

. . . Fire Protection by Computer Design

EASTERN FIRE PROTECTION
170 KITTYHAWK AVE
P.O. BOX 1390
AUBURN, ME. 04210
207-784-1507

Job Name : Allagash Brewing Co.
Drawing : 1 of 2
Location : New Mezzanine Offices
Remote Area : #3
Contract : AU-5227-14
Data File : ALLAGASH BREWING-Office Area.WXF

HYDRAULIC CALCULATIONS
for

Project name: Allagash Brewing Co.
Location: New Mezzanine Offices
Drawing no: 1 of 2
Date: 12/1/14

Design

Remote area number: #3
Remote area location: New Mezzanine Office Area
Occupancy classification: Light Hazard
Density: .1 - Gpm/SqFt
Area of application: 1051 - SqFt
Coverage per sprinkler: 225 - SqFt
Type of sprinklers calculated: 1/2" Tyco TY-FRB 200 Brass Upright k=5.6
No. of sprinklers calculated: 7
In-rack demand: - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 264.86 - GPM @ 49.04 - Psi
Type of system: Wet
Volume of dry or preaction system: - Gal

Water supply information

Date: 10/17/14
Location: Industrial Way
Source: Portland Water District

Name of contractor: Eastern Fire Protection
Address: 170 Kittyhawk Ave
Phone number: 207-784-1507
Name of designer: T. Pray
Authority having jurisdiction: S.F.M.O.

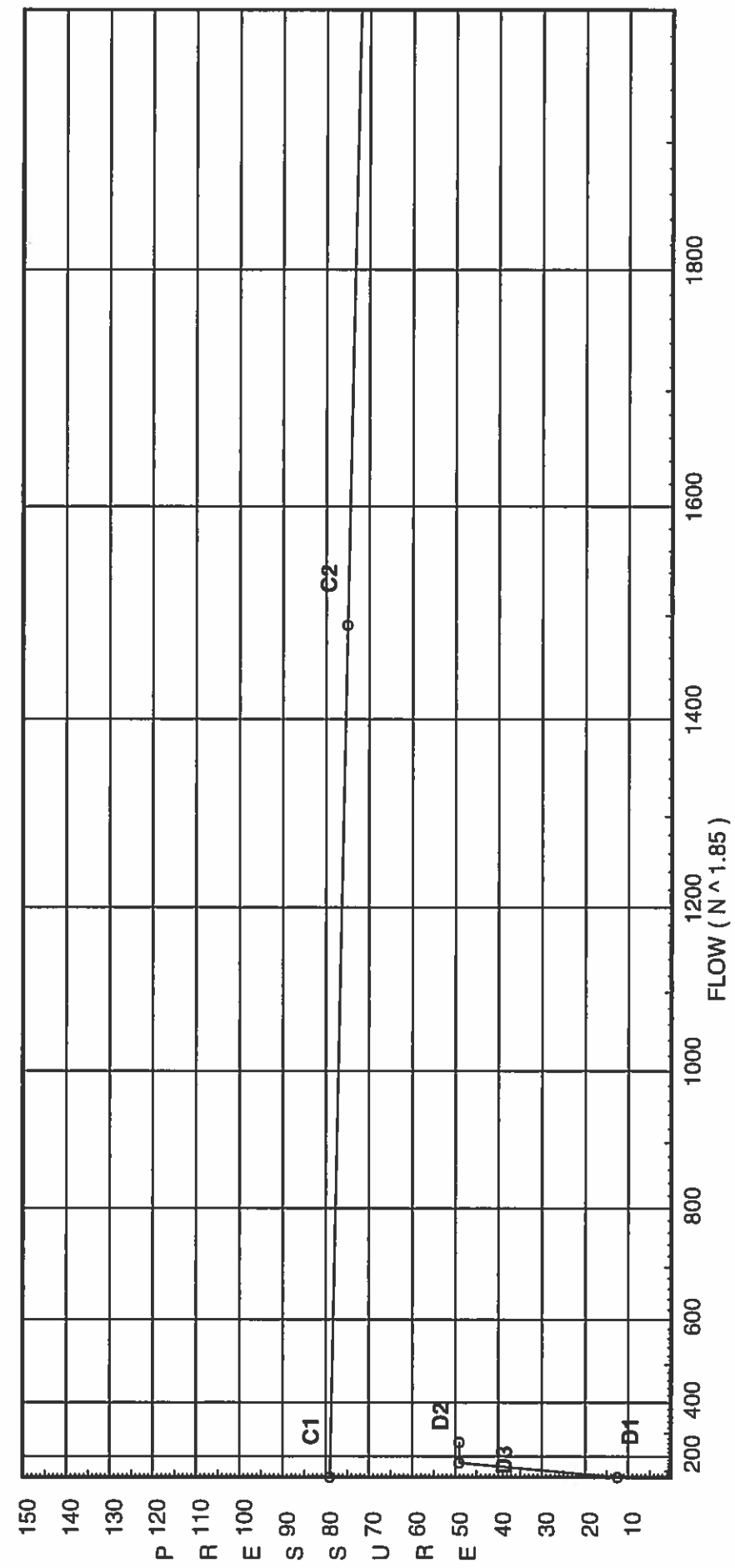
Notes: (Include peaking information or gridded systems here.) Remote design area reduced in accordance with NFPA 13 section 11.2.3.2.3.1

