

... Fire Protection by Computer Design

Residential Fire Protection
64 Daggett Hill Rd.
Greene, ME 04236
(207)946-343

Job Name : 185 FORE STREET BLDG
Building : WOOD STRUCTURE
Location : 4TH FLOOR MEZZANINE
System : 1
Contract : C16011
Data File : 185 FORE ST-HYD CALC-4TH FLR MEZZANINE.WXF

HYDRAULIC DESIGN INFORMATION SHEET

Name - 185 FORE STREET BLDG Date - 4/28/2016
Location - 4TH FLOOR MEZZANINE
Building - WOOD STRUCTURE System No. - 1
Contractor - RESIDENTIAL FIRE PROTECTION Contract No. - C16011
Calculated By - T. PRAY Drawing No. - 2 OF 2
Construction: (X) Combustible () Non-Combustible Ceiling Height 8'-3.5"
OCCUPANCY - RESIDENTIAL

S Type of Calculation: (X)NFPA 13 Residential ()NFPA 13R ()NFPA 13D
Y Number of Sprinklers Flowing: ()1 ()2 (X)4 ()
S ()Other
T ()Specific Ruling Made by Date
E
M Listed Flow at Start Point - 13 Gpm System Type
Listed Pres. at Start Point - 7 Psi () Wet () Dry
D MAXIMUM LISTED SPACING 16 x 16 () Deluge () PreAction
E Domestic Flow Added - Gpm Sprinkler or Nozzle
S Additional Flow Added - 100 Gpm Make VIKING Model VK457
I Elevation at Highest Outlet - 81.59Feet Size 7/16" K-Factor 4.9
G Note: Temperature Rating 155
N

Calculation Gpm Required 157.4 Psi Required 71.87 At Test
Summary C-Factor Used: Overhead 120 Underground 140

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 10-26-2012 Rated Cap. Cap.
T Time of Test - N/A @ Psi Elev.
E Static (Psi) - 97 Elev.
R Residual (Psi) - 93 Other Well
Flow (Gpm) - 1481 Proof Flow Gpm
S Elevation - 24.5

P Location: HYDRANTS ARE LOCATED AT NEWBURY AND HANCOCK STREETS, SEE PLOT PLAN

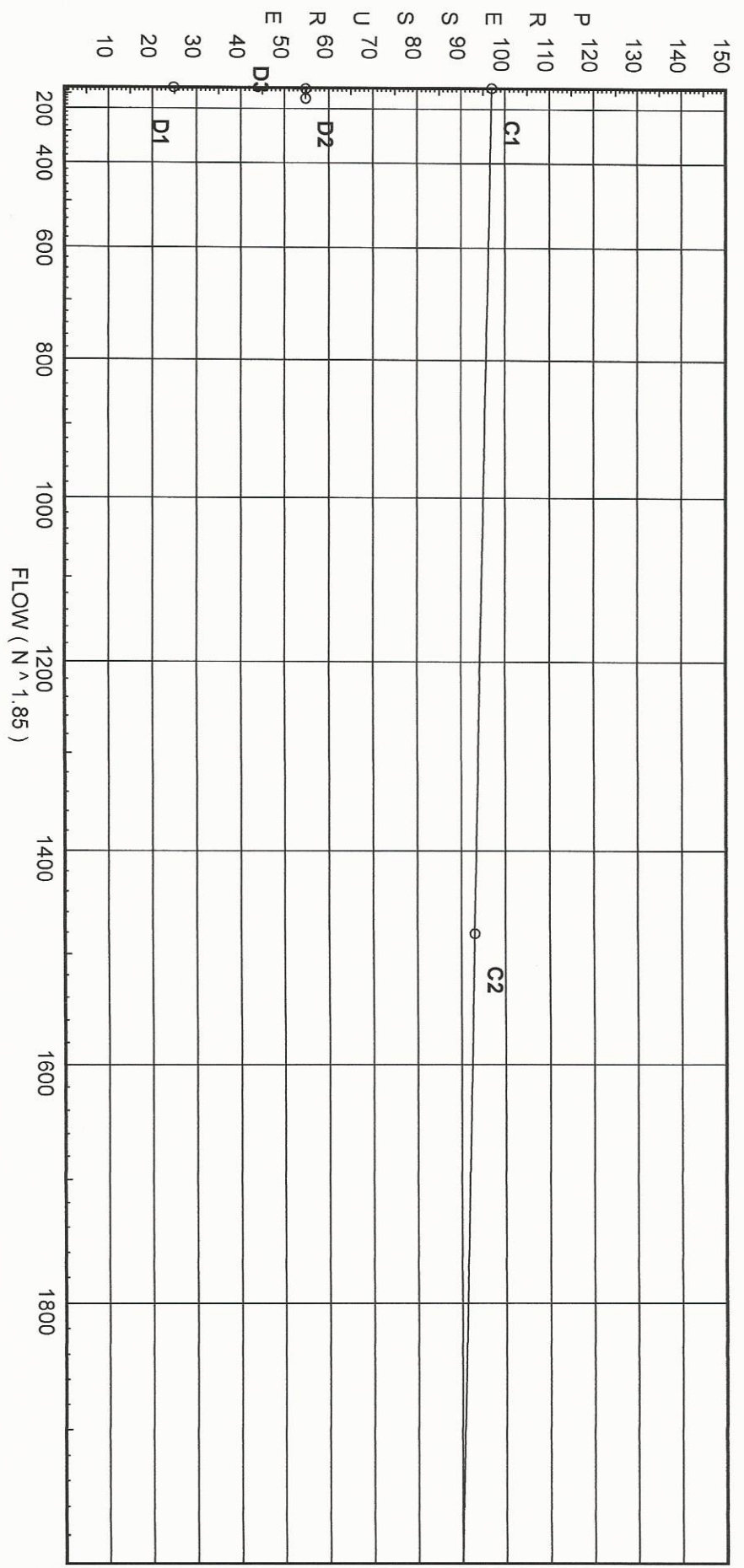
L Source of Information:
Y

Water Supply Curve (C)

