



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

Sprinkler Systems Inc.  
2-4 Avon Street  
P O Box 1285  
Lewiston, Maine 04240  
207-782-0104

Job Name : 106 HIGH STREET  
Building :  
Location : 106 HIGH STREET, PORTLAND, MAINE 04101  
System : 1 OF 1  
Contract : 13073  
Data File : 13073106HIGHSTREETPTLDA24.WXF

Hydraulic Design Information Sheet

Name - 106 HIGH STREET Date - 11-1-2013  
 Location - 106 HIGH STREET, PORTLAND, MAINE 04101  
 Building - System No. - 1 OF 1  
 Contractor - EAST BROWN COW Contract No. - 13073  
 Calculated By - SCOTT E. GARLAND Drawing No. - 1,2 OF 2  
 Construction: (X) Combustible ( ) Non-Combustible Ceiling Height - VARIES  
 Occupancy - STUDIO AREA - 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

Area of Sprinkler Operation	Density	System Type	Sprinkler/Nozzle
Area of Sprinkler Operation - LG ROOM	- .10	(X) Wet	Make RELIABLE
D Area Per Sprinkler	- 130	( ) Dry	Model F1FR56
E Elevation at Highest Outlet	- 131.167	( ) Deluge	Size 1/2 X 1/2
S Hose Allowance - Inside	-	( ) Preaction	K-Factor 5.6
I Rack Sprinkler Allowance	-	( ) Other	Temp.Rat.200 DEG
G Hose Allowance - Outside	- 100		

N Note DESIGN AREA #2 - 2ND FLOOR STUDIO

Calculation Flow Required - 266.965 Press Required - 46.265 AT BASE OF RISER  
 Summary C-Factor Used: 120 Overhead 140 Underground

Water Flow Test:	Pump Data:	Tank or Reservoir:
A Date of Test - 3-26-2008		Cap. -
T Time of Test -	Rated Cap.-	Elev.-
E Static Press - 91	@ Press -	
R Residual Press - 88	Elev. -	Well
Flow - 1644		Proof Flow
S Elevation - 13.0		

U Location - AT MAPLE STREET AND DANFORTH STREET, 1270' AWAY

P Source of Information - PORTLAND WATER DISTRICT

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

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

G Horizontal Barriers Provided:

# Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
21	126.417	5.6	9.31	na	17.09	0.1	148.162	7.0
22	126.417	5.6	9.56	na	17.31	0.1	148.162	7.0
23	131.167	5.6	7.0	na	14.82	0.1	148.162	7.0
24	131.167	5.6	7.19	na	15.02	0.1	148.162	7.0
25	126.417	5.6	9.2	na	16.98	0.1	148.162	7.0
27	124.0	5.6	7.5	na	15.34	0.1	148.162	7.0
28	124.0	5.6	7.33	na	15.16	0.1	148.162	7.0
Q	124.0		8.2	na				
30	124.0	5.6	11.96	na	19.37	0.1	148.162	7.0
31	124.0	5.6	12.17	na	19.53	0.1	148.162	7.0
32	124.0	5.6	12.32	na	19.65	0.1	148.162	7.0
33	124.0	5.6	12.53	na	19.82	0.1	148.162	7.0
34	124.0	5.6	12.84	na	20.07	0.1	148.162	7.0
35	124.0	5.6	13.07	na	20.24	0.1	148.162	7.0
K	126.417		10.21	na				
L	126.417		10.24	na				
M	126.417		10.29	na				
26	126.417	5.6	10.52	na	18.16	0.1	148.162	7.0
P	126.417		10.66	na				
29	126.417	5.6	10.78	na	18.38	0.1	148.162	7.0
S	124.0		13.21	na				
T	124.0		13.6	na				
H	124.0		13.82	na				
U	124.0		14.18	na				
J	124.0		15.17	na				
V	114.0		21.59	na				
W	110.75		25.82	na				
X	110.75		30.08	na				
Y	110.75		31.02	na				
Z	98.417		37.48	na				
RT	98.417		37.82	na				
TV	97.0		41.46	na				
RB	93.0		46.26	na				
X1	100.0		44.18	na	100.0			
X2	100.0		44.2	na				
X3	55.0		63.81	na				
TEST	13.0		82.96	na				

