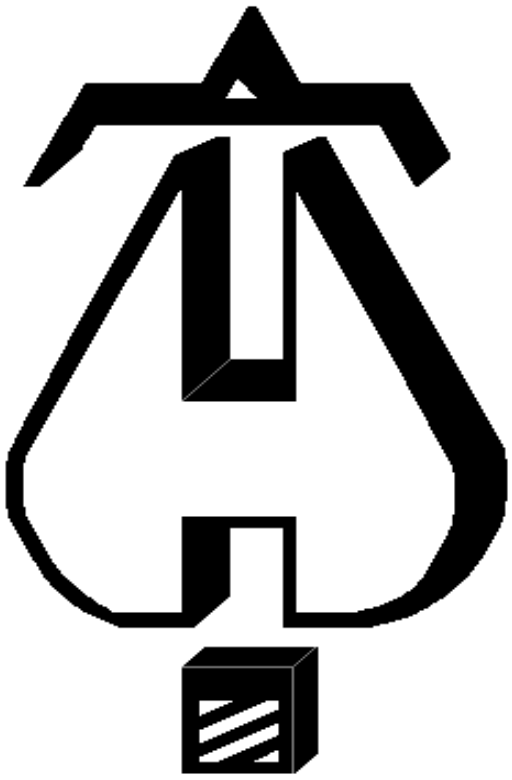


. . . Fire Protection by Computer Design

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

Job Name	:	24 PREBLE ST.
Drawing	:	2 OF 2
Location	:	2ND FLOOR OFFICE
Remote Area	:	2
Contract	:	1-05637-SP-17
Data File	:	2ND FLOOR CALC..WXF

HYDRAULIC CALCULATIONS
for

Project name: 24 PREBLE ST.
Location: 2ND FLOOR OFFICE
Drawing no: 2 OF 2
Date: 8/11/2017

Design

Remote area number: 2
Remote area location: 2ND FLOOR OFFICE
Occupancy classification: LIGHT HAZARD
Density: .1 - Gpm/SqFt
Area of application: 984 - SqFt
Coverage per sprinkler: 120/144/210 - SqFt
Type of sprinklers calculated: RELIABLE F1FR56 200* K=5.6
No. of sprinklers calculated: 18
In-rack demand: - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 456.598 - GPM @ 65.428 - Psi
Type of system: WET
Volume of dry or preaction system: - Gal

Water supply information

Date: 7/6/16
Location: CUMBERLAND AVE. PORTLAND, ME.
Source: PORTLAND WATER DISTRICT

Name of contractor: EASTERN FIRE PROTECTION
Address: 170 KITTY HAWK AVE / / AUBURN, ME 04210
Phone number: 207-784-1507
Name of designer: EWM
Authority having jurisdiction: MAINE STATE FIRE MARSHAL
Notes: (Include peaking information or gridded systems here.) REMOTE AREA REDUCED PER NFPA 13 (2016) SEC. 11.2.3.2.3.1

