

**... 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 : 1ST FLOOR- TRUSS CONCEALED SPACE  
System : 1  
Contract : C16011  
Data File : 185 FORE ST-HYD CALC-1ST FLR CONCEALED SPACE.WXF

Hydraulic Design Information Sheet

Name - 185 FORE STREET BLDG Date - 4/28/16  
 Location - 1ST FLOOR- TRUSS CONCEALED SPACE  
 Building - WOOD STRUCTURE System No. - 1  
 Contractor - RESIDENTIAL FIRE PROTECTION Contract No. - C16011  
 Calculated By - T. PRAY Drawing No. - 1 OF 2  
 Construction: (X) Combustible ( ) Non-Combustible Ceiling Height - 1'-0"  
 Occupancy - CONCEALED SPACE/ LIGHT HAZARD

S (X) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. ( ) 1 ( ) 2 ( ) 3 ( ) Ex.Haz.  
 Y ( ) NFPA 231 ( ) NFPA 231C ( ) Figure Curve

S Other

T Specific Ruling Made By Date

E  
 M Area of Sprinkler Operation - 933 System Type Sprinkler/Nozzle  
 Density - .1 ( ) Wet Make VIKING  
 D Area Per Sprinkler - 130 ( ) Dry Model VK300  
 E Elevation at Highest Outlet - 32.46 ( ) Deluge Size 1/2"  
 S Hose Allowance - Inside - 100 ( ) Preaction K-Factor 5.6  
 I Rack Sprinkler Allowance - ( ) Other Temp.Rat.200  
 G Hose Allowance - Outside - 0  
 N

Note

Calculation Flow Required - 262.21 Press Required - 27.47 AT TEST  
 Summary C-Factor Used: 120 Overhead 140 Underground

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

U  
 P Location - HYDRANTS LOCATED ON NEWBURY AND HANCOCK STREETS, SEE PLOT PLAN

P  
 L Source of Information - PORTLAND WATER DISTRICT  
 Y

C Commodity Class Location  
 O Storage Ht. Area Aisle W.  
 M Storage Method: Solid Piled % Palletized % Rack  
 M  
 ( ) Single Row ( ) Conven. Pallet ( ) Auto. Storage ( ) Encap.  
 S R ( ) Double Row ( ) Slave Pallet ( ) Solid Shelf ( ) Non  
 T A ( ) Mult. Row ( ) Open Shelf

O C  
 R K Flue Spacing Clearance:Storage to Ceiling  
 A Longitudinal Transverse  
 G

E Horizontal Barriers Provided:

# Water Supply Curve (C)

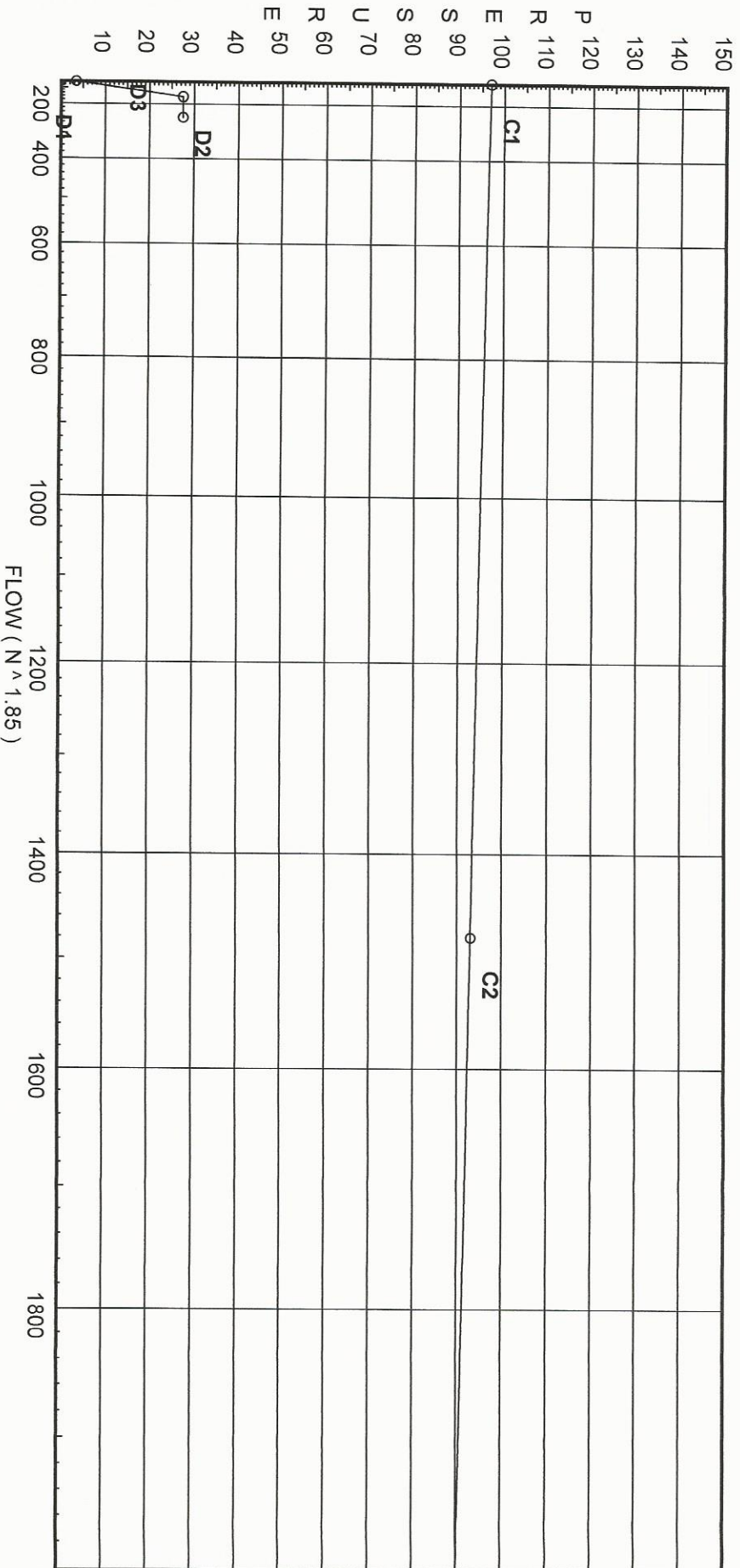
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## City Water Supply:

C1 - Static Pressure : 97  
C2 - Residual Pressure: 93  
C2 - Residual Flow : 1481

## Demand:

D1 - Elevation : 3.447  
D2 - System Flow : 162.211  
D2 - System Pressure : 27.469  
Hose ( Adj City ) :  
Hose ( Demand ) : 100  
D3 - System Demand : 262.211  
Safety Margin : 69.368



# 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	2	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' 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		Long Turn Elbow	1	1	2	2	3	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
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	5.6	7.0	na	14.82	0.114	130	7.0
DO02	0.0	5.6	7.0	na	14.82	0.114	130	7.0
40	32.46	K = K @ EQ01	7.3	na	14.82			
41	32.46	K = K @ EQ02	8.22	na	15.49			
42	32.46	K = K @ EQ02	12.15	na	18.83			
43	32.46	K = K @ EQ01	12.97	na	19.75			
44	32.46	K = K @ EQ01	9.27	na	16.7			
45	32.46	K = K @ EQ02	10.58	na	17.57			
46	32.46	K = K @ EQ01	13.25	na	19.96			
47	32.46	K = K @ EQ01	12.41	na	19.32			
48	32.46	K = K @ EQ02	13.39	na	19.77			
80	32.46		14.5	na				
81	32.46		14.81	na				
82	32.46		15.86	na				
83	32.17		18.2	na				
84	32.17		19.01	na				
TOR	32.17		19.77	na				
BOR	24.5		27.38	na				
TEST	24.5		27.47	na	100.0			

