

. . . Fire Protection by Computer Design

Residential Fire Protection
64 Daggett Hill Rd.
Greene, ME 04236
946-3473

Job Name : MOTHERHOUSE SENIOR HOUSING
Building : WOOD FRAMED
Location : 4TH FLOOR-UNIT (AREA#6)
System : 1
Contract : C17011
Data File : MOTHERHOUSE-4TH FLR-UNIT #2.WXF

Hydraulic Design Information Sheet

Name - MOTHERHOUSE SENIOR HOUSING Date - 7/27/2017
 Location - 4TH FLOOR-UNIT (AREA#6)
 Building - WOOD FRAMED System No. - 1
 Contractor - RESIDENTIAL FIRE PROTECTION Contract No. - C17011
 Calculated By - T. PRAY Drawing No. - 4 OF 5
 Construction: (X) Combustible () Non-Combustible Ceiling Height - 10'-6"
 Occupancy - 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

M	Area of Sprinkler Operation	- 4 SPRK'S	System Type	Sprinkler/Nozzle
	Density	- .0508	(X) Wet	Make VIKING
D	Area Per Sprinkler	- 256	() Dry	Model VK486
E	Elevation at Highest Outlet	- 163.42	() Deluge	Size 1/2"
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 - 63.86 Press Required - 55.25 AT BOR
 Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 6/2/2017		Cap. -
T	Time of Test - 6:30 AM	Rated Cap.-	Elev.-
E	Static Press - 58	@ Press -	
R	Residual Press - 56	Elev. -	Well
S	Flow - 1061		Proof Flow
U	Elevation - 122		

P Location - HYDRANTS ARE LOCATED ON STEVENS AVE, SEE PLOT PLAN

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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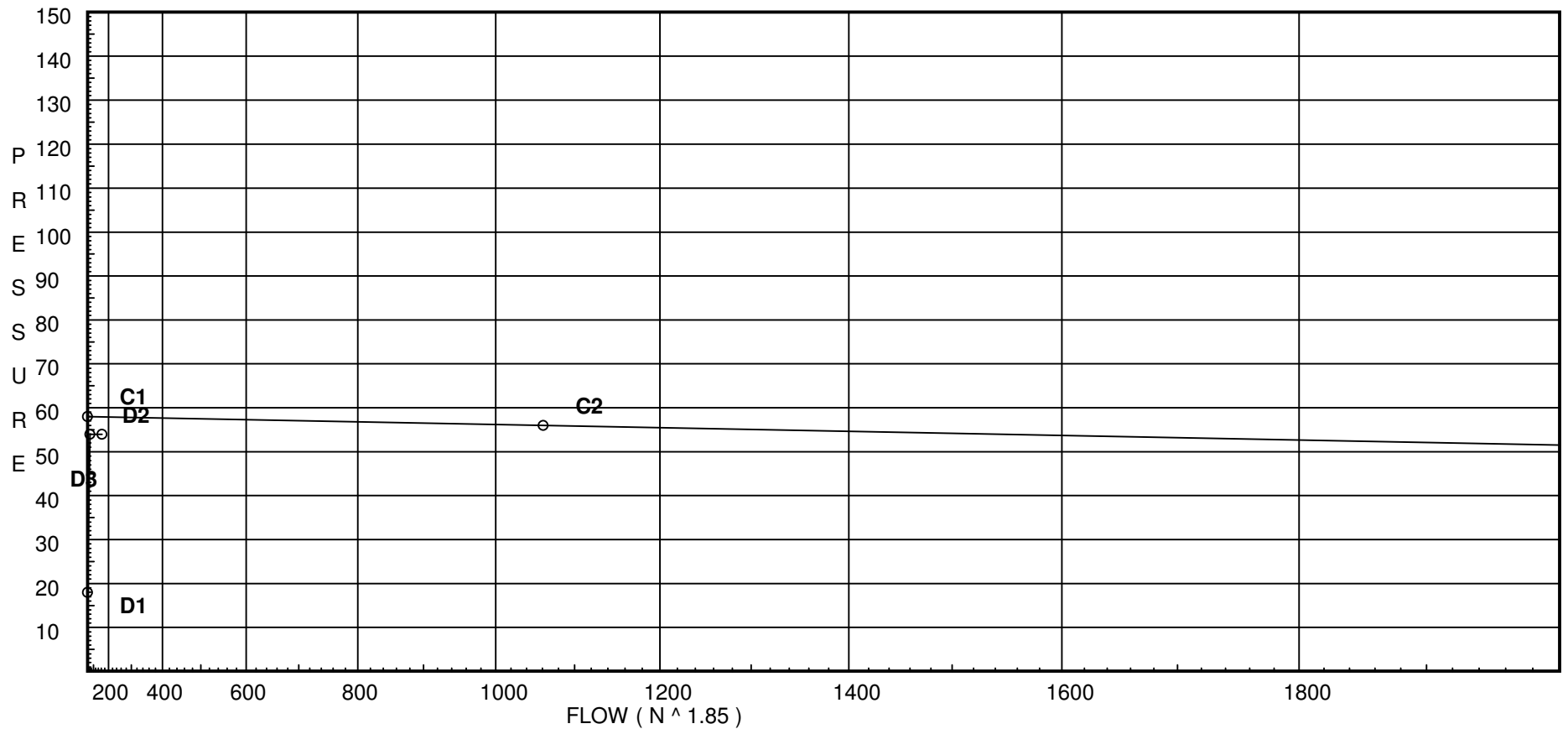
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City Water Supply:

