

. . . Fire Protection by Computer Design

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

Job Name : 223 CUMBERLAND AVE APT'S
Building : WOOD STRUCTURE
Location : 4TH FLOOR
System : WET
Contract : C16005
Data File : 223 CUMBERLAND AVE APT- 4TH FLR.WXF

Hydraulic Design Information Sheet

Name - 223 CUMBERLAND AVE APT'S Date - 2/29/16
 Location - 4TH FLOOR
 Building - WOOD STRUCTURE System No. - WET
 Contractor - RESIDENTIAL FIRE PROTECTION Contract No. - C16005
 Calculated By - T. PRAY Drawing No. - 2 OF 2
 Construction: (X) Combustible () Non-Combustible Ceiling Height - 8'-10"
 Occupancy - RESIDENTIAL

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

M	Area of Sprinkler Operation	- 4 HD'S	System Type	Sprinkler/Nozzle
	Density	- .0508	(X) Wet	Make VIKING
D	Area Per Sprinkler	- 256	() Dry	Model VK486
E	Elevation at Highest Outlet	- 136.5	() Deluge	Size 7/16"
S	Hose Allowance - Inside	-	() Preaction	K-Factor 4.0
I	Rack Sprinkler Allowance	-	() Other	Temp.Rat.155
G	Hose Allowance - Outside	- 100		

N Note

Calculation Flow Required - 162.35 Press Required - 89.15 AT TEST
 Summary C-Factor Used: 150 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 6/20/2012		Cap. -
T	Time of Test - N/A	Rated Cap.-	Elev.-
E	Static Press - 96	@ Press -	
R	Residual Press - 94	Elev. -	Well
S	Flow - 1352		Proof Flow
U	Elevation - 99.0'		

P Location - TEST HYDRANT LOCATED AT THE CORNER OF CUMBERLAND AVE AND WILMOT ST

L Source of Information - PORTLAND WATER DISTRICT

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

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

E Horizontal Barriers Provided:

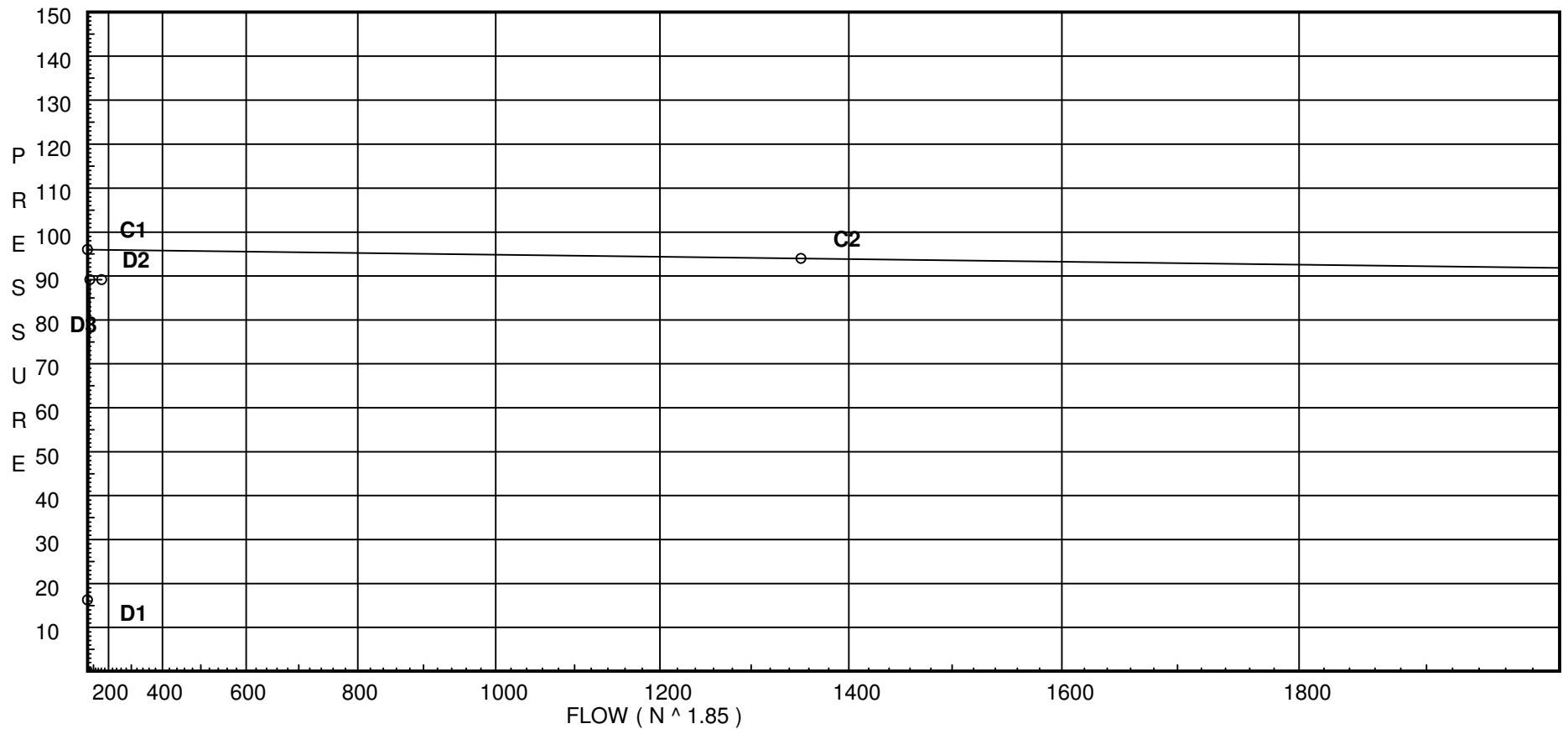
Water Supply Curve (C)

