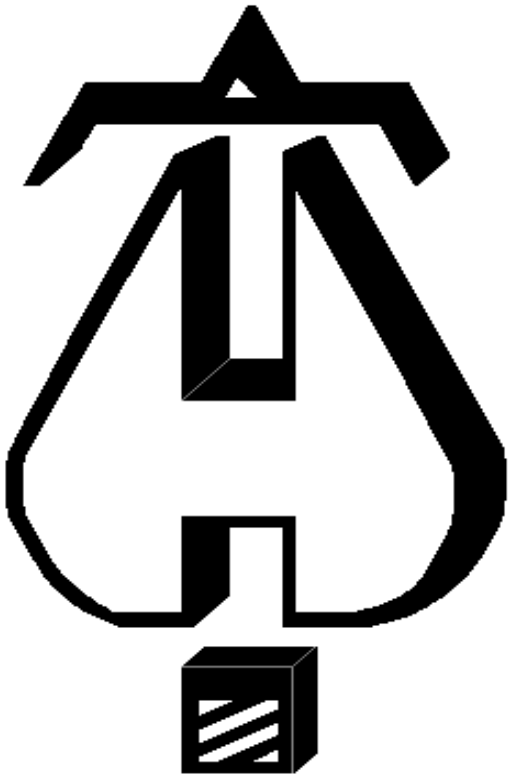


. . . Fire Protection by Computer Design

Eastern Fire Protection
170 Kitty Hawk Ave.
P.O. Box 1390
Auburn, Maine, 04211
207-784-1507

Job Name	:	PORTLAND GASTRO. FOURTH FLOOR REMOTE AREA
Drawing	:	1 OF 2
Location	:	161 MARGINAL WAY, PORTLAND, MAINE
Remote Area	:	ONE
Contract	:	5458-16
Data File	:	PORTLAND GASTRO FOURTH FLOOR PROOF.WXF

HYDRAULIC CALCULATIONS
for

Project name: PORTLAND GASTRO. FOURTH FLOOR REMOTE AREA
Location: 161 MARGINAL WAY, PORTLAND, MAINE
Drawing no: 1 OF 2
Date: 5/26/13

Design

Remote area number: ONE
Remote area location: FOURTH FLOOR
Occupancy classification: LIGHT
Density: .10 - Gpm/SqFt
Area of application: 971 - SqFt
Coverage per sprinkler: 148 - SqFt
Type of sprinklers calculated: 1/2" K=5.6 RELIABE F1FR CHROME PENDENT
No. of sprinklers calculated: 10
In-rack demand: - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 276.9 - GPM @ 87.14 - Psi
Type of system: WET
Volume of dry or preaction system: - Gal

