

... Fire Protection by Computer Design

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

Job Name : PETER HOLMES 3
Drawing : 1 OF 1
Location : 421 WARREN AVE. PORTLAND, MAINE.
Remote Area : 1
Contract : AN-5358-15
Data File : CALCS (3) 10-31-15.WXF

HYDRAULIC CALCULATIONS
for

Project name: PETER HOLMES 3
Location: 421 WARREN AVE. PORTLAND, MAINE.
Drawing no: 1 OF 1
Date: 10/31/15

Design

Remote area number: 1
Remote area location: TENANT #6
Occupancy classification: OH II
Density: .2 - Gpm/SqFt
Area of application: 2048 - SqFt
Coverage per sprinkler: 125 - SqFt
Type of sprinklers calculated: RELIABLE F1 LO BRASS UPRIGHT
No. of sprinklers calculated: 17
In-rack demand: - GPM
Hose streams: 250 - GPM
Total water required (including hose streams): 714.549 - GPM @ 62.605 - Psi
Type of system: DRY
Volume of dry or preaction system: 669.26 - Gal

Water supply information

Date: 6/19/96
Location: 421 WARREN AVE PORTLAND, MAINE
Source: PORTLAND WATER DISTRICT

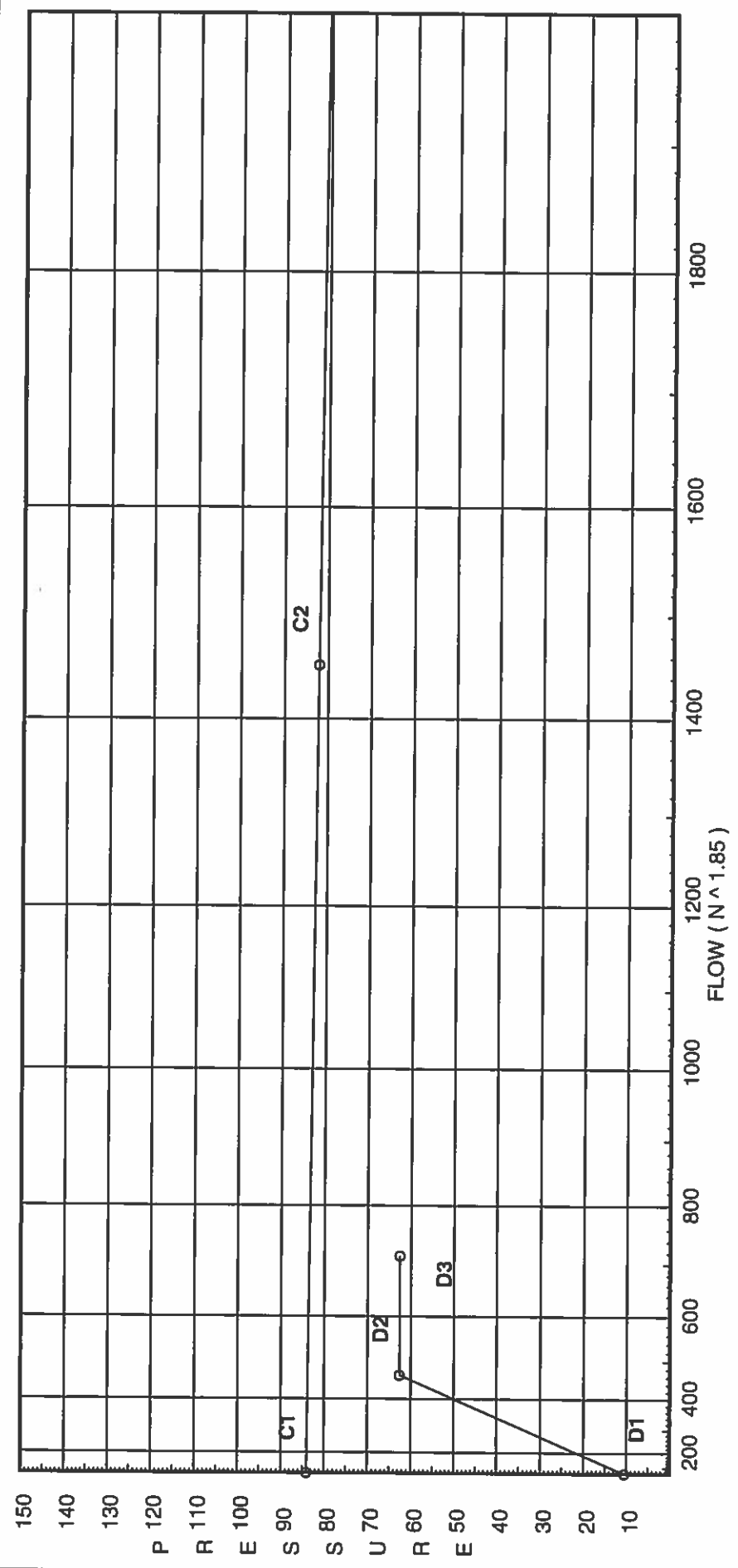
Name of contractor: EASTERN FIRE PROTECTION
Address: 170 KITTYHAWK AVE. AUBURN, MAINE
Phone number: (207)-784-1507
Name of designer: ERIC MELANSON
Authority having jurisdiction: STATE FIRE MARSHAL
Notes: (Include peaking information or gridded systems here.) ROMOTE AREA INCREASED PER NFPA 13 (2007) SECTION 11.2.3.2.5

