

**. . . 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-CHAPEL AREA  
System : 1  
Contract : C17011  
Data File : MOTHERHOUSE-4TH FLR-CHAPEL SS.WXF

Hydraulic Design Information Sheet

Name - MOTHERHOUSE SENIOR HOUSING Date - 7/27/2017  
 Location - 4TH FLOOR-CHAPEL AREA  
 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 - 1546	System Type	Sprinkler/Nozzle
	Density - .1	(X) Wet	Make VIKING
D	Area Per Sprinkler - 165	( ) Dry	Model VK300
E	Elevation at Highest Outlet - 162.08	( ) Deluge	Size 1/2"
S	Hose Allowance - Inside -	( ) Preaction	K-Factor 5.6
I	Rack Sprinkler Allowance -	( ) Other	Temp.Rat.155
G	Hose Allowance - Outside - 100		

N Note

Calculation Flow Required - 233.61 Press Required - 52.04 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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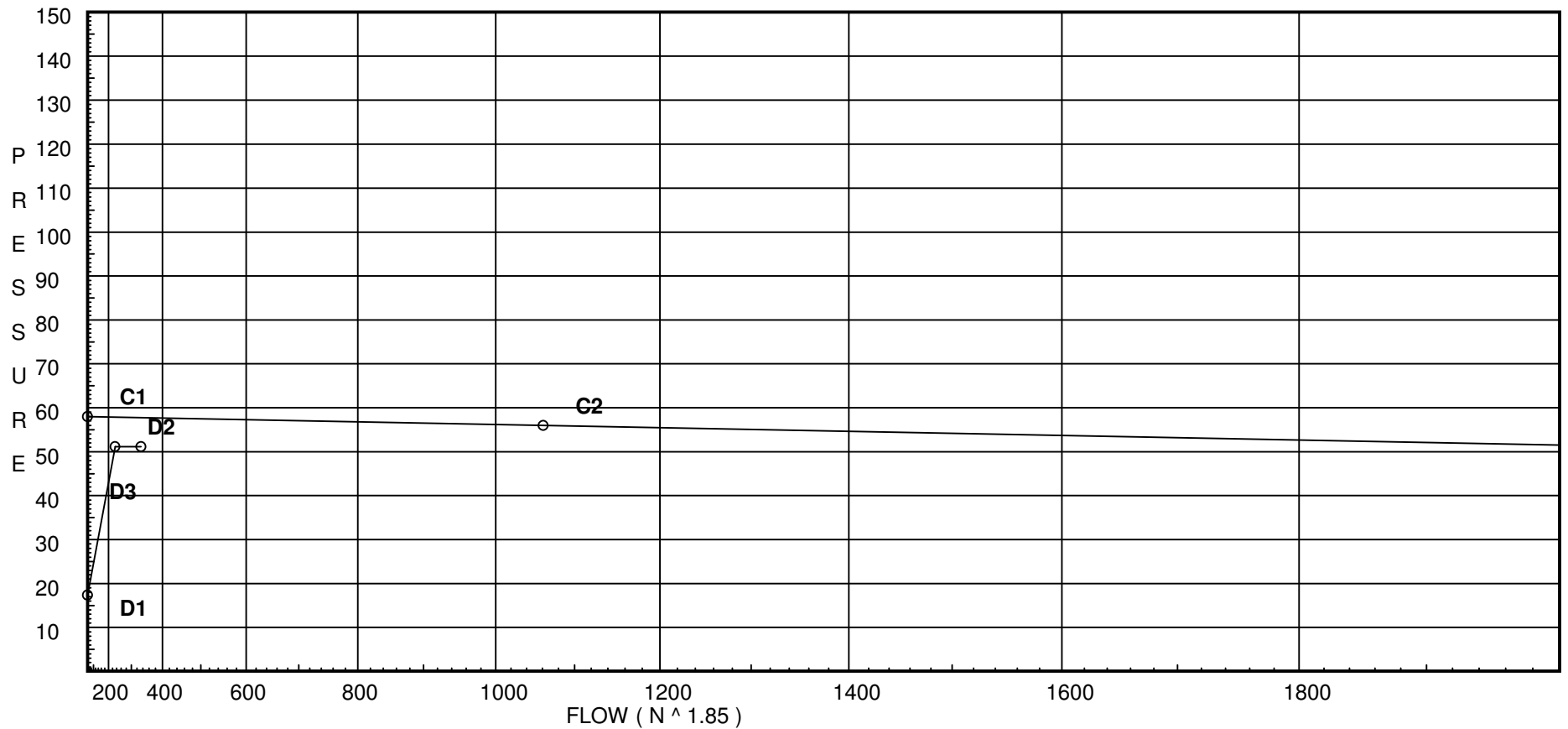
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### City Water Supply:

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

### Demand:

D1 - Elevation : 17.359  
D2 - System Flow : 233.61  
D2 - System Pressure : 51.157  
Hose ( Adj City ) : \_\_\_\_\_  
Hose ( Demand ) : 100  
D3 - System Demand : 333.61  
Safety Margin : 6.608



# 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
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
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
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.
30	162.08	5.6	8.92	na	16.73	0.1	165	7.0
31	162.08	5.6	10.32	na	17.99	0.1	165	7.0
32	162.08	5.6	11.75	na	19.19	0.1	165	7.0
33	162.08	5.6	9.1	na	16.89	0.1	165	7.0
34	162.08	5.6	10.52	na	18.17	0.1	165	7.0
35	162.08	5.6	11.97	na	19.38	0.1	165	7.0
407	162.08		14.22	na				
408	162.08		14.49	na				
408A	160.66		16.93	na				
36	162.08	5.6	12.53	na	19.82	0.1	189	7.0
37	162.08	5.6	14.13	na	21.05	0.1	189	7.0
38	162.08	5.6	11.39	na	18.9	0.1	189	7.0
39	162.08	5.6	13.42	na	20.52	0.1	189	7.0
40	162.08	5.6	14.92	na	21.63	0.1	189	7.0
411A	162.08		17.83	na				
409	160.66		17.01	na				
410	162.08		17.8	na				
41	162.08	5.6	17.37	na	23.34	0.1	161	7.0
411	162.08		17.85	na				
412	162.08		21.66	na				
413	162.08		22.24	na				
414	162.08		24.13	na				
415	162.08		24.94	na				
416	162.08		27.8	na				
601	161.92		30.59	na				
602	150.58		35.65	na				
603	138.5		41.04	na				
604	126.42		46.72	na				
605	125.92		47.7	na				
TOR	122.58		49.71	na				
HDR	118.92		52.04	na				
6UG	117.42		52.74	na				
TEST	122.0		51.16	na	100.0			

The maximum velocity is 13.27 and it occurs in the pipe between nodes 413 and 415

# 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	*****
30 to 31	16.73	1.049 120		0.0	15.000	8.922 0.0			K Factor = 5.60	
31 to 32	16.73	0.0935 1.38		0.0	15.000	1.402 0.0			Vel = 6.21	
31 to 32	17.99	1.38 120		0.0	15.000	10.324 0.0			K Factor = 5.60	
32 to 407	34.72	0.0949 1.38		0.0	15.000	1.424 5.540			Vel = 7.45	
32 to 407	19.19	1.38 120	1T	6.0	5.540	11.748 0.0			K Factor = 5.60	
407 to 33	53.91	0.2144 0.0		0.0	11.540	2.474 53.91			Vel = 11.56	
33 to 34	16.89	1.049 120		0.0	15.000	9.095 0.0			K Factor = 14.30	
34 to 35	16.89	0.0952 1.38		0.0	15.000	1.428 10.523			Vel = 6.27	
34 to 35	18.16	1.38 120		0.0	15.000	10.523 0.0			K Factor = 5.60	
35 to 408	35.05	0.0966 1.38		0.0	15.000	1.449 5.540			Vel = 7.52	
35 to 408	19.38	1.38 120	1T	6.0	5.540	11.972 0.0			K Factor = 5.60	
408 to 407	54.43	0.2182 0.0		0.0	11.540	2.518 54.43			Vel = 11.68	
407 to 408	53.91	2.157 120		0.0	11.000	14.222 0.0			K Factor = 14.30	
408 to 408A	53.91	0.0244 2.157		0.0	11.000	0.268 14.490			Vel = 4.73	
408 to 408A	54.44	2.157 120	2I	8.615	12.050	14.490 0.615			K Factor = 14.30	
408A to 409	108.35	0.0886 2.157		0.0	20.665	1.830 16.935			Vel = 9.51	
408A to 409	40.87	2.157 120		0.0	0.500	16.935 0.0			K Factor = 5.60	
409 to 36	149.22	0.1600 0.0		0.0	0.500	0.080 149.22			Vel = 13.10	
36 to 37	19.82	1.049 120		0.0	12.500	12.531 0.0			K Factor = 5.60	
37 to 38	19.82	0.1281 1.38		0.0	12.500	1.601 14.132			Vel = 7.36	
37 to 408A	21.06	1.38 120	1E 1T	3.0 6.0	8.040 9.000	14.132 0.615			K Factor = 5.60	
408A to 38	40.88	0.1284 0.0		0.0	17.040	2.188 40.88			Vel = 8.77	
38 to 39	18.90	1.049 120	1E	2.0	15.340	11.391 0.0			K Factor = 9.93	
39 to 40	18.9	0.1172 1.38		0.0	17.340	2.032 13.423			Vel = 7.02	
39 to 40	20.52	1.38 120		0.0	12.500	13.423 0.0			K Factor = 5.60	
40 to 411A	39.42	0.1201 1.38		0.0	12.500	1.501 14.924			Vel = 8.46	
40 to 411A	21.63	1.38 120	1T	6.0	4.790	14.924 0.0			K Factor = 5.60	
411A	61.05	0.2697		0.0	10.790	2.910			Vel = 13.10	

