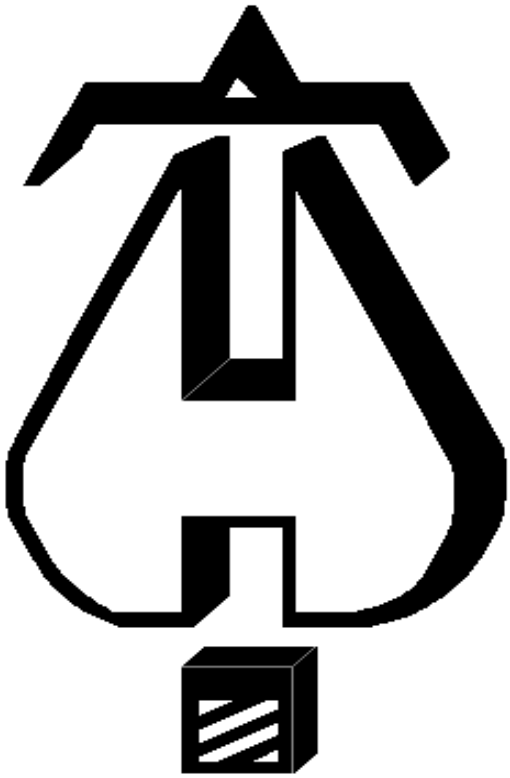

. . . Fire Protection by Computer Design

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

Job Name	:	17 CARLETON STREET
Building	:	
Location	:	17 CARLETON STREET, PORTLAND, MAINE 04101
System	:	1 OF 1
Contract	:	16-149
Data File	:	1614917CARLETONSTREETA1.WXF

HYDRAULIC DESIGN INFORMATION SHEET

Name - 17 CARLETON STREET Date - 3-30-2017
Location - 17 CARLETON STREET, PORTLAND, MAINE 04101
Building - System No. - 1 OF 1
Contractor - BENCHMARK Contract No. - 16-149
Calculated By - SCOTT E. GARLAND Drawing No. - 1-3 OF 3
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height VARIES
OCCUPANCY - RESIDENTIAL - APARTMENTS

SYSTEM DESIGN

Type of Calculation: ( )NFPA 13 Residential (X)NFPA 13R ( )NFPA 13D
Number of Sprinklers Flowing: ( )1 ( )2 (X)4 ( )
( )Other
( )Specific Ruling Made by Date

Listed Flow at Start Point - 17.0 Gpm System Type
Listed Pres. at Start Point - 12.0 Psi (X) Wet ( ) Dry
MAXIMUM LISTED SPACING 18 x 18 ( ) Deluge ( ) PreAction
Domestic Flow Added - Gpm Sprinkler or Nozzle
Additional Flow Added - Gpm Make RELIABLE Model RFC49
Elevation at Highest Outlet - 139.5Feet Size 1/2" X 1/2" K-Factor 4.9
Note: Temperature Rating 155 DEG
DESIGN AREA #1 - FOURTH FLOOR APARTMENT

Calculation Summary: Gpm Required 66.136 Psi Required 46.155 AT BASE OF RISER
C-Factor Used: Overhead 150 Underground 140

Water Flow Test:		Pump Data:	Tank or Reservoir:
Date of Test	- 4-28-2015	Rated Cap.	Cap.
Time of Test	-	@ Psi	Elev.
Static (Psi)	- 50	Elev.	
Residual (Psi)	- 47	Other	Well
Flow (Gpm)	- 1034		Proof Flow Gpm
Elevation	- 98.0		

Location: ON EMERY STREET AT PINE STREET, APPROX. 650' FROM THE BLDG

Source of Information: PORTLAND WATER DISTRICT

Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
Bvca	B Fly Vic 705						6	6	7		8	12	14	16	18	19					
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
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
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
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
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

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
TEST	50.0	47	1034.0	49.981	66.14	43.578

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
TYP	0.0	4.9	7.04	13.0	
TYP1	0.0	4.9	12.04	17.0	
1	139.5	4.8	11.92	16.56	K=K @ DROP
2	139.5	4.8	12.54	17.0	K=K @ DRP1
3	139.5	4.8	11.21	16.05	K=K @ DROP
4	139.5	4.8	11.87	16.52	K=K @ DROP
A	139.5		13.94		
B	139.5		14.69		
C	139.5		15.17		
D	139.5		15.34		
E	139.5		15.65		
FT	139.0		19.19		
G	130.5		22.89		
H	120.0		27.45		
J	110.25		31.68		
T	98.833		36.68		
RT	98.833		36.75		
TOV	95.833		41.06		
RB	91.833		46.15		
X1	91.833		46.17		
X2	91.833		46.22		
X3	91.833		46.23		
TEST	98.0		43.58		

