

. . . Fire Protection by Computer Design

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

Job Name : 93 SAINT LAWRENCE STREET BLDG
Building : WOOD STRUCTURE
Location : 3RD FLR UNIT
System : 1 (WET)
Contract : C16014
Data File : 93 ST LAWRENCE ST- 3RD FLR- HYD CALC.WXF

HYDRAULIC DESIGN INFORMATION SHEET

Name - 93 ST. LAWRENCE STREET Date - 4/18/2016
Location - 3RD FLR UNIT
Building - WOOD STRUCTURE System No. - 1 (WET)
Contractor - RESIDENTIAL FIRE PROTECTION Contract No. - C16014
Calculated By - T.PRAY Drawing No. - 2 OF 2
Construction: (X) Combustible () Non-Combustible Ceiling Height 9'-0"
OCCUPANCY - APARTMENT

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 (X) Wet () Dry
D MAXIMUM LISTED SPACING 16' x 16' () Deluge () PreAction
E Domestic Flow Added - Gpm Sprinkler or Nozzle
S Additional Flow Added - Gpm Make VIKING Model VK468
I Elevation at Highest Outlet - 130.34Feet Size 7/16" K-Factor 4.9
G Note: Temperature Rating 155
N

Calculation Gpm Required 58.86 Psi Required 47.85 At Test
Summary C-Factor Used: Overhead 150 Underground 140

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 4/30/2014 Rated Cap. Cap.
T Time of Test - N/A @ Psi Elev.
E Static (Psi) - 50 Elev.
R Residual (Psi) - 44 Other Well
Flow (Gpm) - 919 Proof Flow Gpm
S Elevation - 100

P Location: TEST HYDRANT AT THE CORNER OF MONUMENT ST AND ST LAWRENCE ST,
P SEE PLOT PLAN FOR MORE INFORMATION
L Source of Information: PORTLAND WATER DISTRICT
Y

Water Supply Curve (C)

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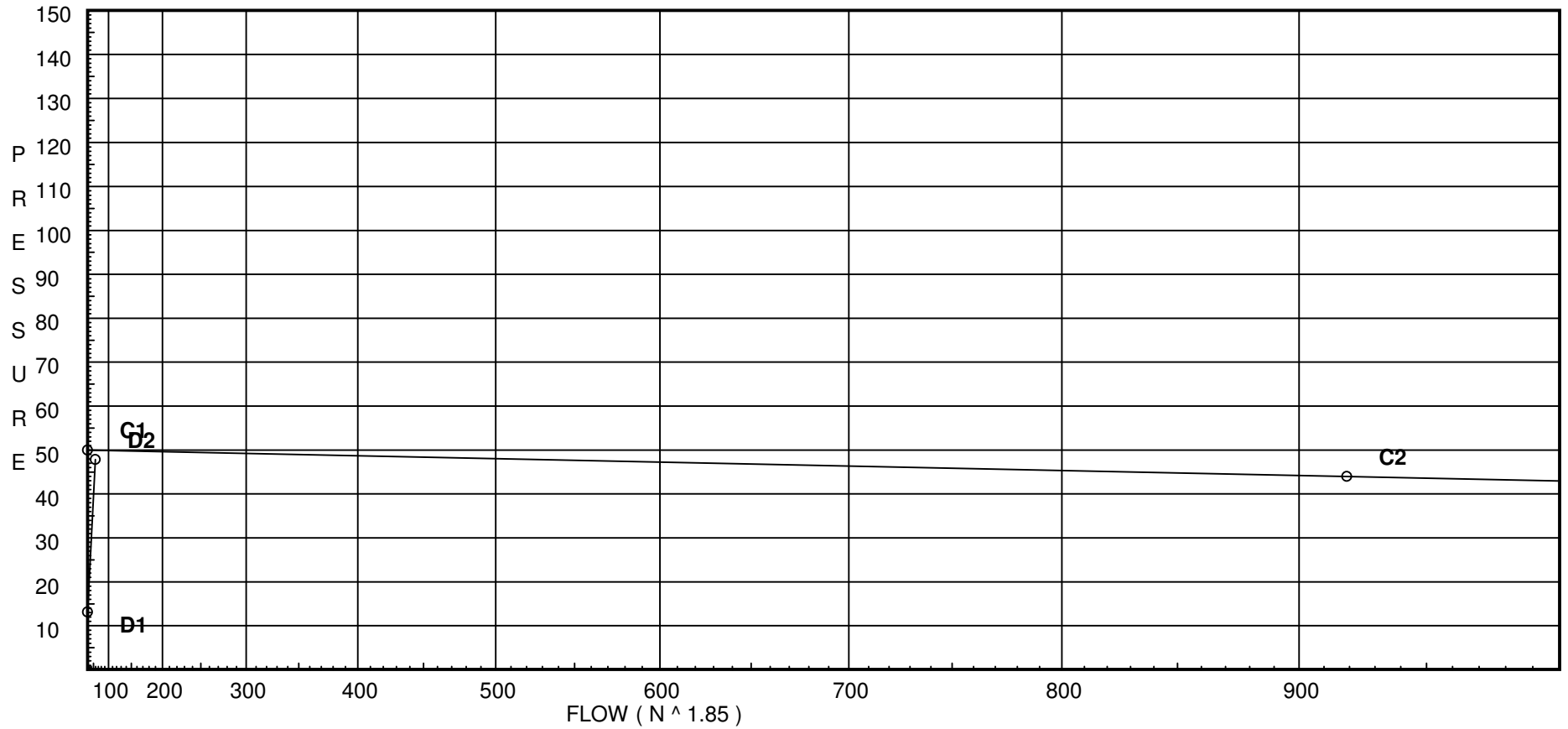
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City Water Supply:

C1 - Static Pressure : 50
C2 - Residual Pressure: 44
C2 - Residual Flow : 919

Demand:

D1 - Elevation : 13.140
D2 - System Flow : 58.8559
D2 - System Pressure : 47.853
Hose (Adj City) : _____
Hose (Demand) : _____
D3 - System Demand : 58.8559
Safety Margin : 2.110



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
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
L	Long Turn Elbow	1	1	2	2	2	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
Z	Generic Flow Switch	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61

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
DO03	0.0	4.9	7.04	na	13.0	0.0508	256	7.0
20	130.34	K = K @ EQ01	7.47	na	13.0			
21	130.34	K = K @ EQ02	8.86	na	13.81			
22	130.34	K = K @ EQ02	10.4	na	14.97			
50	130.34		11.54	na				
51	130.34		12.85	na				
23	130.34	K = K @ EQ02	13.53	na	17.07			
52	130.34		18.93	na				
54	109.08		30.83	na				
55	109.08		32.0	na				
AD	109.08		32.36	na				
TOR	108.5		34.96	na				
BOR	102.08		39.59	na				
BFP	102.08		39.8	na				
6UG	101.0		47.4	na				
TEST	100.0		47.85	na				

The maximum velocity is 12.37 and it occurs in the pipe between nodes 23 and 52

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	13.00 13.0	0.874 150 0.0946	1E	4.026 0.0	0.500 4.026 4.526	7.044 0.0			K Factor = 4.90	
	0.0 13.00						7.472		K Factor = 4.76	
DO02 to EQ02	13.00 13.0	0.874 150 0.0945	1T	8.053 0.0	0.500 8.052 8.552	7.044 0.0			K Factor = 4.90	
	0.0 13.00						7.852		K Factor = 4.64	
DO03 to EQ03	13.00 13.0	1.101 150 0.0307	1T	9.563 0.0	0.500 9.562 10.062	7.044 0.0			K Factor = 4.90	
	0.0 13.00						7.353		K Factor = 4.79	
20 to 21	13.00 13.0	0.874 150 0.0944		0.0 0.0	14.670 0.0 14.670	7.472 0.0			K Factor @ node EQ01	
				0.0	14.670	1.385			Vel = 6.95	
21 to 22	13.82 26.82	1.101 150 0.1171		0.0 0.0	13.210 0.0 13.210	8.857 0.0			K Factor @ node EQ02	
				0.0	13.210	1.547			Vel = 9.04	
22 to 50	14.97 41.79	1.394 150 0.0843	1T	9.523 0.0	4.000 9.523 13.523	10.404 0.0			K Factor @ node EQ02	
	0.0	1.394	1T	9.523	6.000	11.544			Vel = 8.78	
50 to 51	41.79	0.0843		0.0	15.523	1.308			Vel = 8.78	
51 to 23	0.0 41.79	1.394 150 0.0842		0.0 0.0	8.000 0.0 8.000	12.852 0.0			Vel = 8.78	
23 to 52	17.07 58.86	1.394 150 0.1588	2T	19.046 0.0	15.000 19.047 34.047	13.526 0.0			K Factor @ node EQ02	
				0.0	34.047	5.408			Vel = 12.37	
52 to 54	0.0 58.86	1.598 150 0.0817	1T	11.656 0.0	21.210 11.656 32.866	18.934 9.208			Vel = 9.42	
54 to 55	0.0 58.86	1.598 150 0.0817	1T	11.656 0.0	2.670 11.656 14.326	30.826 0.0			Vel = 9.42	
55 to AD	0.0 58.86	1.598 150 0.0816		0.0 0.0	4.500 0.0 4.500	31.996 0.0			Vel = 9.42	
AD to TOR	0.0 58.86	1.61 120 0.1190	2E 1T	8.0 8.0	3.750 16.000 19.750	32.363 0.251			Vel = 9.28	
TOR to BOR	0.0 58.86	1.61 120 0.1190	1Z 1T	4.0 8.0	3.500 12.000 15.500	34.964 2.780			Vel = 9.28	
				0.0	15.500	1.845			Vel = 9.28	

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	*****
BOR to BFP	0.0 58.86	2.469 120 0.0149	2I 12.0 0.0	2.000 12.000 14.000	39.589 0.0 0.208		Vel = 3.94		
BFP to 6UG	0.0 58.86	2.469 120 0.0148	1I 6.0 0.0	3.000 6.000 9.000	39.797 7.468 0.133		* Fixed loss = 7 Vel = 3.94		
6UG to TEST	0.0 58.86	6.16 140 0.0001	2L 25.822 1G 4.304 1T 43.037	95.000 73.163 168.163	47.398 0.433 0.022		Vel = 0.63		
	0.0 58.86				47.853		K Factor = 8.51		