



**. . . Fire Protection by Computer Design**

FREEDOM FIRE PROTECTION INC.  
209 QUAKER RIDGE ROAD  
CASCO, MAINE 04015  
207-627-4109

Job Name : OAK STREET LOFTS HC1  
Building : 72 OAK STREET  
Location : PORTLAND, MAINE 04101  
System : #1 AREA#1  
Contract :  
Data File : OAK STREET LOFTS HC1.WXF

HYDRAULIC DESIGN INFORMATION SHEET

Name - OAK STREET LOFTS Date - 6/14/11  
Location - PORTLAND, MAINE 04101  
Building - 72 OAK STREET System No. - #1 AREA#1  
Contractor - Contract No. -  
Calculated By - MIKE NOBLIT Drawing No. - FP-3  
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height 9'-0"  
OCCUPANCY - LOFTS

S Type of Calculation: (X)NFPA 13 Residential (X)NFPA 13R ( )NFPA 13D  
Y Number of Sprinklers Flowing: ( )1 (X)2 ( )4 ( )  
S ( )Other  
T ( )Specific Ruling Made by Date  
E  
M Listed Flow at Start Point - 17 Gpm System Type  
Listed Pres. at Start Point - 12 Psi (X) Wet ( ) Dry  
D MAXIMUM LISTED SPACING 18 x 18 ( ) Deluge ( ) PreAction  
E Domestic Flow Added - Gpm Sprinkler or Nozzle  
S Additional Flow Added - Gpm Make TYCO Model LFII  
I Elevation at Highest Outlet - 45'-4"Feet Size 1/2" K-Factor 4.9  
G Note: Temperature Rating 155  
N

Calculation Gpm Required 33.949 Psi Required 47.631 At Test  
Summary C-Factor Used: Overhead 150 Underground 140

W Water Flow Test: Pump Data: Tank or Reservoir:  
A Date of Test - 5/7/10 Rated Cap. Cap.  
T Time of Test - @ Psi Elev.  
E Static (Psi) - 66 Elev.  
R Residual (Psi) - 62 Other Well  
Flow (Gpm) - 1186 Proof Flow Gpm  
S Elevation - 0

P Location:  
P  
L Source of Information: PORTLAND WATER DISTRICT  
Y

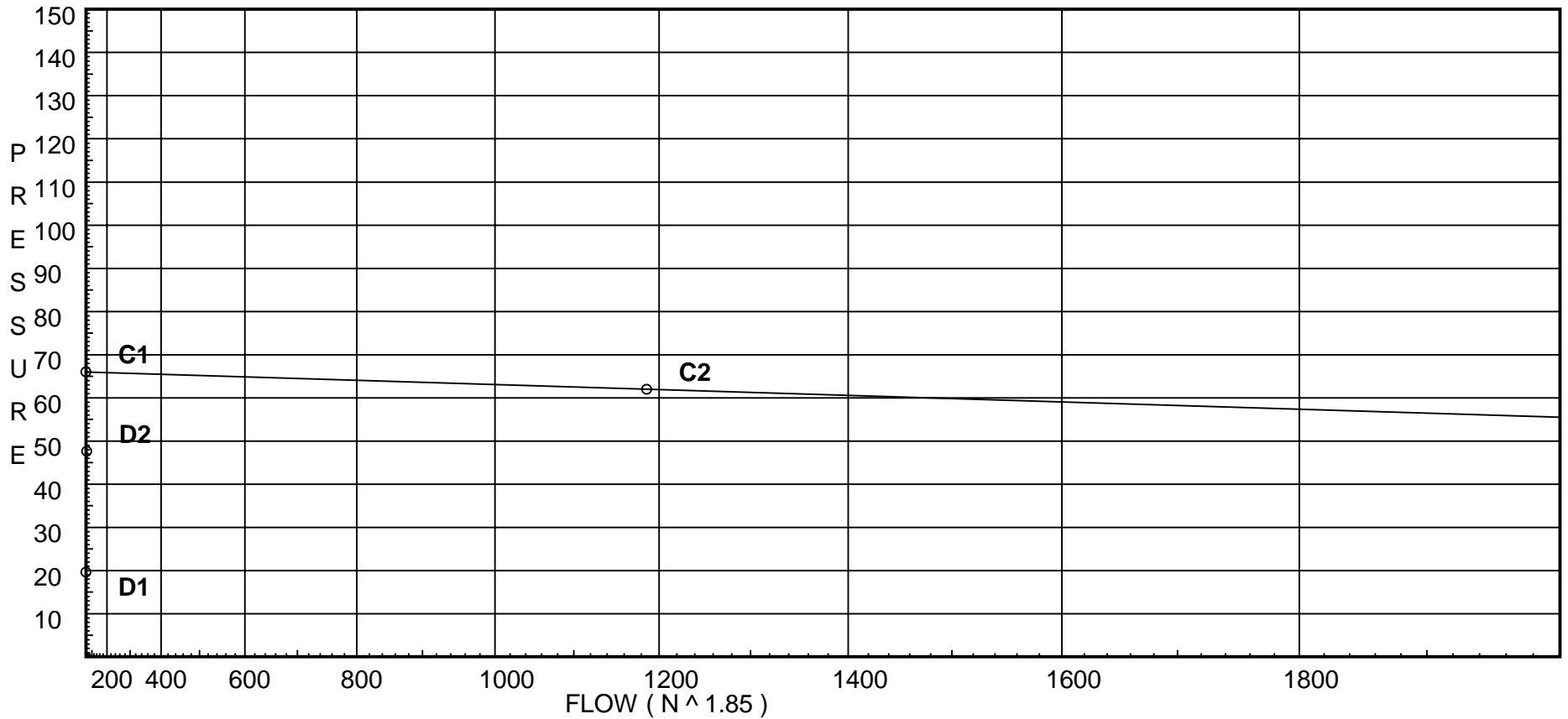
# Water Supply Curve (C)