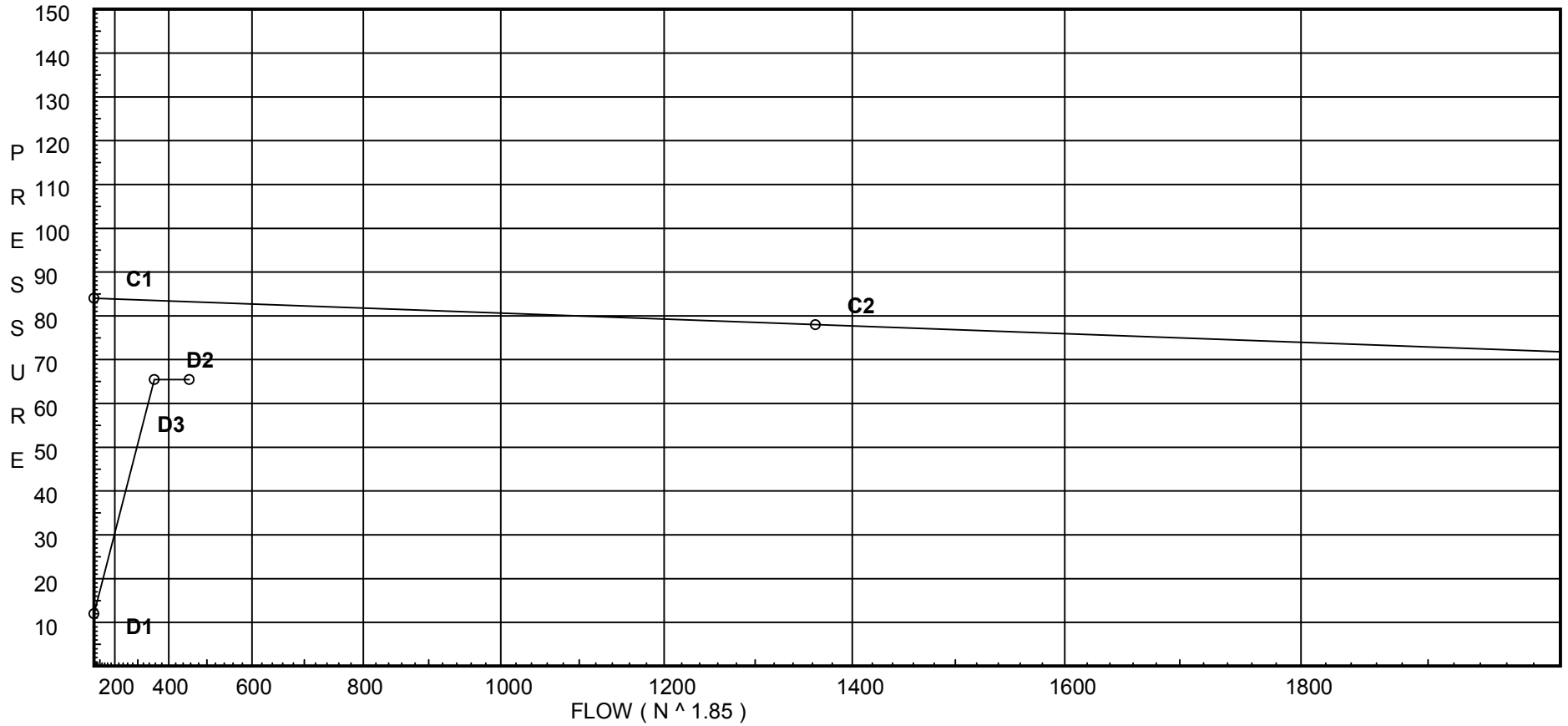
Water Supply Curve C

EASTERN FIRE PROTECTION
24 PREBLE ST.

Date 8/11/2017

City Water Supply:
- C1 - Static Pressure : 84
- C2 - Residual Pressure: 78
- C2 - Residual Flow : 1363

Demand:
- D1 - Elevation : 11.949
- D2 - System Flow : 356.598
- D2 - System Pressure : 65.428
- Hose (Demand) : 100
- D3 - System Demand : 456.598
- Safety Margin : 17.778



Fittings Used Summary

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
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
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

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
TEST	84.0	78	1363.0	83.207	456.6	65.428