Water Supply Curve C

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City Water Supply:
 C1 - Static Pressure : 84
 C2 - Residual Pressure: 82
 C2 - Residual Flow : 1453

Demand:
 D1 - Elevation : 10.481
 D2 - System Flow : 464.549
 D2 - System Pressure : 62.605
 Hose (Demand) : 250
 D3 - System Demand : 714.549
 Safety Margin : 20.857



Fittings Used Summary

EASTERN FIRE PROTECTION
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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
Dge Dry Gem DPV-1	1	2	2	3	4	5	2.2	4.9	8	8.9	12	22	18	22	27	35	40	45	50	61
E NFPA 13 90' Standard Elbow	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
G NFPA 13 Gate Valve	0	0	2	3	4	3.5	6	5	8	7	8.5	10	13	17	20	23	25	33	36	40
I 90' Grvd-Vic Elbow #10	0	0	4.5	6	8	8.5	10.8	13	17	16	21	25	33	41	50	65	78	88	98	120
J 90'Tee-Branch Grv Vic #20	0.5	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
L NFPA 13 Long Turn Elbow	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
T NFPA 13 90' Flow thru Tee																				
Zca Colt C200 Horz 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.

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>
TEST	84.0	82	1453.0	83.462	714.55	62.605

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>
1	94.2	8	9.77	25.0	
2	94.2	8	9.85	25.11	
3	94.2	8	10.15	25.48	
4	94.2	8	10.78	26.27	
5	94.2	8	11.89	27.59	
6	94.2	8	13.61	29.52	
A	90.5		22.07		
7	94.2	8	9.82	25.07	
8	94.2	8	9.91	25.18	
9	94.2	8	10.2	25.56	
10	94.2	8	10.85	26.35	
11	94.2	8	11.96	27.66	
12	94.2	8	13.69	29.6	
B	90.5		22.19		
13	94.2	8	12.47	28.25	
14	94.2	8	12.57	28.36	
15	94.2	8	12.94	28.78	
16	94.2	8	13.74	29.66	
17	94.2	8	15.13	31.12	
C	90.5		22.6		
TOR	90.5		41.29		
BFP	77.0		49.78		
BASE	75.0		59.6		
TEST	70.0		62.6	250.0	

