

. . . Fire Protection by Computer Design

ACCENDO FIRE PROTECTION LLC
38 ADDITON RD
GREENE, MAINE 04236
207-946-6182

Job Name : CPORT CREDIT UNION FIFTH FLOOR
Drawing : 2 OF 2
Location : PORTLAND, MAINE
Remote Area : 5
Contract : 1020
Data File : CPORT 5TH FLOOR LOBBY.WXF

HYDRAULIC CALCULATIONS
for

Project name: CPORT CREDIT UNION FIFTH FLOOR
Location: PORTLAND, MAINE
Drawing no: 2 OF 2
Date: 1/8/18

Design

Remote area number: 5
Remote area location: FIFTH FLOOR
Occupancy classification: LIGHT HAZARD
Density: .1 - Gpm/SqFt
Area of application: 268 - SqFt
Coverage per sprinkler: 148 - SqFt
Type of sprinklers calculated: 1/2" 5.6K 200DEG. CONCEALED PENDENTS
No. of sprinklers calculated: 4
In-rack demand: - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 162.1 - GPM @ 56.0 - Psi
Type of system: WET
Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 7-6-2016
Location: CORNER OF HAMPSHIRE AND NEWBURY
Source: PORTLAND WATER DISTRICT

Name of contractor: ACCENDO FIRE PROTECTION LLC
Address: 38 ADDITON RD / / GREENE, MAINE 04236
Phone number: 207-946-6182
Name of designer: JWD
Authority having jurisdiction: SFMO, PORTLAND FIRE
Notes: (Include peaking information or gridded systems here.)

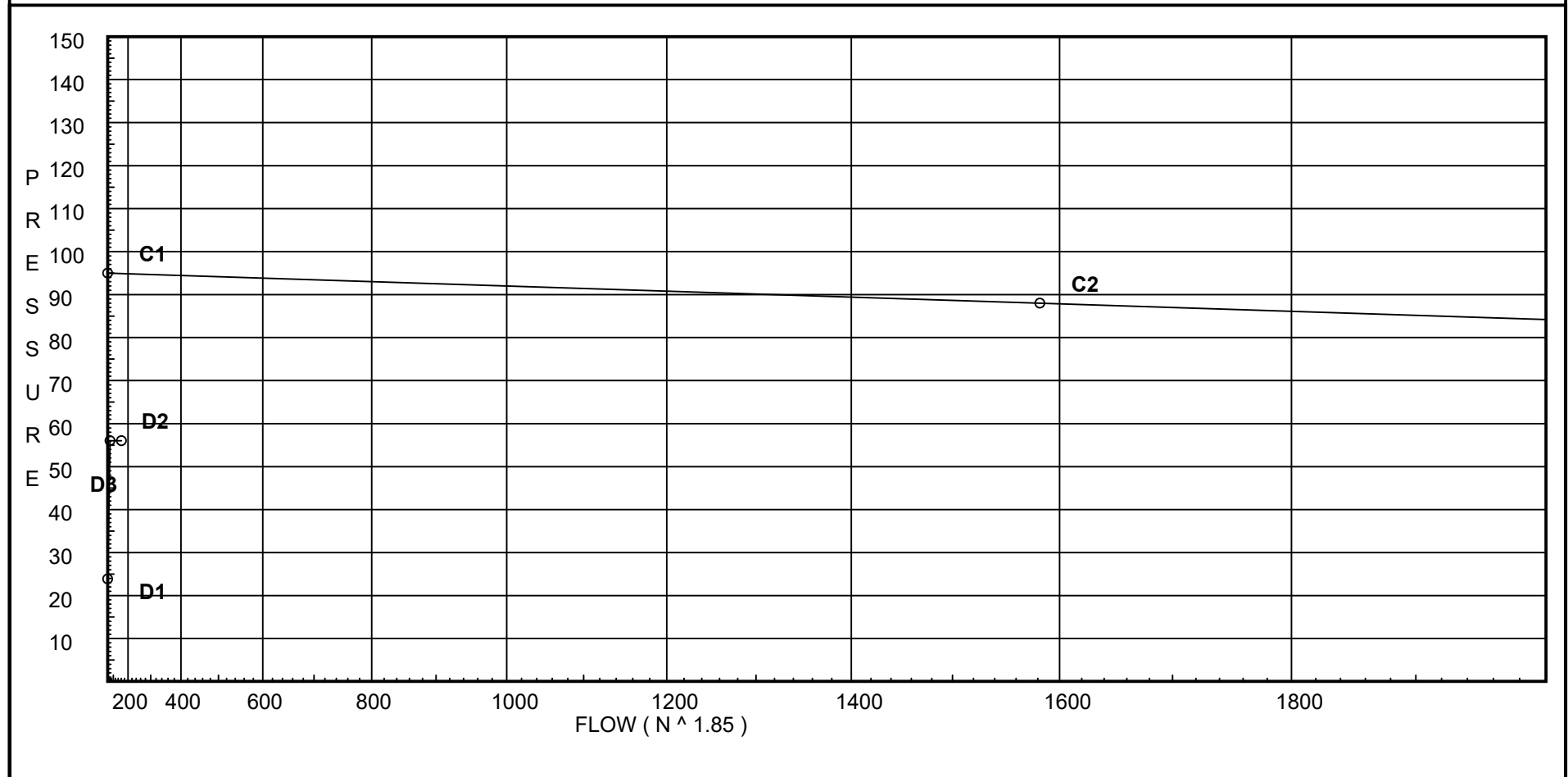
Water Supply Curve C

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CPORT CREDIT UNION FIFTH FLOOR

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City Water Supply:
C1 - Static Pressure : 95
C2 - Residual Pressure: 88
C2 - Residual Flow : 1582

