



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

SPRINKLER SYSTEMS INC.  
P. O. BOX 1285  
2-4 AVON STREET  
LEWISTON, ME 04243  
207-782-0104

Job Name : 191 MARGINAL WAY  
Building :  
Location : 191 MARGINAL WAY, PORTLAND, MAINE 04101  
System : 1 OF 1  
Contract : 17-082  
Data File : 17082191MARGINALWAYA2.WXF

Hydraulic Design Information Sheet

Name - 191 MARGINAL WAY Date - 7-31-2017  
 Location - 191 MARGINAL WAY, PORTLAND, MAINE 04101  
 Building - System No. - 1 OF 1  
 Contractor - LANDRY/FRENCH Contract No. - 17-082  
 Calculated By - SCOTT E. GARLAND Drawing No. - 1 OF 1  
 Construction: ( ) Combustible (X) Non-Combustible Ceiling Height - VARIES  
 Occupancy - FUTURE MERCANTILE - ORDINARY HAZARD GP 2

S (X) NFPA 13 ( ) Lt. Haz. Ord.Haz.Gp. ( ) 1 (X) 2 ( ) 3 ( ) Ex.Haz.  
 Y ( ) NFPA 231 ( ) NFPA 231C ( ) Figure Curve

S Other

T Specific Ruling Made By Date

Specific Ruling	Made By	Date
Area of Sprinkler Operation - 1058	System Type	Sprinkler/Nozzle
Density - .20	(X) Wet	Make RELIABLE
Area Per Sprinkler - 126.379	( ) Dry	Model F1FR56
Elevation at Highest Outlet - 115.75	( ) Deluge	Size 1/2" X 1/2"
Hose Allowance - Inside -	( ) Preaction	K-Factor 5.6
Rack Sprinkler Allowance -	( ) Other	Temp.Rat.200 DEG
Hose Allowance - Outside - 250		

N Note DESIGN AREA #2 - FUTURE MERCANTILE

Calculation Flow Required - 262.677 Press Required - 78.936 AT BASE OF RISER  
 Summary C-Factor Used: 120 Overhead 140 Underground

Water Flow Test:	Pump Data:	Tank or Reservoir:
Date of Test - 5-31-2016	Rated Cap.-	Cap. -
Time of Test -	@ Press -	Elev.-
Static Press - 98	Elev. -	Well
Residual Press - 92		Proof Flow
Flow - 1528		
Elevation - 98.0		

U Location - ON MARGINAL WAY, 150' FROM THE BUILDING

P Source of Information - PORTLAND WATER DISTRICT

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

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

G Horizontal Barriers Provided:

# 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	0	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
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			

## Unit 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.

**SUPPLY ANALYSIS**

<b>Node at Source</b>	<b>Static Pressure</b>	<b>Residual Pressure</b>	<b>Flow</b>	<b>Available Pressure</b>	<b>Total Demand</b>	<b>Required Pressure</b>
TEST	98.0	92	1528.0	97.204	512.68	81.249

**NODE ANALYSIS**

<b>Node Tag</b>	<b>Elevation</b>	<b>Node Type</b>	<b>Pressure at Node</b>	<b>Discharge at Node</b>	<b>Notes</b>
21	115.417	5.6	20.37	25.28	
22	115.417	5.6	20.53	25.38	
23	115.417	5.6	21.19	25.78	
24	115.417	5.6	22.59	26.62	
25	115.417	5.6	25.03	28.02	
M	115.417		28.41		
N	115.417		31.8		
JT	115.417		42.33		
26	115.75	5.6	20.54	25.38	
27	115.75	5.6	20.71	25.48	
28	115.75	5.6	21.37	25.89	
29	115.75	5.6	22.78	26.73	
30	115.75	5.6	25.24	28.13	
P	115.75		28.65		
Q	115.75		32.06		
KT	115.75		42.67		
J	113.917		47.8		
K	113.917		48.46		
L	113.917		49.98		
R	117.0		64.03		
TOR	117.0		65.76		
BKFL	105.333		74.01		
BASE	101.0		78.94		
X1	101.0		79.39	250.0	
TEST	98.0		81.25		