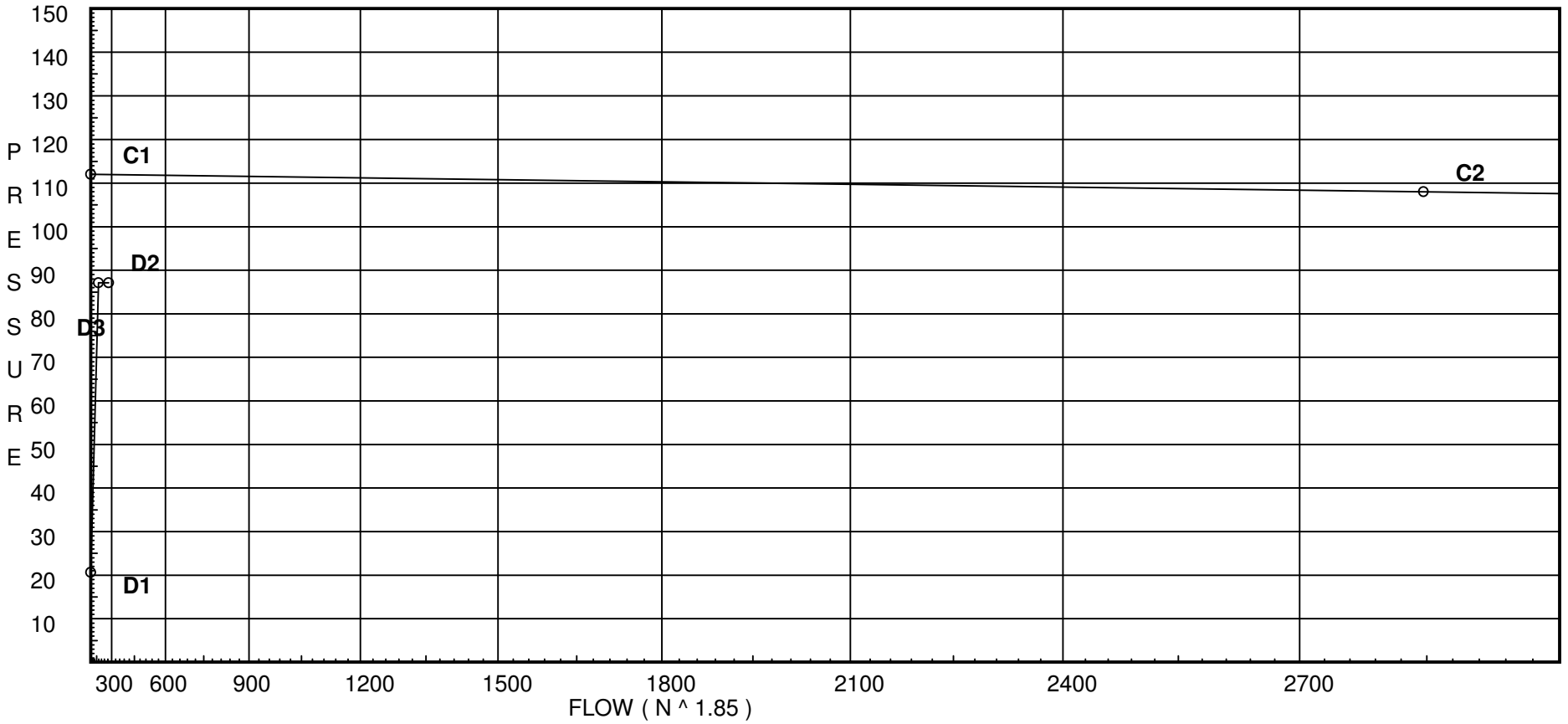
Water supply information

Date: 6/22/2006
Location: HYDRANT LOCATED ON MARGINAL WAY
Source: PORTLAND WATER DISTRICT

Name of contractor: Eastern Fire Protection
Address: 170 Kitty Hawk Ave. / P.O. Box 1390 / Auburn, Maine, 04211
Phone number: 207-784-1507
Name of designer: WAF
Authority having jurisdiction: STATE FIRE MARSHAL
Notes: (Include peaking information or gridded systems here.)
NOTE: REMOTE AREA MODIFIED PER NFPA 13 SECTION 11.2.3.2.3.1

City Water Supply:
- C1 - Static Pressure : 112
- C2 - Residual Pressure: 108
- C2 - Residual Flow : 2846

Demand:
- D1 - Elevation : 20.642
- D2 - System Flow : 176.993
- D2 - System Pressure : 87.144
- Hose (Demand) : 100
- D3 - System Demand : 276.993
- Safety Margin : 24.802



Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	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
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
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
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.

SUPPLY ANALYSIS

Node at Source	*Static Pressure*	*Residual Pressure*	*Flow*	*Available Pressure*	*Total Demand*	*Required Pressure*
TEST	112.0	108	2846.0	111.946	276.99	87.144

NODE ANALYSIS

Node Tag	*Elevation*	*Node Type*	*Pressure at Node*	*Discharge at Node*	*Notes*
D1	0.0	5.6	7.0	14.82	
50	147.66	4.06	13.84	15.08	K=K @ L1
51	147.66	4.06	13.35	14.82	K=K @ L1
52	147.66	4.06	14.42	15.4	K=K @ L1
53	147.66		14.72		
54	147.66	4.06	23.43	19.63	K=K @ L1
55	147.66	4.06	26.45	20.86	K=K @ L1
56	148.33	4.06	17.69	17.05	K=K @ L1
57	148.33	4.06	18.66	17.51	K=K @ L1
58	147.66		34.38		
59	147.66	4.06	18.93	17.64	K=K @ L1
60	147.66		20.04		
61	147.66	4.06	21.07	18.62	K=K @ L1
62	147.66	4.06	25.26	20.38	K=K @ L1
63	147.66		30.59		
AA	147.66		51.87		
BB	147.66		52.13		
D	147.66		52.26		
TOR	109.0		73.44		
B1	109.0		78.39		
BASE	101.0		86.55		
TEST	100.0		87.14	100.0	

