

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

HIGH TECH FIRE PROTECTION  
84 HACKETT MILLS ROAD  
P.O. BOX 156  
POLAND, ME 04274  
207-998-2551

Job Name : 17 Chestnut Street 3rd floor updated water info  
Drawing : FP-01  
Location : 3rd Floor Residential  
Remote Area : #3  
Contract :  
Data File : 3rd floor calc.WXF

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**HYDRAULIC CALCULATIONS**  
*for*

**Project name:** 17 Chestnut Street 3rd floor  
**Location:** 3rd Floor Residential  
**Drawing no:** FP-01  
**Date:** 5-27-16

**Design**

**Remote area number:** #3  
**Remote area location:** 3rd Floor Residential  
**Occupancy classification:** Light Hazard  
**Density:** .1 - Gpm/SqFt  
**Area of application:** 500 - SqFt  
**Coverage per sprinkler:** 256 - SqFt  
**Type of sprinklers calculated:** Quick Response Uprights  
**No. of sprinklers calculated:** 5  
**In-rack demand:** n/a - GPM  
**Hose streams:** 100 - GPM  
**Total water required (including hose streams):** 202 - GPM @ 59 - Psi  
**Type of system:** Wet NFPA 13  
**Volume of dry or preaction system:** n/a - Gal

**Water supply information**

**Date:** 7-06-16  
**Location:** Corner of Cumberland and Chestnut Street  
**Source:** Portland Water District

**Name of contractor:** HIGH TECH FIRE PROTECTION  
**Address:** 84 HACKETT MILLS ROAD / P.O. BOX 156 / POLAND, ME 04274  
**Phone number:** 207-998-2551  
**Name of designer:** Ed Poulin  
**Authority having jurisdiction:** State of Maine / City of Portland  
**Notes: (Include peaking information or gridded systems here.)**

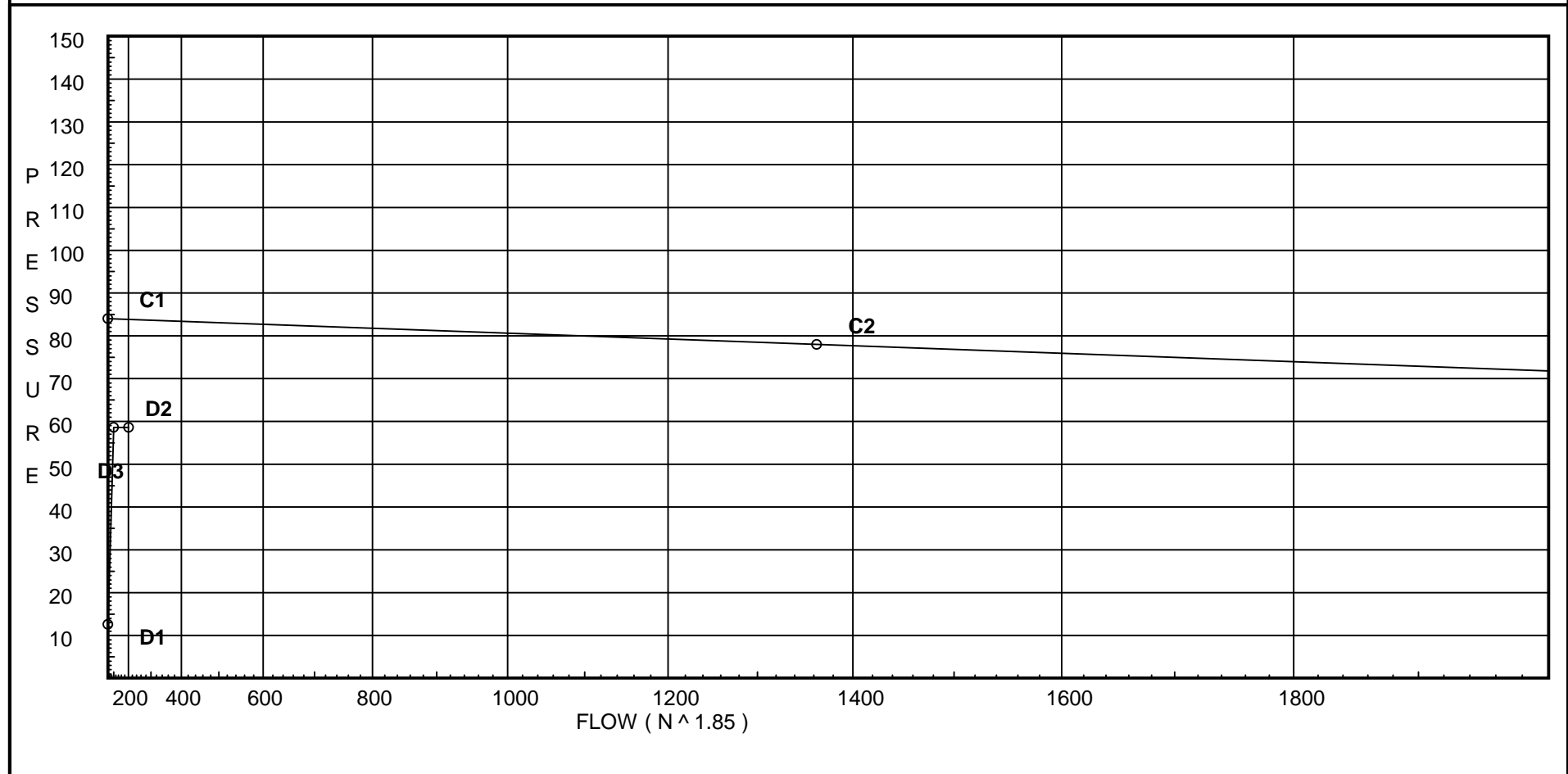
# Water Supply Curve (C)