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City Water Supply:
C1 - Static Pressure : 96
C2 - Residual Pressure: 94
C2 - Residual Flow : 1352

Demand:
D1 - Elevation : 16.241
D2 - System Flow : 62.349
D2 - System Pressure : 89.153
Hose (Adj City) : _____
Hose (Demand) : 100
D3 - System Demand : 162.349
Safety Margin : 6.808



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
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.
1	136.5	4	10.57	na	13.0	0.0508	256	7.6
2	136.5	4	10.68	na	13.07	0.0508	256	7.6
50	136.25		11.63	na				
51	127.75		22.86	na				
3	136.25	4	18.33	na	17.13	0.0508	256	7.6
11	127.75		25.78	na				
52	127.75		27.51	na				
4	136.25	4	22.91	na	19.14	0.0508	256	7.6
53	126.5		32.44	na				
54	126.5		45.11	na				
55	108.0		59.0	na				
56	108.0		62.23	na				
38	97.67		72.14	na				
39	97.67		74.94	na				
40	97.67		77.75	na				
41	97.67		80.55	na				
42	97.67		84.02	na				
43	97.67		84.02	na				
61	97.75		83.98	na				
62	97.75		83.98	na				
TOR	97.75		84.23	na				
BOR	94.29		91.11	na				
TEST	99.0		89.15	na	100.0			