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
HEAD	0.0	5.6	7.0	14.82	
HEAD2	0.0	5.6	14.06	21.0	
200	131.09	5.6	17.75	23.59	
201	130.42	5.15	19.74	22.89	K=K @ LIN1
202	130.42	5.15	19.64	22.83	K=K @ LIN1
203	131.09		20.73		
205	130.42	5.15	8.27	14.82	K=K @ LIN1
206	130.42	5.15	9.18	15.61	K=K @ LIN1
207	131.09		9.01		
208	130.42	5.15	8.93	15.4	K=K @ LIN1
209	131.09		9.16		
210	130.42	5.15	8.98	15.44	K=K @ LIN1
211	131.09		9.27		
212	130.42	5.15	8.39	14.93	K=K @ LIN1
213	130.42	5.15	8.85	15.33	K=K @ LIN1
214	131.09		10.33		
215	130.42	5.15	9.82	16.14	K=K @ LIN1
216	130.42	5.15	9.7	16.04	K=K @ LIN1
217	131.09		10.05		
218	131.09		12.04		
219	130.42	5.15	12.52	18.23	K=K @ LIN1
220	131.09		13.02		
221	130.42	5.15	14.53	19.64	K=K @ LIN1
222	131.09		15.14		
204	131.09		23.49		
223	132.01	5.6	20.31	25.23	
224	131.09		23.83		
225	130.42	5.15	23.78	25.12	K=K @ LIN1
226	131.09		25.29		
227	130.42	5.17	20.25	23.28	K=K @ LIN2
228	132.67		21.05		
229	130.42	5.15	21.56	23.92	K=K @ LIN1
230	132.67		21.98		
231	131.67		25.1		
232	131.67	5.6	25.28	28.16	
233	131.67		32.68		
234	129.42		37.44		
36	129.42		43.58		
37	116.0		50.35		
38	106.5		54.99		
39	106.5		56.66		
TOR	105.83		58.94		

NODE ANALYSIS (cont.)

Node Tag	*Elevation*	*Node Type*	*Pressure at Node*	*Discharge at Node*	*Notes*
BASE	102.83		65.32		
TEST	102.83		65.43	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 ******
HEAD	0	5.60	14.82	1	T	5.0	12.000	120	7.000	
to						0.0	5.000		0.0	
LIN1	0		14.82	1.049		0.0	17.000	0.0747	1.270	Vel = 5.50
			0.0							
LIN1			14.82						8.270	K Factor = 5.15
HEAD2	0	5.60	21.00	1	T	5.0	12.000	120	14.062	
to						0.0	5.000		0.0	
LIN2	0		21.0	1.049		0.0	17.000	0.1425	2.422	Vel = 7.80
			0.0							
LIN2			21.00						16.484	K Factor = 5.17
200	131.090	5.60	23.59	1	3E	6.0	3.625	120	17.752	
to						0.0	6.000		0.290	
201	130.420		23.59	1.049		0.0	9.625	0.1767	1.701	Vel = 8.76
201	130.420	5.15	22.90	1.25	E	3.0	4.840	120	19.743	K = K @ LIN1
to						0.0	3.000		-0.290	
203	131.090		46.49	1.38		0.0	7.840	0.1629	1.277	Vel = 9.97
			0.0							
203			46.49						20.730	K Factor = 10.21
202	130.420	5.15	22.83	1	E	2.0	1.330	120	19.636	K = K @ LIN1
to					T	5.0	7.000		-0.290	
203	131.090		22.83	1.049		0.0	8.330	0.1661	1.384	Vel = 8.48
203	131.090		46.49	1.25	T	6.0	2.080	120	20.730	
to						0.0	6.000		0.0	
204	131.090		69.32	1.38		0.0	8.080	0.3412	2.757	Vel = 14.87
			0.0							
204			69.32						23.487	K Factor = 14.30
205	130.420	5.15	14.82	1	E	2.0	6.830	120	8.270	K = K @ LIN1
to					T	5.0	7.000		-0.290	
207	131.090		14.82	1.049		0.0	13.830	0.0747	1.033	Vel = 5.50
			0.0							
207			14.82						9.013	K Factor = 4.94
206	130.420	5.15	15.61	1		0.0	1.500	120	9.180	K = K @ LIN1
to						0.0	0.0		-0.290	
207	131.090		15.61	1.049		0.0	1.500	0.0820	0.123	Vel = 5.79
207	131.090		14.82	1.25		0.0	1.960	120	9.013	
to						0.0	0.0		0.0	
209	131.090		30.43	1.38		0.0	1.960	0.0745	0.146	Vel = 6.53
			0.0							
209			30.43						9.159	K Factor = 10.05
208	130.420	5.15	15.40	1	T	5.0	1.460	120	8.931	K = K @ LIN1
to						0.0	5.000		-0.290	
209	131.090		15.4	1.049		0.0	6.460	0.0802	0.518	Vel = 5.72
209	131.090		30.42	1.25		0.0	0.670	120	9.159	
to						0.0	0.0		0.0	
211	131.090		45.82	1.38		0.0	0.670	0.1582	0.106	Vel = 9.83
			0.0							
211			45.82						9.265	K Factor = 15.05