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	*****
1 to 2	94.200 94.200	8.00	25.00 25.0	2		0.0 0.0	10.000 0.0	100	9.766 0.0			
						0.0	10.000	0.0082	0.082	Vel =	2.19	
2 to 3	94.200 94.200	8.00	25.11 50.11	2		0.0 0.0	10.000 0.0	100	9.848 0.0			
						0.0	10.000	0.0298	0.298	Vel =	4.40	
3 to 4	94.200 94.200	8.00	25.48 75.59	2		0.0 0.0	10.000 0.0	100	10.146 0.0			
						0.0	10.000	0.0637	0.637	Vel =	6.64	
4 to 5	94.200 94.200	8.00	26.27 101.86	2		0.0 0.0	10.000 0.0	100	10.783 0.0			
						0.0	10.000	0.1107	1.107	Vel =	8.94	
5 to 6	94.200 94.200	8.00	27.58 129.44	2		0.0 0.0	10.000 0.0	100	11.890 0.0			
						0.0	10.000	0.1724	1.724	Vel =	11.36	
6 to A	94.200 90.500	8.00	29.52 158.96	2	2J	14.932 0.0	12.250 14.932	100	13.614 1.602			
						0.0	27.182	0.2522	6.855	Vel =	13.96	
A to B	90.500 90.500		0.0 158.96	4		0.0 0.0	12.500 0.0	100	22.071 0.0			
						0.0	12.500	0.0092	0.115	Vel =	3.58	
B			0.0 158.96						22.186	K Factor =	33.75	
7 to 8	94.200 94.200	8.00	25.07 25.07	2		0.0 0.0	10.000 0.0	100	9.823 0.0			
						0.0	10.000	0.0082	0.082	Vel =	2.20	
8 to 9	94.200 94.200	8.00	25.18 50.25	2		0.0 0.0	10.000 0.0	100	9.905 0.0			
						0.0	10.000	0.0300	0.300	Vel =	4.41	
9 to 10	94.200 94.200	8.00	25.56 75.81	2		0.0 0.0	10.000 0.0	100	10.205 0.0			
						0.0	10.000	0.0641	0.641	Vel =	6.66	
10 to 11	94.200 94.200	8.00	26.34 102.15	2		0.0 0.0	10.000 0.0	100	10.846 0.0			
						0.0	10.000	0.1113	1.113	Vel =	8.97	
11 to 12	94.200 94.200	8.00	27.67 129.82	2		0.0 0.0	10.000 0.0	100	11.959 0.0			
						0.0	10.000	0.1733	1.733	Vel =	11.40	
12 to B	94.200 90.500	8.00	29.60 159.42	2	2J	14.932 0.0	12.250 14.932	100	13.692 1.602			
						0.0	27.182	0.2536	6.892	Vel =	14.00	
B to C	90.500 90.500		158.96 318.38	4		0.0 0.0	12.500 0.0	100	22.186 0.0			
						0.0	12.500	0.0331	0.414	Vel =	7.17	
C			0.0 318.38						22.600	K Factor =	66.97	
13 to 14	94.200 94.200	8.00	28.25 28.25	2		0.0 0.0	10.000 0.0	100	12.467 0.0			
						0.0	10.000	0.0103	0.103	Vel =	2.48	

Final Calculations - Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Fing's Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
14 to 15	94.200 94.200	8.00	28.36 56.61	2 2.157		0.0 0.0	10.000 10.000	100 0.0374	12.570 0.0 0.374		Vel = 4.97	
15 to 16	94.200 94.200	8.00	28.78 85.39	2 2.157		0.0 0.0	10.000 10.000	100 0.0798	12.944 0.0 0.798		Vel = 7.50	
16 to 17	94.200 94.200	8.00	29.66 115.05	2 2.157		0.0 0.0	10.000 10.000	100 0.1387	13.742 0.0 1.387		Vel = 10.10	
17 to C	94.200 90.500	8.00	31.12 146.17	2 2.157	2J	14.932 0.0	12.250 14.932 27.182	100 0.2159	15.129 1.602 5.869		Vel = 12.83	
C to TOR	90.500 90.500		318.38 464.55	4 4.26	2I	13.156 0.0	267.167 13.157 280.324	100 0.0667	22.600 0.0 18.689		Vel = 10.46	
TOR to BFP	90.500 77		0.0 464.55	4 4.26	Dge T	8.364 18.795	12.500 27.159 39.659	100 0.0667	41.289 5.847 2.644		Vel = 10.46	
BFP to BASE	77 75		0.0 464.55	4 4.26	Zca E	0.0 9.397	2.000 9.397 11.397	100 0.0667	49.780 9.060 0.760		** Fixed Loss = 8.194 Vel = 10.46	
BASE to TEST	75 70		0.0 464.55	8 8.249	3L 2T G	32.691 58.677 3.353	220.000 94.721 314.721	100 0.0027	59.600 2.166 0.839		Vel = 2.79	
TEST			250.00 714.55						62.605		Qa = 250.00 K Factor = 90.31	