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City Water Supply:  
C1 - Static Pressure : 84  
C2 - Residual Pressure: 78  
C2 - Residual Flow : 1363

Demand:  
D1 - Elevation : 12.560  
D2 - System Flow : 101.668  
D2 - System Pressure : 58.613  
Hose ( Demand ) : 100  
D3 - System Demand : 201.668  
Safety Margin : 25.212



# 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	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
G	NFPA 13 Gate Valve	0	0	0	0	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
V	90' EII Firelock #001	0	0	0	0	3.5	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
X	90'Tee-BranchFirelock002	0	0	0	0	8.5	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
Zib	Wilkins 350A	Fitting generates a Fixed Loss Based on Flow																			

## Units Summary

Diameter Units	Inches
Length Units	Feet
Flow Units	US Gallons per Minute
Pressure Units	Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with \*. The fittings marked with a \* show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a \* will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

# Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
300	30.0	5.6	9.0	na	16.8	0.1	168	7.0
301	30.0	5.6	10.18	na	17.87	0.1	168	7.0
305	30.0	5.6	13.14	na	20.3	0.1	168	7.0
AA	30.0		14.14	na				
310	30.0	5.6	16.38	na	22.66	0.1	168	7.0
311	30.0	5.6	18.43	na	24.04	0.1	168	7.0
312	30.0		18.9	na				
AB	30.0		21.91	na				
AC	30.0		24.92	na				
AD	30.0		27.37	na				
AE	27.0		30.96	na				
AF	27.0		33.41	na				
AG	0.0		46.17	na				
TOR	0.0		46.66	na				
BOR	0.0		49.92	na				
BASE	-5.0		60.78	na				
H1	-5.0		60.92	na				
H2	-1.0		59.33	na	100.0			
TEST	1.0		58.61	na				