The maximum velocity is 21.01 and it occurs in the pipe between nodes 53 and 54

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	*****
1 to 50	13.00 13.0	0.874 150 0.0945	1T	8.053 0.0 0.0	2.040 8.052 10.092	10.570 0.108 0.954			K Factor = 4.00 Vel = 6.95	
	0.0 13.00						11.632		K Factor = 3.81	
2 to 50	13.07 13.07	0.874 150 0.0954	1T	8.053 0.0 0.0	0.750 8.052 8.802	10.684 0.108 0.840			K Factor = 4.00 Vel = 6.99	
50 to 51	13.01 26.08	0.874 150 0.3423	1E 1T	4.026 8.053 0.0	9.960 12.078 22.038	11.632 3.681 7.543			Vel = 13.95	
51 to 52	0.0 26.08	0.75 150 0.7211		0.0 0.0 0.0	6.460 0.0 6.460	22.856 0.0 4.658			Vel = 18.94	
	0.0 26.08						27.514		K Factor = 4.97	
3 to 11	17.13 17.13	0.874 150 0.1572	1E 1T	4.026 8.053 0.0	11.870 12.078 23.948	18.331 3.681 3.765			K Factor = 4.00 Vel = 9.16	
11 to 52	0.0 17.13	0.874 150 0.1572	1T	8.053 0.0 0.0	3.000 8.052 11.052	25.777 0.0 1.737			Vel = 9.16	
52 to 53	26.07 43.2	1.101 150 0.2829	2E	7.65 0.0 0.0	7.840 7.650 15.490	27.514 0.541 4.382			Vel = 14.56	
	0.0 43.20						32.437		K Factor = 7.59	
4 to 53	19.14 19.14	0.874 150 0.1932	2E 1T	8.053 8.053 0.0	11.370 16.104 27.474	22.907 4.223 5.307			K Factor = 4.00 Vel = 10.24	
53 to 54	43.21 62.35	1.101 150 0.5576	1T 1E	9.563 3.825 0.0	9.340 13.387 22.727	32.437 0.0 12.672			Vel = 21.01	
54 to 55	0.0 62.35	1.394 150 0.1767	3E	14.285 0.0 0.0	19.000 14.285 33.285	45.109 8.012 5.882			Vel = 13.11	
55 to 56	0.0 62.35	1.394 150 0.1767	2E	9.523 0.0 0.0	8.740 9.523 18.263	59.003 0.0 3.227			Vel = 13.11	
56 to 38	0.0 62.35	1.38 120 0.2805	2E	6.0 0.0 0.0	13.370 6.000 19.370	62.230 4.474 5.433			Vel = 13.37	
38 to 39	0.0 62.35	1.38 120 0.2805		0.0 0.0 0.0	10.000 0.0 10.000	72.137 0.0 2.805			Vel = 13.37	
39 to 40	0.0 62.35	1.38 120 0.2804		0.0 0.0 0.0	10.000 0.0 10.000	74.942 0.0 2.804			Vel = 13.37	

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	*****
40	0.0	1.38			10.000		77.746			
to		120			0.0		0.0			
41	62.35	0.2805			10.000		2.805		Vel = 13.37	
41	0.0	1.61	1E	4.0	14.170		80.551			
to		120	1T	8.0	12.000		-0.035			
62	62.35	0.1324			26.170		3.465		Vel = 9.83	
	0.0									
	62.35						83.981		K Factor = 6.80	
42	0.0	1.38			10.000		84.016			
to		120			0.0		0.0			
43	0.0	0.0			10.000		0.0		Vel = 0	
43	0.0	1.61	1E	4.0	14.330		84.016			
to		120	1T	8.0	12.000		-0.035			
61	0.0	0.0			26.330		0.0		Vel = 0	
61	0.0	2.635			1.080		83.981			
to		120			0.0		0.0			
62	0.0	0.0			1.080		0.0		Vel = 0	
62	62.35	2.635	1T	16.474	4.460		83.981			
to		120			0.0		0.0			
TOR	62.35	0.0120			20.934		0.252		Vel = 3.67	
TOR	0.0	2.635	2I	16.474	7.000		84.233			
to		120	1Z	8.237	24.711		6.499		* Fixed loss = 5	
BOR	62.35	0.0120			31.711		0.380		Vel = 3.67	
BOR	0.0	4.1	1E	14.534	30.000		91.112			
to		140	1G	2.907	46.508		-2.040			
TEST	62.35	0.0011	1T	29.067	76.508		0.081		Vel = 1.52	
	100.00								Qa = 100.00	
	162.35						89.153		K Factor = 17.19	