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 ******
210	130.420	5.15	15.44	1	T	5.0	2.170	120	8.977	K = K @ LIN1
to						0.0	5.000		-0.290	
211	131.090		15.44	1.049		0.0	7.170	0.0806	0.578	Vel = 5.73
211	131.090		45.82	1.25		0.0	3.920	120	9.265	
to						0.0	0.0		0.0	
214	131.090		61.26	1.38		0.0	3.920	0.2714	1.064	Vel = 13.14
			0.0							
214			61.26						10.329	K Factor = 19.06
212	130.420	5.15	14.93	1		0.0	6.000	120	8.394	K = K @ LIN1
to						0.0	0.0		0.0	
213	130.420		14.93	1.049		0.0	6.000	0.0757	0.454	Vel = 5.54
213	130.420	5.15	15.32	1	T	5.0	1.330	120	8.848	K = K @ LIN1
to						0.0	5.000		-0.290	
214	131.090		30.25	1.049		0.0	6.330	0.2798	1.771	Vel = 11.23
214	131.090		61.26	1.25		0.0	3.000	120	10.329	
to						0.0	0.0		0.0	
218	131.090		91.51	1.38		0.0	3.000	0.5703	1.711	Vel = 19.63
			0.0							
218			91.51						12.040	K Factor = 26.37
215	130.420	5.15	16.14	1		0.0	6.000	120	9.819	K = K @ LIN1
to						0.0	0.0		-0.290	
217	131.090		16.14	1.049		0.0	6.000	0.0875	0.525	Vel = 5.99
			0.0							
217			16.14						10.054	K Factor = 5.09
216	130.420	5.15	16.04	1	E	2.0	0.500	120	9.695	K = K @ LIN1
to					T	5.0	7.000		-0.290	
217	131.090		16.04	1.049		0.0	7.500	0.0865	0.649	Vel = 5.95
217	131.090		16.15	1	T	5.0	1.330	120	10.054	
to						0.0	5.000		0.0	
218	131.090		32.19	1.049		0.0	6.330	0.3137	1.986	Vel = 11.95
218	131.090		91.51	1.5		0.0	2.080	120	12.040	
to						0.0	0.0		0.0	
220	131.090		123.7	1.61		0.0	2.080	0.4702	0.978	Vel = 19.49
			0.0							
220			123.70						13.018	K Factor = 34.28
219	130.420	5.15	18.23	1	T	5.0	2.170	120	12.522	K = K @ LIN1
to						0.0	5.000		-0.290	
220	131.090		18.23	1.049		0.0	7.170	0.1096	0.786	Vel = 6.77
220	131.090		123.70	1.5		0.0	3.500	120	13.018	
to						0.0	0.0		0.0	
222	131.090		141.93	1.61		0.0	3.500	0.6066	2.123	Vel = 22.37
			0.0							
222			141.93						15.141	K Factor = 36.48
221	130.420	5.15	19.64	1	T	5.0	2.170	120	14.529	K = K @ LIN1
to						0.0	5.000		-0.290	
222	131.090		19.64	1.049		0.0	7.170	0.1258	0.902	Vel = 7.29
222	131.090		141.93	1.5	T	8.0	2.830	120	15.141	
to						0.0	8.000		0.0	
204	131.090		161.57	1.61		0.0	10.830	0.7706	8.346	Vel = 25.46