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 ******
D1	0	5.60	14.82	1	E	2.0	78.000	120	7.000	
to					T	5.0	7.000		0.0	
L1	0		14.82	1.049		0.0	85.000	0.0747	6.350	Vel = 5.50
			0.0							
L1			14.82						13.350	K Factor = 4.06
50	147.660	4.06	15.08	1	T	5.0	6.500	120	13.837	K = K @ L1
to						0.0	5.000		0.0	
53	147.660		15.08	1.049		0.0	11.500	0.0772	0.888	Vel = 5.60
			0.0							
53			15.08						14.725	K Factor = 3.93
51	147.660	4.06	14.82	1	E	2.0	12.370	120	13.350	K = K @ L1
to						0.0	2.000		0.0	
52	147.660		14.82	1.049		0.0	14.370	0.0747	1.073	Vel = 5.50
52	147.660	4.06	15.40	1		0.0	1.080	120	14.423	K = K @ L1
to						0.0	0.0		0.0	
53	147.660		30.22	1.049		0.0	1.080	0.2796	0.302	Vel = 11.22
53	147.660		15.08	1	E	2.0	12.740	120	14.725	
to						0.0	2.000		0.0	
54	147.660		45.3	1.049		0.0	14.740	0.5906	8.705	Vel = 16.82
54	147.660	4.06	19.63	1.25		0.0	10.000	120	23.430	K = K @ L1
to						0.0	0.0		0.0	
55	147.660		64.93	1.38		0.0	10.000	0.3023	3.023	Vel = 13.93
55	147.660	4.06	20.86	1.25	2E	6.0	9.670	120	26.453	K = K @ L1
to						0.0	6.000		0.0	
58	147.660		85.79	1.38		0.0	15.670	0.5061	7.931	Vel = 18.40
			0.0							
58			85.79						34.384	K Factor = 14.63
56	148.330	4.06	17.05	1		0.0	10.000	120	17.687	K = K @ L1
to						0.0	0.0		0.0	
57	148.330		17.05	1.049		0.0	10.000	0.0969	0.969	Vel = 6.33
57	148.330	4.06	17.52	1	4E	8.0	19.500	120	18.656	K = K @ L1
to					T	5.0	13.000		0.290	
63	147.660		34.57	1.049		0.0	32.500	0.3581	11.639	Vel = 12.83
			0.0							
63			34.57						30.585	K Factor = 6.25
58	147.660		85.79	1.25	T	6.0	28.540	120	34.384	
to						0.0	6.000		0.0	
AA	147.660		85.79	1.38		0.0	34.540	0.5061	17.481	Vel = 18.40
			0.0							
AA			85.79						51.865	K Factor = 11.91
59	147.660	4.06	17.64	1	T	5.0	5.790	120	18.928	K = K @ L1
to						0.0	5.000		0.0	
60	147.660		17.64	1.049		0.0	10.790	0.1032	1.113	Vel = 6.55
60	147.660		0.0	1		0.0	10.000	120	20.041	
to						0.0	0.0		0.0	
61	147.660		17.64	1.049		0.0	10.000	0.1032	1.032	Vel = 6.55

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 ******
61	147.660	4.06	18.62	1		0.0	10.710	120	21.073	K = K @ L1
to						0.0	0.0		0.0	
62	147.660		36.26	1.049		0.0	10.710	0.3911	4.189	Vel = 13.46
62	147.660	4.06	20.38	1.25	E	3.0	13.670	120	25.262	K = K @ L1
to					T	6.0	9.000		0.0	
63	147.660		56.64	1.38		0.0	22.670	0.2348	5.323	Vel = 12.15
63	147.660		34.57	1.25	2E	6.0	26.000	120	30.585	
to					T	6.0	12.000		0.0	
BB	147.660		91.21	1.38		0.0	38.000	0.5669	21.542	Vel = 19.56
			0.0							
BB			91.21						52.127	K Factor = 12.63
AA	147.660		85.79	2.5		0.0	12.080	120	51.865	
to						0.0	0.0		0.0	
BB	147.660		85.79	2.635		0.0	12.080	0.0217	0.262	Vel = 5.05
BB	147.660		91.20	2.5		0.0	1.620	120	52.127	
to						0.0	0.0		0.0	
D	147.660		176.99	2.635		0.0	1.620	0.0833	0.135	Vel = 10.41
D	147.660		0.0	3	5I	33.599	100.000	120	52.262	
to					J	17.471	51.070		16.744	
TOR	109		176.99	3.26		0.0	151.070	0.0294	4.437	Vel = 6.80
TOR	109		0.0	3	B	13.44	100.000	120	73.443	
to					S	21.503	68.542		0.0	
B1	109		176.99	3.26	5I	33.599	168.542	0.0294	4.951	Vel = 6.80
B1	109		0.0	4	I	9.217	8.000	120	78.394	
to					Zcb	0.0	9.217		8.020	* * Fixed Loss = 4.555
BASE	101		176.99	4.26		0.0	17.217	0.0080	0.138	Vel = 3.98
BASE	101		0.0	6	L	12.911	100.000	140	86.552	
to					G	4.304	60.252		0.433	
TEST	100		176.99	6.16	T	43.037	160.252	0.0010	0.159	Vel = 1.91
			100.00							Qa = 100.00
TEST			276.99						87.144	K Factor = 29.67