ME 04274
207-998-2551

Job Name : 17 Chestnut Street 2nd floor updated water info
Drawing : FP-01
Location : 2nd Floor Residential
Remote Area : #2
Contract :
Data File : 2nd floor calc.WXF

HYDRAULIC CALCULATIONS
for

Project name: 17 Chestnut Street 2nd floor
Location: 2nd Floor Residential
Drawing no: FP-01
Date: 7-7-16

Design

Remote area number: #2
Remote area location: 2nd Floor Residential
Occupancy classification: Light Hazard
Density: .1 - Gpm/SqFt
Area of application: 700 - SqFt
Coverage per sprinkler: 256 - SqFt
Type of sprinklers calculated: Extended Coverage HSW and Standard HSW
No. of sprinklers calculated: 5
In-rack demand: n/a - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 231 - GPM @ 68 - Psi
Type of system: Wet NFPA 13
Volume of dry or preaction system: n/a - Gal

Water supply information

Date: 7-06-16
Location: Corner of Cumberland and Chestnut Street
Source: Portland Water District

Name of contractor: HIGH TECH FIRE PROTECTION
Address: 84 HACKETT MILLS ROAD / P.O. BOX 156 / POLAND, ME 04274
Phone number: 207-998-2551
Name of designer: Ed Poulin
Authority having jurisdiction: State of Maine / City of Portland
Notes: (Include peaking information or gridded systems here.)

Water Supply Curve (C)

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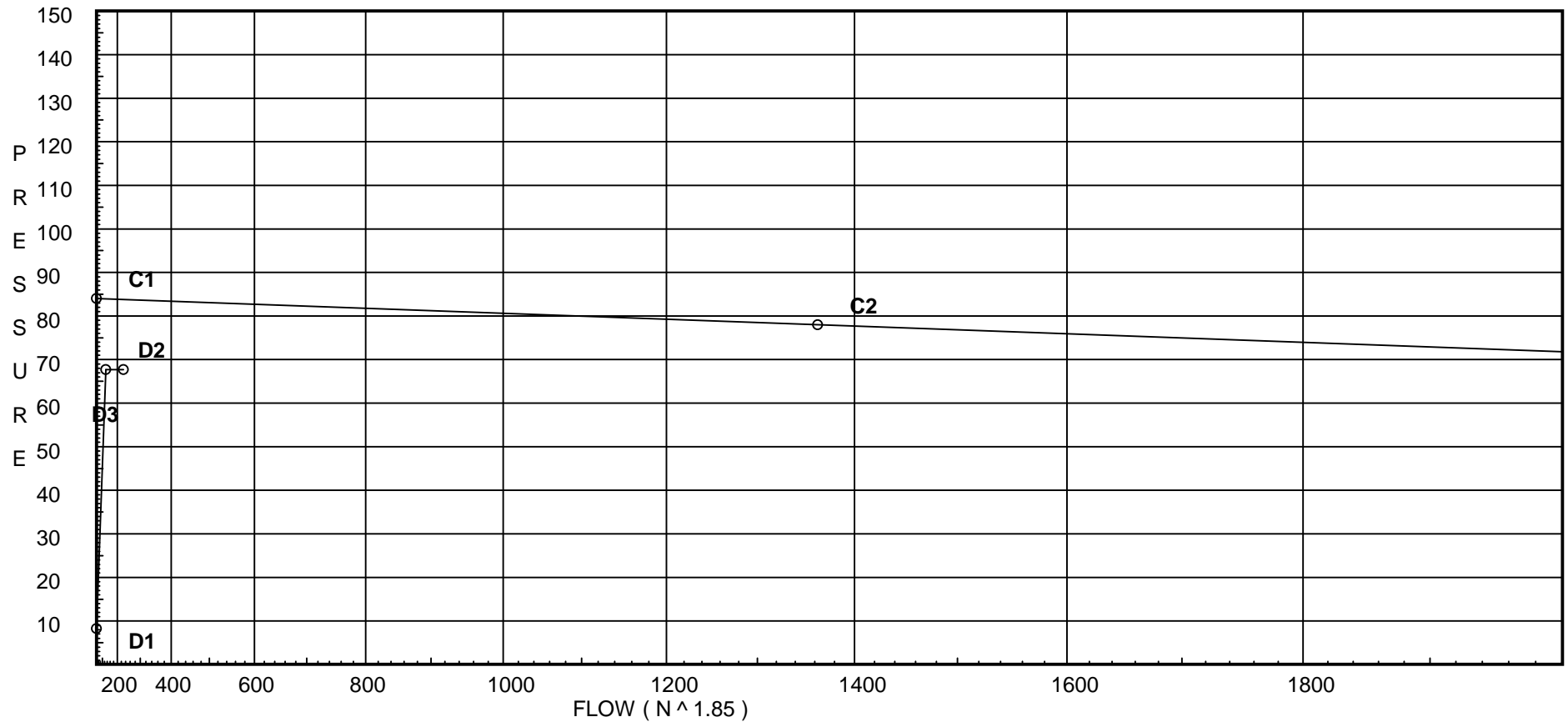
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City Water Supply:

C1 - Static Pressure : 84
C2 - Residual Pressure: 78
C2 - Residual Flow : 1363

Demand:

D1 - Elevation : 8.229
D2 - System Flow : 130.205
D2 - System Pressure : 67.728
Hose (Demand) : 100
D3 - System Demand : 230.205
Safety Margin : 16.049



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
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
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
G	NFPA 13 Gate Valve	0	0	0	0	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
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
V	90' Ell Firelock #001	0	0	0	0	3.5	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	8.5	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
Zib	Wilkins 350A	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.

Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
200	20.0	5.6	12.25	na	19.6	0.1	196	7.0
201	20.0	8	12.95	na	28.78	0.1	256	10.6
BA	20.0		12.97	na				
205	20.0	5.6	15.14	na	21.79	0.1	168	7.0
BB	20.0		17.31	na				
210	20.0	5.6	17.72	na	23.58	0.1	196	7.0
BC	20.0		18.74	na				
215	20.0	8	20.77	na	36.46	0.1	256	10.6
BD	20.0		21.02	na				
BE	20.0		28.13	na				
BF	20.0		35.11	na				
BG	18.0		38.77	na				
BH	18.0		45.54	na				
AG	0.0		54.55	na				
TOR	0.0		55.32	na				
BOR	0.0		58.74	na				
BASE	-5.0		69.69	na				
H1	-5.0		69.91	na				
H2	-1.0		68.4	na	100.0			
TEST	1.0		67.73	na				

The maximum velocity is 20.52 and it occurs in the pipe between nodes 215 and BD

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	*****
200 to BA	19.60 19.6 0.0 19.60	1.049 120.0 0.1254	1T	5.0 0.0 0.0	0.750 5.000 5.750	12.250 0.0 0.721			K Factor = 5.60 Vel = 7.28	
						12.971			K Factor = 5.44	
201 to BA	28.78 28.78	1.049 120.0 0.2600		0.0 0.0 0.0	0.100 0.0 0.100	12.945 0.0 0.026			K Factor = 8.00 Vel = 10.68	
BA to BB	19.60 48.38 0.0 48.38	1.049 120.0 0.6671		0.0 0.0 0.0	6.500 0.0 6.500	12.971 0.0 4.336			Vel = 17.96	
						17.307			K Factor = 11.63	
205 to BB	21.79 21.79	1.049 120.0 0.1525	1E 1T	2.0 5.0 0.0	7.200 7.000 14.200	15.141 0.0 2.166			K Factor = 5.60 Vel = 8.09	
BB to BC	48.38 70.17 0.0 70.17	1.38 120.0 0.3490		0.0 0.0 0.0	4.100 0.0 4.100	17.307 0.0 1.431			Vel = 15.05	
						18.738			K Factor = 16.21	
210 to BC	23.58 23.58	1.049 120.0 0.1765	1T	5.0 0.0 0.0	0.750 5.000 5.750	17.723 0.0 1.015			K Factor = 5.60 Vel = 8.75	
BC to 215	70.17 93.75	1.38 120.0 0.5965		0.0 0.0 0.0	3.400 0.0 3.400	18.738 0.0 2.028			Vel = 20.11	
215 to BD	36.46 130.21	1.61 120.0 0.5160		0.0 0.0 0.0	0.500 0.0 0.500	20.766 0.0 0.258			K Factor = 8.00 Vel = 20.52	
BD to BE	0.0 130.21	1.61 120.0 0.5170	1T	8.0 0.0 0.0	5.750 8.000 13.750	21.024 0.0 7.109			Vel = 20.52	
BE to BF	0.0 130.21	1.61 120.0 0.5170	1V	3.5 0.0 0.0	10.000 3.500 13.500	28.133 0.0 6.979			Vel = 20.52	
BF to BG	0.0 130.21	1.61 120.0 0.5170	1V	3.5 0.0 0.0	1.900 3.500 5.400	35.112 0.866 2.792			Vel = 20.52	
BG to BH	0.0 130.21	1.61 120.0 0.5169	1T	8.0 0.0 0.0	5.100 8.000 13.100	38.770 0.0 6.772			Vel = 20.52	
BH to AG	0.0 130.21	2.635 120.0 0.0469	1V	5.903 0.0 0.0	20.000 5.903 25.903	45.542 7.796 1.216			Vel = 7.66	
AG to TOR	0.0 130.21	2.635 120.0 0.0469	1X	14.827 0.0 0.0	1.500 14.827 16.327	54.554 0.0 0.766			Vel = 7.66	

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	*****
TOR to BOR	0.0 130.21	2.635 120.0 0.0470	1Fsp 1V	0.0 5.903 0.0	3.000 5.903 8.903	55.320 3.000 0.418		* Fixed loss = 3 Vel = 7.66	
BOR to BASE	0.0 130.21	2.635 120.0 0.0470	1E 1Zib	8.237 0.0 0.0	1.000 8.237 9.237	58.738 10.523 0.434		* Fixed loss = 8.358 Vel = 7.66	
BASE to H1	0.0 130.21	4.1 140.0 0.0041	1G 1T	2.907 29.067 0.0	20.000 31.974 51.974	69.695 0.0 0.213		Vel = 3.16	
H1 to H2	0.0 130.21	6.14 100.0 0.0011	1T	22.732 0.0 0.0	185.000 22.732 207.732	69.908 -1.732 0.221		Vel = 1.41	
H2 to TEST	99.99 230.2	8.23 100.0 0.0007	1G 1E 1T	3.316 14.92 29.011	220.000 47.246 267.246	68.397 -0.866 0.197		Qa = 100 Vel = 1.39	
	0.0 230.20					67.728		K Factor = 27.97	