



... 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 : 3RD FLOOR CORRIDOR 409
Drawing : FP-02
Location : NATHAN CLIFFORD RESIDENCE
Remote Area : #2
Contract : 020714-1
Data File : 3rd floor Corridor.WXF

HYDRAULIC CALCULATIONS
for

Project name: 3RD FLOOR CORRIDOR
Location: NATHAN CLIFFORD RESIDENCE
Drawing no: FP-02
Date: 4/29/14

Design

Remote area number: #2
Remote area location: 3RD FLOOR CORRIDOR
Occupancy classification: RESIDENTIAL
Density: .05 - Gpm/SqFt
Area of application: 4 - SqFt
Coverage per sprinkler: 256 - SqFt
Type of sprinklers calculated: RESIDENTIAL PENDENT
No. of sprinklers calculated: 4
In-rack demand: N/A - GPM
Hose streams: 0 - GPM
Total water required (including hose streams): 53 - GPM @ 44 - Psi
Type of system: WET NFPA 13R
Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 4/30/14
Location: TEST HYDRANT ON FALMOUTH ST. IN FRONT OF BUILDING
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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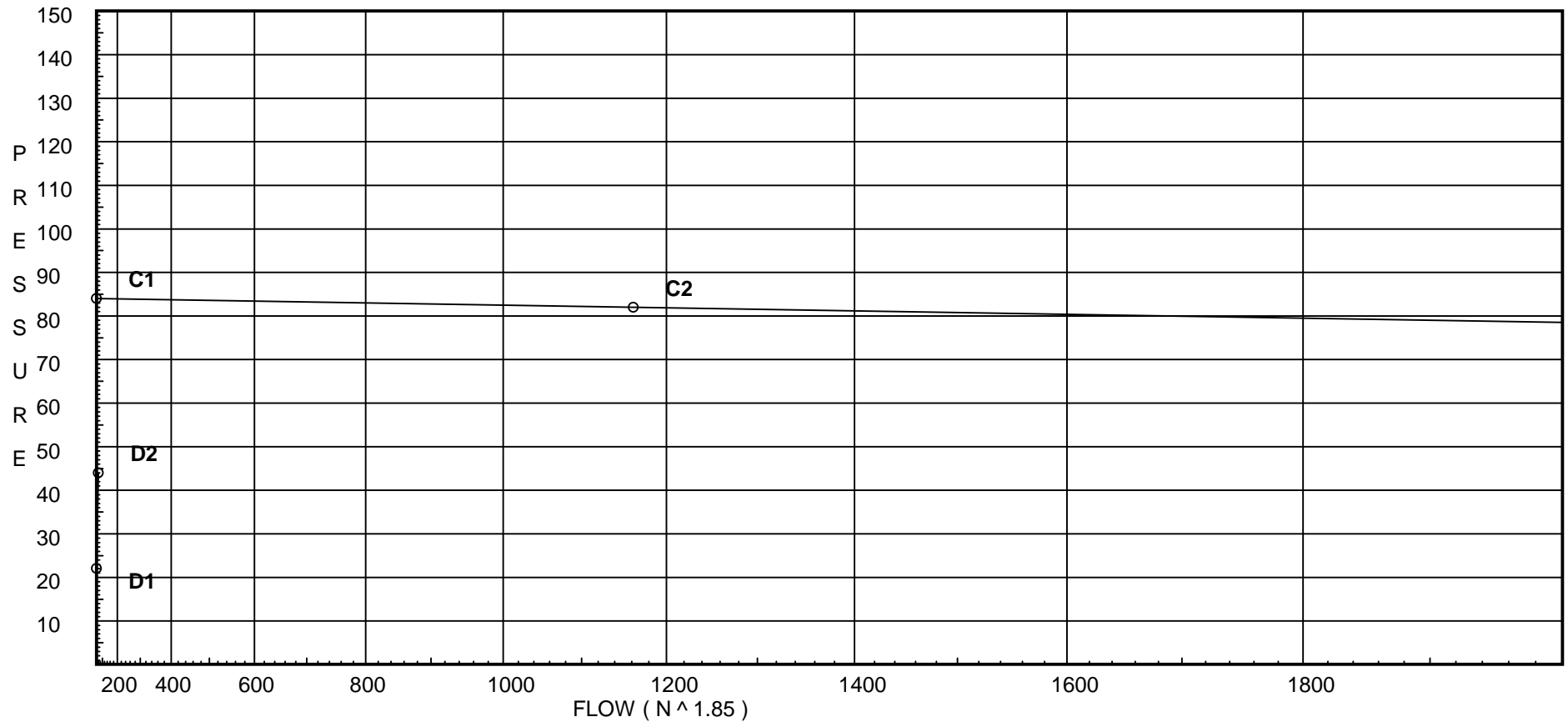
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City Water Supply:

C1 - Static Pressure : 84
C2 - Residual Pressure: 82
C2 - Residual Flow : 1162

Demand:

D1 - Elevation : 22.088
D2 - System Flow : 52.421
D2 - System Pressure : 43.977
Hose (Demand) : _____
D3 - System Demand : 52.421
Safety Margin : 40.016



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	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
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
N *	CPVC 90'EII Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
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' EII 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
Zia	Wilkins 350	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.
DP1	-1.0	4.9	7.0	na	12.96	0.05	256	7.0
429	63.0	K = K @ EQ01	6.99	na	12.96			
430	63.0		7.01	na				
431	63.0	K = K @ EQ01	7.06	na	13.04			
432	63.0	K = K @ EQ01	7.15	na	13.12			
433	63.0	K = K @ EQ01	7.36	na	13.3			
435	63.0		8.75	na				
4B	63.0		12.61	na				
1B	10.0		35.63	na				
TOW	10.0		35.69	na				
BOW	3.0		41.76	na				
BASE	3.0		41.79	na				
UG	0.0		49.14	na				
HS1	0.0		49.17	na				
HS2	0.0		49.17	na				
TEST	12.0		43.98	na				

The maximum velocity is 5.34 and it occurs in the pipe between nodes 433 and 435

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	12.96 12.96	1.101 150.0 0.0305	1N 1O	7.0 5.0 0.0	1.750 12.000 13.750	7.000 -0.433 0.419			K Factor = 4.90 Vel = 4.37	
	0.0 12.96						6.986		K Factor = 4.90	
429 to 430	12.96 12.96	2.003 150.0 0.0017	1O	10.0 0.0 0.0	2.900 10.000 12.900	6.986 0.0 0.022			K Factor @ node EQ01 Vel = 1.32	
430 to 431	0.0 12.96	2.003 150.0 0.0016	2N	22.0 0.0 0.0	11.500 22.000 33.500	7.008 0.0 0.055			Vel = 1.32	
431 to 432	13.04 26.0	2.003 150.0 0.0060		0.0 0.0 0.0	15.000 0.0 15.000	7.063 0.0 0.090			K Factor @ node EQ01 Vel = 2.65	
432 to 433	13.12 39.12	2.003 150.0 0.0127		0.0 0.0 0.0	16.000 0.0 16.000	7.153 0.0 0.204			K Factor @ node EQ01 Vel = 3.98	
433 to 435	13.30 52.42	2.003 150.0 0.0220	1N	11.0 0.0 0.0	52.500 11.000 63.500	7.357 0.0 1.394			K Factor @ node EQ01 Vel = 5.34	
435 to 4B	0.0 52.42	2.157 120.0 0.0231	1B 1Fsp 1S 1T	7.384 0.0 13.537 12.307	4.000 33.228 37.228	8.751 3.000 0.860			* Fixed loss = 3 Vel = 4.60	
4B to 1B	0.0 52.42	4.26 120.0 0.0009	4V	35.814 0.0 0.0	45.000 35.814 80.814	12.611 22.954 0.069			Vel = 1.18	
1B to TOW	0.0 52.42	4.26 120.0 0.0008	2V	17.907 0.0 0.0	44.500 17.907 62.407	35.634 0.0 0.052			Vel = 1.18	
TOW to BOW	0.0 52.42	4.26 120.0 0.0008	1B 1T 1Fsp	15.8 26.334 0.0	6.000 42.134 48.134	35.686 6.032 0.040			* Fixed loss = 3 Vel = 1.18	
BOW to BASE	0.0 52.42	4.26 120.0 0.0009	1V 1X	8.954 21.067 0.0	4.000 30.021 34.021	41.758 0.0 0.029			Vel = 1.18	
BASE to UG	0.0 52.42	4.26 120.0 0.0008	1V 1Zia	8.954 0.0 0.0	1.000 8.954 9.954	41.787 7.343 0.008			* Fixed loss = 6.043 Vel = 1.18	
UG to HS1	0.0 52.42	6.16 140.0 0.0001	2V 1T 1G	28.692 43.037 4.304	210.000 76.033 286.033	49.138 0.0 0.030			Vel = 0.56	
HS1 to HS2	0.0 52.42	8.23 100.0 0.0001	1T	29.011 0.0 0.0	10.000 29.010 39.010	49.168 0.0 0.002			Vel = 0.32	
HS2 to TEST	0.0 52.42	6.14 100.0 0.0002	1G 1E	2.273 10.608 0.0	10.000 12.881 22.881	49.170 -5.197 0.004			Vel = 0.57	

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	*****
	0.0 52.42				43.977			K Factor = 7.90	