



... Fire Protection by Computer Design

ALTERNATIVE SPRINKLER
39 JACKSON RD.
POLAND SPRING, ME
04274
207-838-8930

Job Name : 98 WASHINGTON AVE 1ST FL CALC
Building : FP-01
Location : 98 WASHINGTON AVE
System : #1
Contract :
Data File : 98 WAHSINGTON AVE 1ST FL CALC.WXF

HYDRAULIC CALCULATIONS
for

Project name: 98 WASHINGTON AVE 1ST FL CALC
Location: 98 WASHINGTON AVE
Drawing no: FP-01
Date: 12-2-15

Design

Remote area number: #1
Remote area location: 1ST FLOOR OFFICE SPACE
Occupancy classification: LIGHT HAZARD
Density: .1 - Gpm/SqFt
Area of application: 374 - SqFt
Coverage per sprinkler: 225 - SqFt
Type of sprinklers calculated: RELIABLE F1FR56 HSW
No. of sprinklers calculated: 4
In-rack demand: N/A - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 199.048 - GPM @ 58.1033 - Psi
Type of system: NFPA 13 WET SYSTEM
Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 5-23-15
Location: WASHINGTON AVE
Source: PORTLAND WATER DEPT.

Name of contractor: ALTERNATIVE SPRINKLER
Address: 39 JACKSON RD. / POLAND SPRING, ME / 04274
Phone number: 207-838-8930
Name of designer: TIM FORTIN
Authority having jurisdiction:
Notes: (Include peaking information or gridded systems here.)

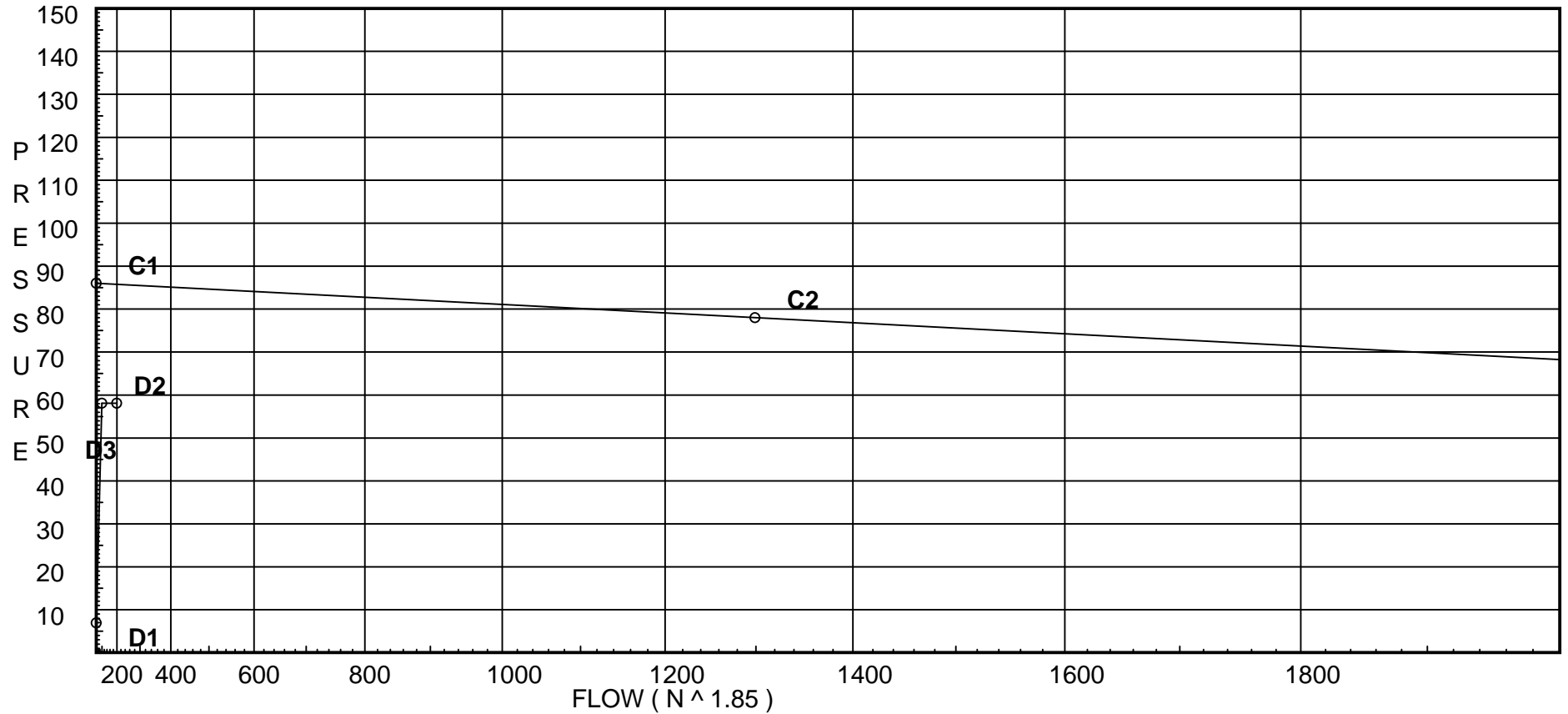
Water Supply Curve (C)