The maximum velocity is 11.32 and it occurs in the pipe between nodes Q and P

# Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
21 to 22	17.09	1.442 120.0		11.958 0.0	9.313 0.0			K Factor = 5.60	
22 to K	17.09	0.0207		11.958	0.247			Vel = 3.36	
22 to K	17.31	1.442 120.0	1T	7.432 0.0	1.209 7.432	9.560 0.0		K Factor = 5.60	
	34.4	0.0753		8.641	0.651			Vel = 6.76	
	0.0 34.40					10.211		K Factor = 10.77	
23 to 24	14.82	1.442 120.0		11.958 0.0	7.000 0.0			K Factor = 5.60	
24 to L	14.82	0.0159		11.958	0.190			Vel = 2.91	
24 to L	15.01	1.442 120.0	1E 1T	3.716 7.432	5.958 11.148	7.190 2.057		K Factor = 5.60	
	29.83	0.0579		17.106	0.990			Vel = 5.86	
	0.0 29.83					10.237		K Factor = 9.32	
25 to M	16.98	1.049 120.0	1E 1T	2.0 5.0	4.375 7.000	9.197 0.0		K Factor = 5.60	
	16.98	0.0962		11.375	1.094			Vel = 6.30	
	0.0 16.98					10.291		K Factor = 5.29	
27 to Q	15.34	1.049 120.0	1T	5.0 0.0	3.833 5.000	7.499 0.0		K Factor = 5.60	
	15.34	0.0797		0.0	8.833	0.704		Vel = 5.69	
	0.0 15.34					8.203		K Factor = 5.36	
28 to Q	15.16	1.049 120.0	1T	5.0 0.0	6.167 5.000	7.332 0.0		K Factor = 5.60	
	15.16	0.0780		0.0	11.167	0.871		Vel = 5.63	
	0.0 15.16					8.203		K Factor = 5.29	
Q to P	30.50	1.049 120.0	1E 1T	2.0 5.0	5.333 7.000	8.203 -1.047			
	30.5	0.2840		0.0	12.333	3.503		Vel = 11.32	
	0.0 30.50					10.659		K Factor = 9.34	
30 to 31	19.37	1.442 120.0		8.000 0.0	11.959 0.0			K Factor = 5.60	
31 to S	19.37	0.0260		8.000	0.208			Vel = 3.81	
31 to S	19.53	1.442 120.0	1T	7.432 0.0	3.583 7.432	12.167 0.0		K Factor = 5.60	
	38.9	0.0946		0.0	11.015	1.042		Vel = 7.64	
	0.0 38.90					13.209		K Factor = 10.70	
32 to 33	19.65	1.442 120.0		8.000 0.0	12.315 0.0			K Factor = 5.60	
33 to T	19.65	0.0268		8.000	0.214			Vel = 3.86	
33 to T	19.82	1.442 120.0	1T	7.432 0.0	3.583 7.432	12.529 0.0		K Factor = 5.60	
	39.47	0.0972		0.0	11.015	1.071		Vel = 7.75	