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City Water Supply:  
C1 - Static Pressure : 66  
C2 - Residual Pressure: 62  
C2 - Residual Flow : 1186

Demand:  
D1 - Elevation : 19.632  
D2 - System Flow : 33.9489  
D2 - System Pressure : 47.631  
Hose ( Adj City ) : \_\_\_\_\_  
Hose ( Demand ) : \_\_\_\_\_  
D3 - System Demand : 33.9489  
Safety Margin : 18.363



# Fittings Used Summary

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## 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	Generic Butterfly Valve	0	0	0	0	0	0	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
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
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			

Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
101	45.33	4.9	12.0	na	16.97	0.05	324	12.0
17	45.33		13.36	na				
16	45.33		14.15	na				
15	45.33		16.18	na				
102	45.33	4.9	12.0	na	16.97	0.05	324	12.0
14	45.33		13.08	na				
13	45.33		13.86	na				
12	45.33		15.44	na				
11	45.33		16.82	na				
10	45.33		17.01	na				
9	45.33		17.93	na				
8	45.33		20.51	na				
7	45.33		23.32	na				
6	12.76		37.82	na				
5	12.76		37.96	na				
4	12.76		38.38	na				
3	4.42		42.0	na				
2	4.42		42.01	na				
1	0.0		47.61	na				
TEST	0.0		47.63	na				

The maximum velocity is 7.14 and it occurs in the pipe between nodes 10 and 9

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 *****
101 to 17	16.97	1.101 150	1E 3.825	23.330 0.0 3.825	12.000 0.0		K Factor = 4.90
17 to 16	16.97	0.0502	0.0	27.155	1.364		Vel = 5.72
17 to 16	0.0	1.101 150	0.0	15.660 0.0	13.364 0.0		
16 to 15	16.97	0.0503	0.0	15.660	0.787		Vel = 5.72
16 to 15	0.0	1.101 150	0.0	40.330 0.0	14.151 0.0		
15 to 10	16.97	0.0502	0.0	40.330	2.025		Vel = 5.72
15 to 10	0.0	1.101 150	1T 9.563	7.083 0.0 9.562	16.176 0.0		
10	16.97	0.0502	0.0	16.645	0.836		Vel = 5.72
	0.0						
	16.97				17.012		K Factor = 4.11
102 to 14	16.97	1.101 150	1E 3.825	17.583 0.0 3.825	12.001 0.0		K Factor = 4.90
14 to 13	16.97	0.0502	0.0	21.408	1.075		Vel = 5.72
14 to 13	0.0	1.101 150	0.0	15.660 0.0	13.076 0.0		
13 to 12	16.97	0.0503	0.0	15.660	0.787		Vel = 5.72
13 to 12	0.0	1.101 150	0.0	31.330 0.0	13.863 0.0		
12 to 11	16.97	0.0502	0.0	31.330	1.574		Vel = 5.72
12 to 11	0.0	1.101 150	1T 9.563	18.000 0.0 9.562	15.437 0.0		
11 to 10	16.97	0.0503	0.0	27.562	1.385		Vel = 5.72
11 to 10	0.0	1.394 150	0.0	12.000 0.0	16.822 0.0		
10 to 9	16.97	0.0158	0.0	12.000	0.190		Vel = 3.57
10 to 9	16.98	1.394 150	1T 9.523	6.500 0.0 9.523	17.012 0.0		
9 to 8	33.95	0.0574	0.0	16.023	0.920		Vel = 7.14
9 to 8	0.0	1.394 150	1T 9.523	35.375 0.0 9.523	17.932 0.0		
8 to 7	33.95	0.0574	0.0	44.898	2.577		Vel = 7.14
8 to 7	0.0	1.598 150	1E 5.828	21.491 0.0 5.828	20.509 2.000		* Fixed loss = 2
7 to 6	33.95	0.0295	0.0	27.319	0.806		Vel = 5.43
7 to 6	0.0	2.157 120	1E 6.153	32.660 0.0 6.153	23.315 14.106		
6 to 5	33.95	0.0104	0.0	38.813	0.402		Vel = 2.98
6 to 5	0.0	2.157 120	1T 12.307	0.750 0.0 12.307	37.823 0.0		
5	33.95	0.0103	0.0	13.057	0.135		Vel = 2.98

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
5	0.0	2.157	3E 18.46	22.000	37.958				
to		120	0.0	18.460	0.0				
4	33.95	0.0103	0.0	40.460	0.418		Vel =	2.98	
4	0.0	4.26	1E 13.167	8.250	38.376				
to		120	1B 15.8	28.967	3.612				
3	33.95	0.0004	0.0	37.217	0.014		Vel =	0.76	
3	0.0	4.26	1T 26.334	2.000	42.002				
to		120	0.0	26.334	0.0				
2	33.95	0.0004	0.0	28.334	0.011		Vel =	0.76	
2	0.0	4.026	1Zac 0.0	3.420	42.013				
to		120	0.0	0.0	5.594		* Fixed loss =	3.68	
1	33.95	0.0006	0.0	3.420	0.002		Vel =	0.86	
1	0.0	4.1	1E 14.534	50.000	47.609				
to		140	0.0	14.534	0.0				
TEST	33.95	0.0003	0.0	64.534	0.022		Vel =	0.83	
	0.0								
	33.95				47.631		K Factor =	4.92	