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City Water Supply:
 C1 - Static Pressure : 97
 C2 - Residual Pressure: 93
 C2 - Residual Flow : 1481

Demand:
 D1 - Elevation : 24.726
 D2 - System Flow : 40.19
 D2 - System Pressure : 54.751
 Hose (Adj City) :
 Hose (Demand) : 100
 D3 - System Demand : 140.19
 Safety Margin : 42.198



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
E 90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F 45' Elbow	1	1	1	1	2	3	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G Generic 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 Long Turn Elbow	1	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
S Generic Swing Check Valve	4	5	5	7	9	11	14	16	19	22	27	32	45	55	65	76	87	98	109	130
T 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121

Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
DO01	0.0	4.9	7.04	na	13.0	0.0508	256	7.0
DO02	0.0	4.9	7.04	na	13.0	0.0508	256	7.0
20	81.59	K = K @ EQ01	7.22	na	13.0			
21	81.59	K = K @ EQ01	7.76	na	13.49			
22	81.59	K = K @ EQ02	8.21	na	13.7			
60	81.59		8.36	na				
61	70.375		22.19	na				
62	70.375		26.53	na				
66	70.375		27.41	na				
67	70.375		27.98	na				
HV1	63.0		31.19	na	50.0			
HV2	70.375		28.09	na	50.0			
83	32.17		45.94	na				
84	32.17		46.56	na				
TOR	32.17		47.14	na				
BOR	24.5		54.69	na				
TEST	24.5		54.75	na				

The maximum velocity is 14.92 and it occurs in the pipe between nodes 60 and 61

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftnng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
DO01 to EQ01	13.00 13.0	1.049 120 0.0587	1E	2.0 0.0 0.0	1.000 2.000 3.000	7.044 0.0 0.176			K Factor = 4.90 Vel = 4.83	
	0.0 13.00					7.220			K Factor = 4.84	
DO02 to EQ02	13.00 13.0	1.049 120 0.0587	1T	5.0 0.0 0.0	1.000 5.000 6.000	7.044 0.0 0.352			K Factor = 4.90 Vel = 4.83	
	0.0 13.00					7.396			K Factor = 4.78	
20 to 60	13.00 13.0	1.049 150 0.0388	1E 1T	3.022 7.555 0.0	18.750 10.577 29.327	7.220 0.0 1.139			K Factor @ node EQ01 Vel = 4.83	
	0.0 13.00					8.359			K Factor = 4.50	
21 to 22	13.49 13.49	1.049 150 0.0415		0.0 0.0 0.0	10.670 0.0 10.670	7.764 0.0 0.443			K Factor @ node EQ01 Vel = 5.01	
22 to 60	13.70 27.19	1.049 150 0.1520		0.0 0.0 0.0	1.000 0.0 1.000	8.207 0.0 0.152			K Factor @ node EQ02 Vel = 10.09	
60 to 61	13.00 40.19	1.049 150 0.3132	2E 1T	6.044 7.555 0.0	15.050 13.599 28.649	8.359 4.857 8.973			Vel = 14.92	
61 to 62	0.0 40.19	1.049 120 0.4733	1T	5.0 0.0 0.0	4.170 5.000 9.170	22.189 0.0 4.340			Vel = 14.92	
62 to 66	0.0 40.19	2.157 120 0.0141	3T	36.92 0.0 0.0	25.710 36.920 62.630	26.529 0.0 0.885			Vel = 3.53	
66 to 67	0.0 40.19	2.157 120 0.0141	1I 1F 1S 1T	4.307 2.461 13.537 12.307	7.250 32.612 39.862	27.414 0.0 0.564			Vel = 3.53	
67 to HV1	0.0 40.19	3.26 120 0.0019		0.0 0.0 0.0	7.380 0.0 7.380	27.978 3.194 0.014			Vel = 1.54	
HV1 to HV2	50.00 90.19	3.26 120 0.0084		0.0 0.0 0.0	12.000 0.0 12.000	31.186 -3.194 0.101			Qa = 50 Vel = 3.47	
HV2 to 83	50.00 140.19	3.26 120 0.0191	1I 1J	6.72 17.471 0.0	44.000 24.191 68.191	28.093 16.547 1.301			Qa = 50 Vel = 5.39	
83 to 84	0.0 140.19	3.26 120 0.0191	1J	17.471 0.0 0.0	15.040 17.471 32.511	45.941 0.0 0.621			Vel = 5.39	
84 to TOR	0.0 140.19	3.26 120 0.0191	2I	13.44 0.0 0.0	16.920 13.440 30.360	46.562 0.0 0.579			Vel = 5.39	

Final Calculations - Standard

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
TOR	0.0	3.26	1F 4.032	7.670	47.141				
to		120	0.0	4.032	7.322				
BOR	140.19	0.0191	0.0	11.702	0.223			* Fixed loss = 4 Vel = 5.39	
BOR	0.0	6.16	1L 12.911	40.000	54.686				
to		140	1G 4.304	60.252	0.0				
TEST	140.19	0.0006	1T 43.037	100.252	0.065			Vel = 1.51	
	0.0								
	140.19				54.751			K Factor = 18.95	