

... 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 Production Area
Remote Area : #2
Contract : AU-5227-14
Data File : ALLAGASH BREWING-Production Area.WXF

HYDRAULIC CALCULATIONS
for

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

Design

Remote area number: #2
Remote area location: New Production Area
Occupancy classification: Ordinary Group I
Density: .15 - Gpm/SqFt
Area of application: 1557 - SqFt
Coverage per sprinkler: 130 - SqFt
Type of sprinklers calculated: 1/2" Tyco TY-B 200 Brass Upright k=5.6
No. of sprinklers calculated: 13
In-rack demand: - GPM
Hose streams: 250 - GPM
Total water required (including hose streams): 533.47 - GPM @ 60.39 - 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

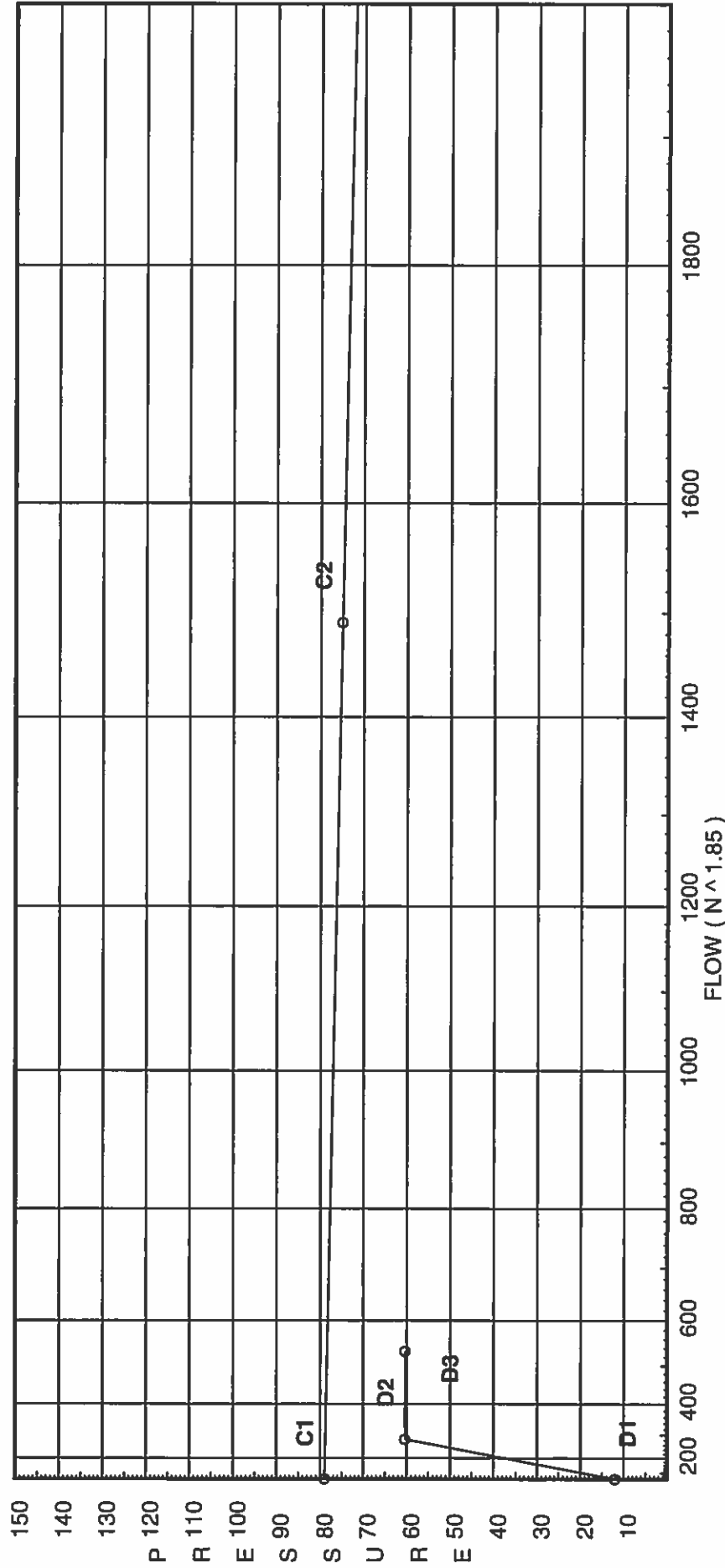
Name of contractor: Eastern Fire Protection
Address: 170 Kittyhawk Ave
Phone number: 207-784-1507
Name of designer: T. Pray
Authority having jurisdiction: S.F.M.O.
Notes: (Include peaking information or gridded systems here.)