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City Water Supply:
C1 - Static Pressure : 86
C2 - Residual Pressure: 78
C2 - Residual Flow : 1299

Demand:
D1 - Elevation : 6.930
D2 - System Flow : 99.048
D2 - System Pressure : 58.103
Hose (Adj City) :
Hose (Demand) : 100
D3 - System Demand : 199.048
Safety Margin : 27.648



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	1	1	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
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
Zik	Wilkins 950XL	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.
20	16.0	5.6	21.67	na	26.07	0.1	225	14.0
21	16.0	5.6	24.43	na	27.68	0.1	225	14.0
15	16.0		34.56	na				
30	16.0	5.6	16.14	na	22.5	0.1	225	14.0
32	16.0	5.6	16.57	na	22.8	0.1	225	14.0
31	16.0		17.49	na				
33	16.0		20.79	na				
34	16.0		25.34	na				
35	8.0		30.51	na				
36	8.0		36.42	na				
37	8.0		40.76	na				
16	16.0		35.25	na				
17	8.0		40.32	na				
TOR	8.0		41.36	na				
BOR	1.0		52.28	na				
UG	1.0		57.66	na				
TEST	0.0		58.1	na	100.0			

The maximum velocity is 19.95 and it occurs in the pipe between nodes 21 and 15

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	*****
20	26.07	1.049	1E	2.0	11.000	21.670			K Factor = 5.60	
to		120.0		0.0	2.000	0.0				
21	26.07	0.2125		0.0	13.000	2.762			Vel = 9.68	
21	27.68	1.049	1T	5.0	7.500	24.432			K Factor = 5.60	
to		120.0		0.0	5.000	0.0				
15	53.75	0.8104		0.0	12.500	10.130			Vel = 19.95	
15	0.0	1.61	1E	4.0	2.800	34.562				
to		120.0		0.0	4.000	0.0				
16	53.75	0.1006		0.0	6.800	0.684			Vel = 8.47	
	0.0									
	53.75					35.246			K Factor = 9.05	
30	22.50	1.049	1T	5.0	3.300	16.143			K Factor = 5.60	
to		120.0		0.0	5.000	0.0				
31	22.5	0.1618		0.0	8.300	1.343			Vel = 8.35	
	0.0									
	22.50					17.486			K Factor = 5.38	
32	22.80	1.049	1T	5.0	0.500	16.574			K Factor = 5.60	
to		120.0		0.0	5.000	0.0				
31	22.8	0.1658		0.0	5.500	0.912			Vel = 8.46	
31	22.50	1.049	1E	2.0	3.600	17.486				
to		120.0		0.0	2.000	0.0				
33	45.3	0.5905		0.0	5.600	3.307			Vel = 16.82	
33	0.0	1.049	1E	2.0	5.700	20.793				
to		120.0		0.0	2.000	0.0				
34	45.3	0.5905		0.0	7.700	4.547			Vel = 16.82	
34	0.0	1.38	1E	3.0	8.000	25.340				
to		120.0		0.0	3.000	3.465				
35	45.3	0.1553		0.0	11.000	1.708			Vel = 9.72	
35	0.0	1.38	1E	3.0	35.000	30.513				
to		120.0		0.0	3.000	0.0				
36	45.3	0.1553		0.0	38.000	5.902			Vel = 9.72	
36	0.0	1.38	1T	6.0	22.000	36.415				
to		120.0		0.0	6.000	0.0				
37	45.3	0.1553		0.0	28.000	4.349			Vel = 9.72	
37	0.0	2.067	1E	5.0	12.600	40.764				
to		120.0	1T	10.0	15.000	0.0				
TOR	45.3	0.0217		0.0	27.600	0.599			Vel = 4.33	
	0.0									
	45.30					41.363			K Factor = 7.04	
16	53.75	1.61	1T	8.0	8.000	35.246				
to		120.0		0.0	8.000	3.465				
17	53.75	0.1006		0.0	16.000	1.609			Vel = 8.47	

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 *****
17 to TOR	0.0 53.75	2.067 120.0 0.0298	1T 0.0	10.0 0.0 35.000	25.000 10.000 35.000	40.320 0.0 1.043	Vel = 5.14
TOR to BOR	45.30 99.05	2.067 120.0 0.0923	1G 1Z 1Zik	1.0 5.0 0.0	7.000 6.000 13.000	41.363 9.717 1.200	* Fixed loss = 6.685 Vel = 9.47
BOR to UG	0.0 99.05	1.917 120.0 0.1332	1E 1T	3.464 6.929 0.0	30.000 10.393 40.393	52.280 0.0 5.381	Vel = 11.01
UG to TEST	0.0 99.05	11.938 120.0 0.0	1E 1T	27.0 60.0 0.0	400.000 87.000 487.000	57.661 0.433 0.009	Vel = 0.28
	100.00 199.05					58.103	Qa = 100.00 K Factor = 26.11