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv. Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
21 to 22	115.417 115.417	5.60	25.28	1.5	0.0 0.0	8.000 0.0	120	20.372 0.0			
			25.28	1.682	0.0	8.000	0.0201	0.161	Vel =	3.65	
22 to 23	115.417 115.417	5.60	25.37	1.5	0.0 0.0	9.000 0.0	120	20.533 0.0			
			50.65	1.682	0.0	9.000	0.0729	0.656	Vel =	7.31	
23 to 24	115.417 115.417	5.60	25.78	1.5	0.0 0.0	9.000 0.0	120	21.189 0.0			
			76.43	1.682	0.0	9.000	0.1559	1.403	Vel =	11.04	
24 to 25	115.417 115.417	5.60	26.62	1.5	0.0 0.0	9.000 0.0	120	22.592 0.0			
			103.05	1.682	0.0	9.000	0.2710	2.439	Vel =	14.88	
25 to M	115.417 115.417	5.60	28.01	1.5	0.0 0.0	8.000 0.0	120	25.031 0.0			
			131.06	1.682	0.0	8.000	0.4229	3.383	Vel =	18.92	
M to N	115.417 115.417		0.0	1.5	0.0 0.0	8.000 0.0	120	28.414 0.0			
			131.06	1.682	0.0	8.000	0.4229	3.383	Vel =	18.92	
N to JT	115.417 115.417		0.0	1.5	T 9.9 0.0	15.000 9.900	120	31.797 0.0			
			131.06	1.682	0.0	24.900	0.4229	10.530	Vel =	18.92	
JT to J	115.417 113.917		0.0	1.5	T 9.9 0.0	1.500 9.900	120	42.327 0.650			
			131.06	1.682	0.0	11.400	0.4229	4.821	Vel =	18.92	
J			0.0 131.06					47.798	K Factor =	18.96	
26 to 27	115.750 115.750	5.60	25.38	1.5	0.0 0.0	8.000 0.0	120	20.544 0.0			
			25.38	1.682	0.0	8.000	0.0204	0.163	Vel =	3.66	
27 to 28	115.750 115.750	5.60	25.49	1.5	0.0 0.0	9.000 0.0	120	20.707 0.0			
			50.87	1.682	0.0	9.000	0.0733	0.660	Vel =	7.35	
28 to 29	115.750 115.750	5.60	25.88	1.5	0.0 0.0	9.000 0.0	120	21.367 0.0			
			76.75	1.682	0.0	9.000	0.1572	1.415	Vel =	11.08	
29 to 30	115.750 115.750	5.60	26.73	1.5	0.0 0.0	9.000 0.0	120	22.782 0.0			
			103.48	1.682	0.0	9.000	0.2731	2.458	Vel =	14.94	
30 to P	115.750 115.750	5.60	28.13	1.5	0.0 0.0	8.000 0.0	120	25.240 0.0			
			131.61	1.682	0.0	8.000	0.4261	3.409	Vel =	19.00	
P to Q	115.750 115.750		0.0	1.5	0.0 0.0	8.000 0.0	120	28.649 0.0			
			131.61	1.682	0.0	8.000	0.4262	3.410	Vel =	19.00	
Q to KT	115.750 115.750		0.0	1.5	T 9.9 0.0	15.000 9.900	120	32.059 0.0			
			131.61	1.682	0.0	24.900	0.4261	10.611	Vel =	19.00	
KT to K	115.750 113.917		0.0	1.5	T 9.9 0.0	1.833 9.900	120	42.670 0.794			
			131.61	1.682	0.0	11.733	0.4262	5.001	Vel =	19.00	

# Final Calculations - Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv. Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
			0.0 131.61					48.465		K Factor = 18.90	
J to K	113.917 113.917		131.06 131.06	2.5 2.635	0.0 0.0	14.042 0.0	120 0.0475	47.798 0.0		Vel = 7.71	
K to L	113.917 113.917		131.62 262.68	2.5 2.635	0.0 0.0	8.792 8.792	120 0.1719	48.465 1.511		Vel = 15.45	
L to R	113.917 117		0.0 262.68	2.5 2.635	2E 0.0	16.474 16.474	120 0.1719	49.976 -1.335		Vel = 15.45	
R to TOR	117 117		0.0 262.68	4 4.26	2E 0.0	26.334 26.334	120 0.0166	64.025 0.0		Vel = 5.91	
TOR to BKFL	117 105.333		0.0 262.68	4 4.26	Fsp 0.0	11.667 0.0	120 0.0165	65.763 8.053		* Fixed Loss = 3 Vel = 5.91	
BKFL to BASE	105.333 101		0.0 262.68	4 4.26	Zac 0.0	4.333 0.0	120 0.0166	74.009 4.855		* Fixed Loss = 2.978 Vel = 5.91	
BASE to X1	101 101		0.0 262.68	6 6.16	2E G T	40.168 4.304 43.037	130.000 87.509 217.509	140 0.0 0.449		Vel = 2.83	
X1 to TEST	101 98	H250	250.00 512.68	8 7.98	0.0 0.0	150.000 0.0	100 0.0038	79.385 1.299		Vel = 3.29	
TEST			0.0 512.68					81.249		K Factor = 56.88	

# Water Supply Curve C

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City Water Supply:  
C1 - Static Pressure : 98  
C2 - Residual Pressure: 92  
C2 - Residual Flow : 1528

Demand:  
D1 - Elevation : 7.543  
D2 - System Flow : 262.677  
D2 - System Pressure : 81.249  
Hose ( Demand ) : 250  
D3 - System Demand : 512.677  
Safety Margin : 15.955