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 : 12.036
D2 - System Flow : 263.469
D2 - System Pressure : 60.392
Hose (Demand) : 250
D3 - System Demand : 533.469
Safety Margin : 18.010



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	88	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	78.403	533.47	60.392

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>
50	111.29	5.6	14.13	21.05	
51	111.29	5.6	14.26	21.15	
52	111.29	5.6	14.74	21.5	
53	111.29	5.6	15.77	22.24	
54	111.29	5.6	17.56	23.47	
55	111.29	5.6	20.32	25.24	
56	111.29	5.6	12.13	19.5	
57	111.29	5.6	12.22	19.58	
58	111.29	5.6	12.59	19.87	
59	111.29	5.6	13.36	20.47	
60	111.29	5.6	14.73	21.49	
61	111.29	5.6	16.82	22.96	
62	111.29	5.6	19.86	24.96	
70	111.29		25.96		
71	111.29		26.21		
72	111.29		27.19		
77	111.29		28.82		
78	106.79		41.8		
24	106.79		45.61		
TOR	106.79		46.2		
BOR	83.5		59.88		
TEST	83.5		60.39	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 Fng's Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
50 to 51	111.290 111.290	5.60	21.05	1.5		0.0	9.250	120	14.125			
						0.0	0.0		0.0			
			21.05	1.682		0.0	9.250	0.0144	0.133	Vel =	3.04	
51 to 52	111.290 111.290	5.60	21.14	1.5		0.0	9.250	120	14.258			
						0.0	0.0		0.0			
			42.19	1.682		0.0	9.250	0.0519	0.480	Vel =	6.09	
52 to 53	111.290 111.290	5.60	21.50	1.5		0.0	9.250	120	14.738			
						0.0	0.0		0.0			
			63.69	1.682		0.0	9.250	0.1114	1.030	Vel =	9.20	
53 to 54	111.290 111.290	5.60	22.24	1.5		0.0	9.250	120	15.768			
						0.0	0.0		0.0			
			85.93	1.682		0.0	9.250	0.1936	1.791	Vel =	12.41	
54 to 55	111.290 111.290	5.60	23.46	1.5		0.0	9.125	120	17.559			
						0.0	0.0		0.0			
			109.39	1.682		0.0	9.125	0.3027	2.762	Vel =	15.79	
55 to 70	111.290 111.290	5.60	25.25	1.5	1T	9.9	2.790	120	20.321			
						0.0	9.900		0.0			
			134.64	1.682		0.0	12.690	0.4445	5.641	Vel =	19.44	
			0.0									
70			134.64						25.962	K Factor =	26.42	
56 to 57	111.290 111.290	5.60	19.50	1.5		0.0	8.000	120	12.125			
						0.0	0.0		0.0			
			19.5	1.682		0.0	8.000	0.0125	0.100	Vel =	2.82	
57 to 58	111.290 111.290	5.60	19.58	1.5		0.0	8.000	120	12.225			
						0.0	0.0		0.0			
			39.08	1.682		0.0	8.000	0.0451	0.361	Vel =	5.64	
58 to 59	111.290 111.290	5.60	19.87	1.5		0.0	8.000	120	12.586			
						0.0	0.0		0.0			
			58.95	1.682		0.0	8.000	0.0964	0.771	Vel =	8.51	
59 to 60	111.290 111.290	5.60	20.46	1.5		0.0	8.210	120	13.357			
						0.0	0.0		0.0			
			79.41	1.682		0.0	8.210	0.1674	1.374	Vel =	11.47	
60 to 61	111.290 111.290	5.60	21.50	1.5		0.0	8.000	120	14.731			
						0.0	0.0		0.0			
			100.91	1.682		0.0	8.000	0.2608	2.086	Vel =	14.57	
61 to 62	111.290 111.290	5.60	22.96	1.5		0.0	8.000	120	16.817			
						0.0	0.0		0.0			
			123.87	1.682		0.0	8.000	0.3809	3.047	Vel =	17.89	
62 to 71	111.290 111.290	5.60	24.96	1.5	1T	9.9	1.960	120	19.864			
						0.0	9.900		0.0			
			148.83	1.682		0.0	11.860	0.5351	6.346	Vel =	21.49	
			0.0									
71			148.83						26.210	K Factor =	29.07	
70 to 71	111.290 111.290		134.64	3		0.0	14.000	120	25.962			
						0.0	0.0		0.0			
			134.64	3.26		0.0	14.000	0.0177	0.248	Vel =	5.18	

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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	*****
71 to 72	111.290 111.290		148.83 283.47	3 3.26		0.0 0.0	14.000 0.0	120 0.0702	26.210 0.0 0.983			Vel = 10.90
72 to 77	111.290 111.290		0.0 283.47	3 3.26	1T	20.159 0.0	2.960 20.159	120 0.0702	27.193 0.0 1.623			Vel = 10.90
77 to 78	111.290 106.790		0.0 283.47	3 3.26	3V 1X	20.159 17.471	119.500 37.630	120 0.0702	28.816 1.949 11.032			Vel = 10.90
78 to 24	106.790 106.790		0.0 283.47	3 3.26		0.0 0.0	54.250 0.0	120 0.0702	41.797 0.0 3.809			Vel = 10.90
24 to TOR	106.790 106.790		0.0 283.47	4 4.26	1I 1J	9.217 21.067	0.830 30.284	120 0.0191	45.606 0.0 0.594			Vel = 6.38
TOR to BOR	106.790 83.500		0.0 283.47	4 4.26	2F	10.534 0.0	20.290 10.534	120 0.0191	46.200 13.087 0.588		** Fixed Loss = 3	Vel = 6.38
BOR to TEST	83.500 83.500		0.0 283.47	6 6.16	1L 1G 1T	12.911 4.304 43.037	157.000 60.252 217.252	140 0.0024	59.875 0.0 0.517			Vel = 3.05
TEST			250.00 533.47									Qa = 250.00 K Factor = 68.65