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 39.47					13.600		K Factor = 10.70	
34 to 35	20.07	1.442 120.0	0.0	8.000	12.844	0.0		K Factor = 5.60	
	20.07	0.0279	0.0	8.000	0.223			Vel = 3.94	
35 to U	20.24	1.442 120.0	1T	7.432	3.583	13.067		K Factor = 5.60	
	40.31	0.1010	0.0	11.015	1.113			Vel = 7.92	
	0.0 40.31					14.180		K Factor = 10.70	
K to L	34.40	2.635 120.0	0.0	6.500	10.211	0.0			
	34.4	0.0040	0.0	6.500	0.026			Vel = 2.02	
L to M	29.84	2.635 120.0	0.0	4.209	10.237	0.0			
	64.24	0.0128	0.0	4.209	0.054			Vel = 3.78	
	0.0 64.24					10.291		K Factor = 20.03	
M to 26	81.22	2.635 120.0	1E	8.237	3.542	10.291			
	81.22	0.0196	0.0	11.779	0.231			Vel = 4.78	
26 to P	18.16	2.635 120.0	0.0	4.833	10.522	0.0		K Factor = 5.60	
	99.38	0.0283	0.0	4.833	0.137			Vel = 5.85	
	0.0 99.38					10.659		K Factor = 30.44	
P to 29	129.88	3.26 120.0	0.0	7.125	10.659	0.0			
	129.88	0.0166	0.0	7.125	0.118			Vel = 4.99	
29 to S	18.39	3.26 120.0	5E	47.038	18.375	10.777		K Factor = 5.60	
	148.27	0.0212	0.0	65.413	1.385			Vel = 5.70	
S to T	38.90	3.26 120.0	0.0	12.000	13.209	0.0			
	187.17	0.0326	0.0	12.000	0.391			Vel = 7.19	
T to H	39.47	3.26 120.0	0.0	4.833	13.600	0.0			
	226.64	0.0463	0.0	4.833	0.224			Vel = 8.71	
H to U	0.0	3.26 120.0	0.0	7.667	13.824	0.0			
	226.64	0.0464	0.0	7.667	0.356			Vel = 8.71	
U to J	40.31	3.26 120.0	1E	9.408	6.333	14.180			
	266.95	0.0628	0.0	15.741	0.989			Vel = 10.26	
J to V	0.0	3.26 120.0	2E	18.815	14.375	15.169			
	266.95	0.0629	0.0	33.190	2.086			Vel = 10.26	
V to W	0.0	3.26 120.0	1E	9.408	15.458	21.586			
	266.95	0.0628	1T	20.159	29.567	1.408			
			0.0	45.025	2.828			Vel = 10.26	

# Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
W to X	0.0 266.95	3.26 120.0 0.0628	2E 1T	18.815 20.159 0.0	28.792 38.974 67.766	25.822 0.0 4.258		Vel = 10.26	
X to Y	0.0 266.95	3.26 120.0 0.0628	1E	9.408 0.0 0.0	5.583 9.408 14.991	30.080 0.0 0.942		Vel = 10.26	
Y to Z	0.0 266.95	4.26 120.0 0.0171	1E 1T	13.167 26.334 0.0	25.875 39.501 65.376	31.022 5.341 1.117		Vel = 6.01	
Z to RT	0.0 266.95	4.26 120.0 0.0171	1E	13.167 0.0 0.0	7.000 13.167 20.167	37.480 0.0 0.344		Vel = 6.01	
RT to TV	0.0 266.95	4.26 120.0 0.0169	1Fsp	0.0 0.0 0.0	1.417 0.0 1.417	37.824 3.614 0.024		* Fixed loss = 3 Vel = 6.01	
TV to RB	0.0 266.95	4.26 120.0 0.0173	1Zac	0.0 0.0 0.0	4.000 0.0 4.000	41.462 4.734 0.069		* Fixed loss = 3.002 Vel = 6.01	
RB to X1	0.0 266.95	4.1 140.0 0.0155	1E 1G 1T	14.534 2.907 29.067	15.000 46.508 61.508	46.265 -3.032 0.951		Vel = 6.49	
X1 to X2	100.00 366.95	12.34 140.0 0.0001	1T	93.767 0.0 0.0	40.000 93.767 133.767	44.184 0.0 0.018		Qa = 100 Vel = 0.98	
X2 to X3	0.0 366.95	12.34 140.0 0.0001	2E 1T	84.39 93.767 0.0	720.000 178.157 898.157	44.202 19.490 0.116		Vel = 0.98	
X3 to TEST	0.0 366.95	8.23 100.0 0.0017		0.0 0.0 0.0	550.000 0.0 550.000	63.808 18.190 0.960		Vel = 2.21	
	0.0 366.95					82.958		K Factor = 40.29	

# Water Supply Curve (C)

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City Water Supply:  
C1 - Static Pressure : 91  
C2 - Residual Pressure: 88  
C2 - Residual Flow : 1644

Demand:  
D1 - Elevation : 51.178  
D2 - System Flow : 266.953  
D2 - System Pressure : 82.958  
Hose ( Adj City ) : \_\_\_\_\_  
Hose ( Demand ) : 100  
D3 - System Demand : 366.953  
Safety Margin : 7.855