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 ******
204	131.090		69.31	3		0.0	7.170	120	23.487	
to						0.0	0.0		0.0	
224	131.090		230.88	3.26		0.0	7.170	0.0480	0.344	Vel = 8.87
			0.0							
224			230.88						23.831	K Factor = 47.29
223	132.010	5.60	25.23	1	2E	4.0	6.630	120	20.306	
to					T	5.0	9.000		0.398	
224	131.090		25.23	1.049		0.0	15.630	0.2001	3.127	Vel = 9.37
224	131.090		230.89	3	2E	18.815	6.250	120	23.831	
to						0.0	18.815		0.0	
226	131.090		256.12	3.26		0.0	25.065	0.0582	1.459	Vel = 9.84
			0.0							
226			256.12						25.290	K Factor = 50.93
225	130.420	5.15	25.12	1	E	2.0	2.080	120	23.778	K = K @ LIN1
to					T	5.0	7.000		-0.290	
226	131.090		25.12	1.049		0.0	9.080	0.1985	1.802	Vel = 9.33
226	131.090		256.12	3		0.0	0.830	120	25.290	
to						0.0	0.0		-0.251	
231	131.670		281.24	3.26		0.0	0.830	0.0687	0.057	Vel = 10.81
			0.0							
231			281.24						25.096	K Factor = 56.14
227	130.420	5.17	23.28	1	E	2.0	3.290	120	20.251	K = K @ LIN2
to					T	5.0	7.000		-0.974	
228	132.670		23.28	1.049		0.0	10.290	0.1723	1.773	Vel = 8.64
228	132.670		0.0	1.25	2E	6.0	14.580	120	21.050	
to						0.0	6.000		0.0	
230	132.670		23.28	1.38		0.0	20.580	0.0453	0.932	Vel = 4.99
			0.0							
230			23.28						21.982	K Factor = 4.97
229	130.420	5.15	23.92	1	E	2.0	0.710	120	21.559	K = K @ LIN1
to					T	5.0	7.000		-0.974	
230	132.670		23.92	1.049		0.0	7.710	0.1812	1.397	Vel = 8.88
230	132.670		23.28	1.25	E	3.0	7.000	120	21.982	
to					T	6.0	9.000		0.433	
231	131.670		47.2	1.38		0.0	16.000	0.1676	2.681	Vel = 10.12
231	131.670		281.24	3		0.0	2.000	120	25.096	
to						0.0	0.0		0.0	
232	131.670		328.44	3.26		0.0	2.000	0.0925	0.185	Vel = 12.62
232	131.670	5.60	28.16	3	V	6.72	62.250	120	25.281	
to						0.0	6.720		0.0	
233	131.670		356.6	3.26		0.0	68.970	0.1074	7.404	Vel = 13.71
233	131.670		0.0	3	3V	20.159	15.040	120	32.685	
to						0.0	20.159		0.974	
234	129.420		356.6	3.26		0.0	35.199	0.1074	3.779	Vel = 13.71
234	129.420		0.0	3	B	13.44	2.125	120	37.438	
to					S	21.503	55.102		0.0	
36	129.420		356.6	3.26	T	20.159	57.227	0.1074	6.144	Vel = 13.71

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 ******
36	129.420		0.0	4	2V	17.907	14.920	120	43.582	
to						0.0	17.907		5.812	
37	116		356.6	4.26		0.0	32.827	0.0292	0.958	Vel = 8.03
37	116		0.0	4	V	8.954	9.040	120	50.352	
to						0.0	8.954		4.114	
38	106.500		356.6	4.26		0.0	17.994	0.0292	0.525	Vel = 8.03
38	106.500		0.0	4	V	8.954	11.420	120	54.991	
to					X	21.067	45.821		0.0	
39	106.500		356.6	4.26	B	15.8	57.241	0.0292	1.670	Vel = 8.03
39	106.500		0.0	4	3V	26.861	14.835	120	56.661	
to					T	26.334	53.195		0.290	
TOR	105.830		356.6	4.26		0.0	68.030	0.0292	1.984	Vel = 8.03
TOR	105.830		0.0	4		0.0	3.000	120	58.935	
to						0.0	0.0		6.299	* * Fixed Loss = 5
BASE	102.830		356.6	4.26		0.0	3.000	0.0293	0.088	Vel = 8.03
BASE	102.830		0.0	8	L	20.56	40.000	140	65.322	
to					T	55.354	82.240		0.0	
TEST	102.830		356.6	8.27	G	6.326	122.240	0.0009	0.106	Vel = 2.13
			100.00							Qa = 100.00
TEST			456.60						65.428	K Factor = 56.45