C1 - Static Pressure : 58
C2 - Residual Pressure: 56
C2 - Residual Flow : 1061

Demand:

D1 - Elevation : 17.939
D2 - System Flow : 63.863
D2 - System Pressure : 53.958
Hose (Adj City) : _____
Hose (Demand) : 100
D3 - System Demand : 163.863
Safety Margin : 3.979



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
A	Generic Alarm Valve	0	0	0	0	0	0	7.7	21.5	0	17	17	27	29	0	0	0	0	0	0	0
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
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	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
N	CPVC 90'El Harvel-Spears	7	7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
R	CPVC Coupling Tee - Run	1	1	1	1	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0
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.
20A	163.42	4	10.6	na	13.02	0.0508	256	10.6
21A	163.42	4	11.37	na	13.49	0.0508	256	10.6
417	163.42		11.8	na				
418	161.92		14.47	na				
23A	161.92	4.9	14.58	na	18.71	0.0508	256	7.0
419	161.92		19.54	na				
22A	161.92		14.84	na				
420	161.92		21.02	na				
421	161.92		36.11	na				
416	161.92		36.18	na				
601	161.92		36.37	na				
602	150.58		41.3	na				
603	138.5		46.54	na				
604	126.42		51.81	na				
605	125.92		52.1	na				
TOR	122.58		53.6	na				
HDR	118.92		55.25	na				
6UG	117.42		55.9	na				
TEST	122.0		53.96	na	100.0			

The maximum velocity is 10.22 and it occurs in the pipe between nodes 420 and 421

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	*****
20A to 417	13.02 13.02	0.874 150 0.0947	1N	7.0 0.0 0.0	5.710 7.000 12.710	10.600 0.0 1.204			K Factor = 4.00 Vel = 6.96	
	0.0 13.02						11.804		K Factor = 3.79	
21A to 417	13.49 13.49	0.874 150 0.1012	1O	3.0 0.0 0.0	1.250 3.000 4.250	11.374 0.0 0.430			K Factor = 4.00 Vel = 7.21	
417 to 418	13.02 26.51	1.101 150 0.1146	2N	14.0 0.0 0.0	3.625 14.000 17.625	11.804 0.650 2.020			Vel = 8.93	
418 to 23A	-10.21 16.3	1.394 150 0.0147		0.0 0.0 0.0	6.960 0.0 6.960	14.474 0.0 0.102			Vel = 3.43	
23A to 419	18.71 35.01	1.394 150 0.0608	1N 10R	8.0 10.0 0.0	63.625 18.000 81.625	14.576 0.0 4.959			K Factor = 4.90 Vel = 7.36	
419 to 420	0.0 35.01	1.394 150 0.0608	3R	3.0 0.0 0.0	21.500 3.000 24.500	19.535 0.0 1.489			Vel = 7.36	
	0.0 35.01						21.024		K Factor = 7.64	
418 to 22A	28.85 28.85	1.394 150 0.0424	1O	6.0 0.0 0.0	2.580 6.000 8.580	14.474 0.0 0.364			K Factor = 4.90 Vel = 6.06	
22A to 420	0.0 28.85	1.394 150 0.0425	5N 1T 14R	40.0 9.523 14.0	82.080 63.523 145.603	14.838 0.0 6.186			Vel = 6.06	
420 to 421	35.01 63.86	1.598 150 0.0950	4N 2O 1T 10R	36.0 16.0 11.656 10.0	85.170 73.656 158.826	21.024 0.0 15.086			Vel = 10.22	
421 to 416	0.0 63.86	3.26 150 0.0030	2I	20.308 0.0 0.0	4.670 20.308 24.978	36.110 0.0 0.074			Vel = 2.45	
416 to 601	0.0 63.86	3.26 120 0.0044	1F 1S 1B	4.032 21.503 13.44	3.000 38.975 41.975	36.184 0.0 0.186			Vel = 2.45	
601 to 602	0.0 63.86	4.26 120 0.0013		0.0 0.0 0.0	11.340 0.0 11.340	36.370 4.911 0.015			Vel = 1.44	
602 to 603	0.0 63.86	4.26 120 0.0012		0.0 0.0 0.0	12.080 0.0 12.080	41.296 5.232 0.014			Vel = 1.44	
603 to 604	0.0 63.86	4.26 120 0.0012	1J	21.067 0.0 0.0	12.580 21.067 33.647	46.542 5.232 0.041			Vel = 1.44	
604 to 605	0.0 63.86	4.26 120 0.0012	4I	36.868 0.0 0.0	20.170 36.868 57.038	51.815 0.217 0.068			Vel = 1.44	

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	*****
605 to TOR	0.0 63.86	4.026 120 0.0016	2F 8.0 1E 10.0 0.0	14.000 18.000 32.000	52.100 1.447 0.051		Vel = 1.61		
TOR to HDR	0.0 63.86	4.026 120 0.0016	1A 17.0 1G 2.0 1T 20.0	3.670 39.000 42.670	53.598 1.585 0.068		Vel = 1.61		
HDR to 6UG	0.0 63.86	7.981 120 0.0001	1S 45.0 1E 18.0 0.0	11.000 63.000 74.000	55.251 0.650 0.004		Vel = 0.41		
6UG to TEST	0.0 63.86	6.16 140 0.0002	1L 12.911 1G 4.304 1T 43.037	180.000 60.252 240.252	55.905 -1.984 0.037		Vel = 0.69		
	100.00 163.86					53.958	Qa = 100.00 K Factor = 22.31		