The maximum velocity is 20.4 and it occurs in the pipe between nodes AA and AB

# Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftn'g's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
300 to 301	16.80 16.8	1.049 120.0 0.0942		0.0 0.0 0.0	12.500 0.0 12.500	9.000 0.0 1.178			K Factor = 5.60 Vel = 6.24	
301 to AA	17.87 34.67	1.049 120.0 0.3600	1T	5.0 0.0 0.0	6.000 5.000 11.000	10.178 0.0 3.960			K Factor = 5.60 Vel = 12.87	
	0.0 34.67					14.138			K Factor = 9.22	
305 to AA	20.30 20.3	1.049 120.0 0.1337	1T	5.0 0.0 0.0	2.500 5.000 7.500	13.135 0.0 1.003			K Factor = 5.60 Vel = 7.54	
AA to AB	34.66 54.96	1.049 120.0 0.8445	1T	5.0 0.0 0.0	4.200 5.000 9.200	14.138 0.0 7.769			Vel = 20.40	
	0.0 54.96					21.907			K Factor = 11.74	
310 to 311	22.66 22.66	1.049 120.0 0.1640		0.0 0.0 0.0	12.500 0.0 12.500	16.381 0.0 2.050			K Factor = 5.60 Vel = 8.41	
311 to 312	24.05 46.71	1.049 120.0 0.6253		0.0 0.0 0.0	0.750 0.0 0.750	18.431 0.0 0.469			K Factor = 5.60 Vel = 17.34	
312 to AB	0.0 46.71	1.38 120.0 0.1643	1E 1T	3.0 6.0 0.0	9.300 9.000 18.300	18.900 0.0 3.007			Vel = 10.02	
AB to AC	54.96 101.67	1.61 120.0 0.3272	1T	8.0 0.0 0.0	1.200 8.000 9.200	21.907 0.0 3.010			Vel = 16.02	
AC to AD	0.0 101.67	1.61 120.0 0.3271	1E	4.0 0.0 0.0	3.500 4.000 7.500	24.917 0.0 2.453			Vel = 16.02	
AD to AE	0.0 101.67	1.61 120.0 0.3271	1E	4.0 0.0 0.0	3.000 4.000 7.000	27.370 1.299 2.290			Vel = 16.02	
AE to AF	0.0 101.67	1.61 120.0 0.3272	1E	4.0 0.0 0.0	3.500 4.000 7.500	30.959 0.0 2.454			Vel = 16.02	
AF to AG	0.0 101.67	2.635 120.0 0.0297	1V	5.903 0.0 0.0	30.000 5.903 35.903	33.413 11.694 1.066			Vel = 5.98	
AG to TOR	0.0 101.67	2.635 120.0 0.0297	1X	14.827 0.0 0.0	1.500 14.827 16.327	46.173 0.0 0.485			Vel = 5.98	
TOR to BOR	0.0 101.67	2.635 120.0 0.0297	1Fsp 1V	0.0 5.903 0.0	3.000 5.903 8.903	46.658 3.000 0.264			* Fixed loss = 3 Vel = 5.98	
BOR to BASE	0.0 101.67	2.635 120.0 0.0297	1E 1Zib	8.237 0.0 0.0	1.000 8.237 9.237	49.922 10.586 0.274			* Fixed loss = 8.421 Vel = 5.98	

# 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	*****
BASE	0.0	4.1	1G	2.907	20.000	60.782			
to		140.0	1T	29.067	31.974	0.0			
H1	101.67	0.0026		0.0	51.974	0.135		Vel = 2.47	
H1	0.0	6.14	1T	22.732	185.000	60.917			
to		100.0		0.0	22.732	-1.732			
H2	101.67	0.0007		0.0	207.732	0.140		Vel = 1.10	
H2	100.00	8.23	1G	3.316	220.000	59.325		Qa = 100	
to		100.0	1E	14.92	47.246	-0.866			
TEST	201.67	0.0006	1T	29.011	267.246	0.154		Vel = 1.22	
	0.0								
	201.67					58.613		K Factor = 26.34	