Demand:
D1 - Elevation : 23.875
D2 - System Flow : 62.11
D2 - System Pressure : 56.025
Hose (Demand) : 100
D3 - System Demand : 162.11
Safety Margin : 38.872



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
Ball	B Ball Milw BB-SC100			2.25	2	2.5	2.25	10													
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	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
I	90' Grvd-Vic Elbow #10	0	0	2	3	4	3.5	6	5	8	7	8.5	10	13	17	20	23	25	33	36	40
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	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
Zcb	Colt C200 Vert Butt	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.
DROP	0.0	5.6	7.0	na	14.82	0.1	148	7.0
SP2	0.0	5.6	7.0	na	14.82	0.15	60	7.0
500	155.125	K = K @ DN	8.77	na	16.04			
501	155.125	K = K @ UP2	8.64	na	15.8			
502	155.125	K = K @ DN	7.49	na	14.82			
503	155.125	K = K @ DN	8.14	na	15.45			
504	155.125		9.63	na				
505	155.125		10.14	na				
506	155.125		18.26	na				
16A	155.125		24.15	na				
16	145.5		28.39	na				
17	134.0		33.38	na				
18	122.0		38.62	na				
19	111.75		43.08	na				
20	111.75		43.1	na				
TOW	111.75		43.21	na				
BFP	111.75		43.22	na				
BASE	101.0		55.57	na				
TEST	100.0		56.02	na	100.0			

The maximum velocity is 23.06 and it occurs in the pipe between nodes 505 and 506

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	*****
DROP to DN	0 0	5.60	14.82 14.82	1 1.049	T	5.0 0.0 0.0	1.500 5.000 6.500	120 0.0748	7.000 0.0 0.486		Vel = 5.50	
DN			0.0 14.82						7.486		K Factor = 5.42	
SP2 to UP2	0 0	5.60	14.82 14.82	1 1.049	E T	2.0 5.0 0.0	1.000 7.000 8.000	120 0.0748	7.000 0.0 0.598		Vel = 5.50	
UP2			0.0 14.82						7.598		K Factor = 5.38	
500 to 505	155.125 155.125	5.42	16.04 16.04	1 1.049	2E T	4.0 5.0 0.0	6.750 9.000 15.750	120 0.0865	8.775 0.0 1.363		K = K @ DN Vel = 5.95	
505			0.0 16.04						10.138		K Factor = 5.04	
501 to 504	155.125 155.125	5.38	15.80 15.8	1 1.049	T Ball	5.0 2.25 0.0	4.500 7.250 11.750	120 0.0842	8.643 0.0 0.989		K = K @ UP2 Vel = 5.87	
504			0.0 15.80						9.632		K Factor = 5.09	
502 to 503	155.125 155.125	5.42	14.82 14.82	1 1.049		0.0 0.0 0.0	8.750 0.0 8.750	120 0.0746	7.486 0.0 0.653		K = K @ DN Vel = 5.50	
503 to 504	155.125 155.125	5.42	15.45 30.27	1 1.049	2E	4.0 0.0 0.0	1.330 4.000 5.330	120 0.2801	8.139 0.0 1.493		K = K @ DN Vel = 11.24	
504 to 505	155.125 155.125		15.80 46.07	1 1.049		0.0 0.0 0.0	0.830 0.0 0.830	120 0.6096	9.632 0.0 0.506		Vel = 17.10	
505 to 506	155.125 155.125		16.04 62.11	1 1.049	T	5.0 0.0 0.0	2.670 5.000 7.670	120 1.0588	10.138 0.0 8.121		Vel = 23.06	
506 to 16A	155.125 155.125		0.0 62.11	1.5 1.61	Ball Fsp S T	2.5 0.0 9.0 8.0	2.500 19.500 22.000	120 0.1315	18.259 3.000 2.892		** Fixed Loss = 3 Vel = 9.79	
16A to 16	155.125 145.500		0.0 62.11	4 4.26	2L T	15.8 26.334 0.0	18.420 42.134 60.554	120 0.0011	24.151 4.169 0.069		Vel = 1.40	
16 to 17	145.500 134		0.0 62.11	4 4.26		0.0 0.0 0.0	10.000 0.0 10.000	120 0.0011	28.389 4.981 0.011		Vel = 1.40	
17 to 18	134 122		0.0 62.11	4 4.26	T	26.334 0.0 0.0	10.000 26.334 36.334	120 0.0012	33.381 5.197 0.042		Vel = 1.40	
18 to 19	122 111.750		0.0 62.11	4 4.26		0.0 0.0 0.0	15.000 0.0 15.000	120 0.0011	38.620 4.439 0.017		Vel = 1.40	

Final Calculations - Hazen-Williams

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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	*****
19 to 20	111.750 111.750		0.0 62.11	4 4.26	2L	15.8 0.0 15.800	3.000 18.800	120 0.022	43.076 0.0	Vel = 1.40	
20 to TOW	111.750 111.750		0.0 62.11	4 4.26	3L T	23.701 26.334 0.0	45.000 50.035 95.035	120 0.109	43.098 0.0	Vel = 1.40	
TOW to BFP	111.750 111.750		0.0 62.11	4 4.26	I	9.217 0.0 9.217	4.000 13.217	120 0.016	43.207 0.0	Vel = 1.40	
BFP to BASE	111.750 101		0.0 62.11	4 4.26	7I Zcb	64.519 0.0 64.519	40.000 64.519	120 12.226	43.223 12.226	* * Fixed Loss = 7.57	Vel = 1.40
BASE to TEST	101 100		0.0 62.11	6 6.16	L T G	12.911 43.037 4.304	100.000 60.252 160.252	140 0.433	55.568 0.433	Vel = 0.67	
TEST			100.00 162.11						56.025	Qa = 100.00 K Factor = 21.66	