# 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	*****
411A to 411	0.0 61.05	2.157 120 0.0320		0.0 0.0 0.0	0.500 0.0 0.500	17.834 0.0 0.016		Vel = 5.36		
	0.0 61.05					17.850		K Factor = 14.45		
409 to 410	89.56 89.56	2.157 120 0.0623	2I	8.615 0.0 0.0	13.920 8.615 22.535	17.015 -0.615 1.403		Vel = 7.86		
410 to 411	-68.16 21.4	2.157 120 0.0044		0.0 0.0 0.0	10.670 0.0 10.670	17.803 0.0 0.047		Vel = 1.88		
	0.0 21.40					17.850		K Factor = 5.07		
409 to 41	59.66 59.66	2.157 120 0.0294	1T 2I	12.307 8.615 0.0	12.080 20.922 33.002	17.015 -0.615 0.969		Vel = 5.24		
41 to 412	23.34 83.0	2.157 120 0.0541	1T	12.307 0.0 0.0	67.000 12.307 79.307	17.369 0.0 4.290		K Factor = 5.60 Vel = 7.29		
	0.0 83.00					21.659		K Factor = 17.83		
410 to 413	68.15 68.15	2.157 120 0.0376	3I 1J 1T	12.922 10.461 12.307	82.330 35.690 118.020	17.803 0.0 4.433		Vel = 5.98		
	0.0 68.15					22.236		K Factor = 14.45		
411 to 414	82.45 82.45	2.157 120 0.0534	3I 1J 1T	12.922 10.461 12.307	81.790 35.690 117.480	17.850 0.0 6.277		Vel = 7.24		
	0.0 82.45					24.127		K Factor = 16.79		
412 to 413	83.00 83.0	2.157 120 0.0541		0.0 0.0 0.0	10.670 0.0 10.670	21.659 0.0 0.577		Vel = 7.29		
413 to 415	68.16 151.16	2.157 120 0.1640	1J	10.461 0.0 0.0	6.000 10.461 16.461	22.236 0.0 2.699		Vel = 13.27		
	0.0 151.16					24.935		K Factor = 30.27		
414 to 415	82.45 82.45	2.157 120 0.0534	1J	10.461 0.0 0.0	4.670 10.461 15.131	24.127 0.0 0.808		Vel = 7.24		
415 to 416	151.16 233.61	3.26 120 0.0491	2I 1J	13.44 17.471 0.0	27.410 30.911 58.321	24.935 0.0 2.863		Vel = 8.98		
416 to 601	0.0 233.61	3.26 120 0.0491	1Z 1S 1G	9.408 21.503 1.344	3.000 52.414 55.414	27.798 0.069 2.721		Vel = 8.98		

# 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	*****
				1T	20.159					
601 to 602	0.0 233.61	4.26 120 0.0133		0.0	11.340 0.0 11.340	30.588 4.911 0.151		Vel =	5.26	
602 to 603	0.0 233.61	4.26 120 0.0133		0.0	12.080 0.0 12.080	35.650 5.232 0.161		Vel =	5.26	
603 to 604	0.0 233.61	4.26 120 0.0133	1J	21.067	12.580 21.067 33.647	41.043 5.232 0.449		Vel =	5.26	
604 to 605	0.0 233.61	4.26 120 0.0133	4I	36.868	20.170 36.868 57.038	46.724 0.217 0.760		Vel =	5.26	
605 to TOR	0.0 233.61	4.026 120 0.0176	2F 1E	8.0 10.0	14.000 18.000 32.000	47.701 1.447 0.562		Vel =	5.89	
TOR to HDR	0.0 233.61	4.026 120 0.0176	1A 1G	17.0 2.0	3.670 39.000 42.670	49.710 1.585 0.749		Vel =	5.89	
HDR to 6UG	0.0 233.61	7.981 120 0.0006	1S 1E	45.0 18.0	11.000 63.000 74.000	52.044 0.650 0.046		Vel =	1.50	
6UG to TEST	0.0 233.61	6.16 140 0.0017	1L 1G	12.911 4.304	180.000 60.252 240.252	52.740 -1.984 0.401		Vel =	2.51	
	100.00 333.61					51.157		Qa =	100.00	K Factor = 46.64