The maximum velocity is 14.51 and it occurs in the pipe between nodes 48 and 82

# Final Calculations - Hazen-Williams

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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	*****
DO01 to EQ01	14.82	1.049 120	1E	2.0 0.0	2.000 2.000	7.004 0.0			K Factor = 5.60	
	14.82	0.0748		0.0	4.000	0.299			Vel = 5.50	
	0.0 14.82						7.303		K Factor = 5.48	
DO02 to EQ02	14.82	1.049 120	1T	5.0 0.0	2.000 5.000	7.004 0.0			K Factor = 5.60	
	14.82	0.0747		0.0	7.000	0.523			Vel = 5.50	
	0.0 14.82						7.527		K Factor = 5.40	
40 to 41	14.82	1.049 120	1E	2.0 0.0	10.290 2.000	7.303 0.0			K Factor @ node EQ01	
	14.82	0.0747		0.0	12.290	0.918			Vel = 5.50	
41 to 42	15.49	1.049 120		0.0 0.0	14.000 0.0	8.221 0.0			K Factor @ node EQ02	
	30.31	0.2808		0.0	14.000	3.931			Vel = 11.25	
42 to 80	18.83	1.38 120	1T	6.0 0.0	7.000 6.000	12.152 0.0			K Factor @ node EQ02	
	49.14	0.1805		0.0	13.000	2.347			Vel = 10.54	
	0.0 49.14						14.499		K Factor = 12.91	
43 to 80	19.75	1.049 120	1T	5.0 0.0	7.000 5.000	12.973 0.0			K Factor @ node EQ01	
	19.75	0.1272		0.0	12.000	1.526			Vel = 7.33	
	0.0 19.75						14.499		K Factor = 5.19	
44 to 45	16.70	1.049 120		0.0 0.0	14.000 0.0	9.272 0.0			K Factor @ node EQ01	
	16.7	0.0932		0.0	14.000	1.305			Vel = 6.20	
45 to 81	17.57	1.049 120	1T	5.0 0.0	7.000 5.000	10.577 0.0			K Factor @ node EQ02	
	34.27	0.3524		0.0	12.000	4.229			Vel = 12.72	
	0.0 34.27						14.806		K Factor = 8.91	
46 to 81	19.96	1.049 120	1T	5.0 0.0	7.000 5.000	13.250 0.0			K Factor @ node EQ01	
	19.96	0.1297		0.0	12.000	1.556			Vel = 7.41	
	0.0 19.96						14.806		K Factor = 5.19	
47 to 48	19.32	1.049 120		0.0 0.0	8.000 0.0	12.413 0.0			K Factor @ node EQ01	
	19.32	0.1221		0.0	8.000	0.977			Vel = 7.17	
48 to 82	19.77	1.049 120	1T	5.0 0.0	0.500 5.000	13.390 0.0			K Factor @ node EQ02	
	39.09	0.4495		0.0	5.500	2.472			Vel = 14.51	
	0.0 39.09						15.862		K Factor = 9.81	

# 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	*****
80	68.89	2.157		8.000	14.499				
to		120		0.0	0.0				
81	68.89	0.0384		8.000	0.307		Vel = 6.05		
81	54.23	2.157		9.420	14.806				
to		120		0.0	0.0				
82	123.12	0.1121		9.420	1.056		Vel = 10.81		
82	39.09	2.157		11.830	15.862				
to		120		0.0	0.126				
83	162.21	0.1868		11.830	2.210		Vel = 14.24		
83	0.0	3.26	1J	17.471	15.040	18.198			
to		120		0.0	17.471	0.0			
84	162.21	0.0250		0.0	32.511	0.813	Vel = 6.23		
84	0.0	3.26	2I	13.44	16.920	19.011			
to		120		0.0	13.440	0.0			
TOR	162.21	0.0250		0.0	30.360	0.759	Vel = 6.23		
TOR	0.0	3.26	1F	4.032	7.670	19.770			
to		120		0.0	4.032	7.322			
BOR	162.21	0.0250		0.0	11.702	0.292	* Fixed loss = 4 Vel = 6.23		
BOR	0.0	6.16	1L	12.911	40.000	27.384			
to		140	1G	4.304	60.252	0.0			
TEST	162.21	0.0008	1T	43.037	100.252	0.085	Vel = 1.75		
	100.00						Qa = 100.00		
	262.21				27.469		K Factor = 50.03		