Water Supply Curve C

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City Water Supply:
C1 - Static Pressure : 79
C2 - Residual Pressure: 75
C2 - Residual Flow : 1491

Demand:
D1 - Elevation : 12.486
D2 - System Flow : 164.863
D2 - System Pressure : 49.042
Hose (Demand) : 100
D3 - System Demand : 264.863
Safety Margin : 29.795



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
F NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
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' Grnd-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
J 90'Tee-Branch Grv Vic #20	0	0	4.5	6	8	8.5	10.8	13	17	16	21	25	33	41	50	65	78	98	98	120
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
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	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

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	79.0	75	1491.0	78.836	264.86	49.042

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>
100	112.33	5.6	16.14	22.5	
101	112.33	5.6	16.66	22.86	
102	112.33	5.6	18.54	24.12	
103	112.33	5.6	24.16	27.52	
104	112.33	5.6	15.37	21.96	
105	112.33	5.6	15.67	22.17	
106	112.33	5.6	17.98	23.75	
73	112.33		25.09		
74	112.33		25.14		
75	112.33		25.19		
76	112.33		25.66		
77	111.29		27.31		
78	104.79		34.18		
24	123.29		28.19		
TOR	123.29		28.4		
BOR	83.5		48.85		
TEST	83.5		49.04	100.0	

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 Fng's Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
100 to 101	112.330 112.330	5.60	22.50 22.5	1.25 1.442		0.0 0.0	15.000 0.0	120 0.0343	16.143 0.0 0.515			Vel = 4.42
101 to 102	112.330 112.330	5.60	22.86 45.36	1.25 1.442		0.0 0.0	15.000 0.0	120 0.1257	16.658 0.0 1.886			Vel = 8.91
102 to 73	112.330 112.330	5.60	24.11 69.47	1.25 1.442	1T	7.432 0.0	16.250 7.432 23.682	120 0.2766	18.544 0.0 6.550			Vel = 13.65
73			0.0 69.47						25.094			K Factor = 13.87
103 to 74	112.330 112.330	5.60	27.52 27.52	1.25 1.442	1T	7.432 0.0	12.290 7.432 19.722	120 0.0499	24.157 0.0 0.984			Vel = 5.41
74			0.0 27.52						25.141			K Factor = 5.49
104 to 105	112.330 112.330	5.60	21.96 21.96	1.25 1.442		0.0 0.0	9.000 0.0	120 0.0329	15.372 0.0 0.296			Vel = 4.31
105 to 106	112.330 112.330	5.60	22.16 44.12	1.25 1.442	2I	7.432 0.0	11.920 7.432 19.352	120 0.1194	15.668 0.0 2.311			Vel = 8.67
106 to 75	112.330 112.330	5.60	23.75 67.87	1.25 1.442	1T	7.432 0.0	19.790 7.432 27.222	120 0.2649	17.979 0.0 7.211			Vel = 13.33
75			0.0 67.87						25.190			K Factor = 13.52
73 to 74	112.330 112.330		69.47 69.47	3 3.26		0.0 0.0	9.080 0.0	120 0.0052	25.094 0.0 0.047			Vel = 2.67
74 to 75	112.330 112.330		27.53 97.0	3 3.26		0.0 0.0	5.080 0.0	120 0.0096	25.141 0.0 0.049			Vel = 3.73
75 to 76	112.330 112.330		67.86 164.86	3 3.26		0.0 0.0	18.250 0.0	120 0.0258	25.190 0.0 0.470			Vel = 6.34
76 to 77	112.330 111.290		0.0 164.86	3 3.26	1T	20.159 0.0	26.540 20.159 46.699	120 0.0258	25.660 0.450 1.204			Vel = 6.34
77 to 78	111.290 104.790		0.0 164.86	3 3.26	3V 1X	20.159 17.471	119.500 37.630 157.130	120 0.0258	27.314 2.815 4.048			Vel = 6.34
78 to 24	104.790 123.290		0.0 164.86	3 3.26	1I 1J	6.72 17.471	54.250 24.191 78.441	120 0.0258	34.177 -8.012 2.020			Vel = 6.34

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 *****
24 to TOR	123.290 123.290		0.0 164.86	4 4.26	1I 1J	9.217 21.067	0.830 30.284	120 0.0070	28.185 0.0 0.218	Vel = 3.71
TOR to BOR	123.290 83.500		0.0 164.86	4 4.26	2F	10.534 0.0	20.290 10.534	120 0.0070	28.403 20.233 0.216	** Fixed Loss = 3 Vel = 3.71
BOR to TEST	83.500 83.500		0.0 164.86	6 6.16	1L 1G 1T	12.911 4.304 43.037	157.000 60.252 217.252	140 0.0009	48.852 0.0 0.190	Vel = 1.77
TEST			100.00 264.86						49.042	Qa = 100.00 K Factor = 37.82