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 ******
TYP	0	4.90	13.00	1	T	9.563	0.500	150	7.039	
to						0.0	9.562		0.0	
DROP	0		13.0	1.101		0.0	10.062	0.0306	0.308	Vel = 4.38
			0.0							
DROP			13.00						7.347	K Factor = 4.80
TYP1	0	4.90	17.00	1	T	9.563	0.500	150	12.037	
to						0.0	9.562		0.0	
DRP1	0		17.0	1.101		0.0	10.062	0.0504	0.507	Vel = 5.73
			0.0							
DRP1			17.00						12.544	K Factor = 4.80
1	139.500	4.8	16.56	1	E	3.825	9.167	150	11.920	K = K @ DROP
to						0.0	3.825		0.0	
2	139.500		16.56	1.101		0.0	12.992	0.0480	0.624	Vel = 5.58
2	139.500	4.8	17.00	1.25	E	4.762	20.125	150	12.544	K = K @ DRP1
to						0.0	4.761		0.0	
A	139.500		33.56	1.394		0.0	24.886	0.0562	1.398	Vel = 7.05
			0.0							
A			33.56						13.942	K Factor = 8.99
3	139.500	4.8	16.06	1	E	3.825	10.792	150	11.206	K = K @ DROP
to						0.0	3.825		0.0	
4	139.500		16.06	1.101		0.0	14.617	0.0454	0.663	Vel = 5.41
4	139.500	4.8	16.52	1	T	9.563	2.792	150	11.869	K = K @ DROP
to						0.0	9.562		0.0	
A	139.500		32.58	1.101		0.0	12.354	0.1678	2.073	Vel = 10.98
			0.0							
A			32.58						13.942	K Factor = 8.73
A	139.500		66.14	1.5		0.0	7.417	150	13.942	
to						0.0	0.0		0.0	
B	139.500		66.14	1.598		0.0	7.417	0.1013	0.751	Vel = 10.58
B	139.500		0.0	2	T	12.965	1.250	150	14.693	
to						0.0	12.965		0.0	
C	139.500		66.14	2.003		0.0	14.215	0.0337	0.479	Vel = 6.73
C	139.500		0.0	3		0.0	34.292	120	15.172	
to						0.0	0.0		0.0	
D	139.500		66.14	3.26		0.0	34.292	0.0048	0.164	Vel = 2.54
D	139.500		0.0	3	T	20.159	47.000	120	15.336	
to						0.0	20.159		0.0	
E	139.500		66.14	3.26		0.0	67.159	0.0047	0.319	Vel = 2.54
E	139.500		0.0	3	Bvca	9.408	8.583	120	15.655	
to					3E	28.223	59.134		3.217	* Fixed Loss = 3
FT	139		66.14	3.26	S	21.503	67.717	0.0047	0.321	Vel = 2.54
					Fsp	0.0				
FT	139		0.0	4		0.0	8.500	120	19.193	
to						0.0	0.0		3.681	
G	130.500		66.14	4.26		0.0	8.500	0.0014	0.012	Vel = 1.49
G	130.500		0.0	4		0.0	10.500	120	22.886	
to						0.0	0.0		4.548	
H	120		66.14	4.26		0.0	10.500	0.0012	0.013	Vel = 1.49

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 ******
H	120		0.0	4		0.0	9.750	120	27.447	
to						0.0	0.0		4.223	
J	110.250		66.14	4.26		0.0	9.750	0.0012	0.012	Vel = 1.49
J	110.250		0.0	4	T	26.334	11.417	120	31.682	
to						0.0	26.334		4.945	
T	98.833		66.14	4.26		0.0	37.751	0.0013	0.049	Vel = 1.49
T	98.833		0.0	4	Bvca	10.534	23.792	120	36.676	
to					2E	26.334	36.868		0.0	
RT	98.833		66.14	4.26		0.0	60.660	0.0013	0.078	Vel = 1.49
RT	98.833		0.0	4	Fsp	0.0	3.000	120	36.754	
to						0.0	0.0		4.299	* Fixed Loss = 3
TOV	95.833		66.14	4.26		0.0	3.000	0.0013	0.004	Vel = 1.49
TOV	95.833		0.0	4	Zac	0.0	4.000	120	41.057	
to						0.0	0.0		5.092	* Fixed Loss = 3.36
RB	91.833		66.14	4.26		0.0	4.000	0.0015	0.006	Vel = 1.49
RB	91.833		0.0	6	E	20.084	40.000	140	46.155	
to					G	4.304	67.425		0.0	
X1	91.833		66.14	6.16	T	43.037	107.425	0.0002	0.017	Vel = 0.71
X1	91.833		0.0	6	T	43.037	225.000	140	46.172	
to						0.0	43.037		0.0	
X2	91.833		66.14	6.16		0.0	268.037	0.0002	0.043	Vel = 0.71
X2	91.833		0.0	8	2F	28.468	360.000	140	46.215	
to						0.0	28.468		0.0	
X3	91.833		66.14	8.27		0.0	388.468	0	0.015	Vel = 0.40
X3	91.833		0.0	6	F	10.042	65.000	140	46.230	
to					T	43.037	53.079		-2.671	
TEST	98		66.14	6.16		0.0	118.079	0.0002	0.019	Vel = 0.71
			0.0							
TEST			66.14						43.578	K Factor = 10.02

Water Supply Curve C

SPRINKLER SYSTEMS INC.
17 CARLETON STREET

Page 7
Date 3-30-2017

City Water Supply:
- C1 - Static Pressure : 50
- C2 - Residual Pressure: 47
- C2 - Residual Flow : 1034

Demand:
- D1 - Elevation : 17.974
- D2 - System Flow : 66.136
- D2 - System Pressure : 43.578
- Hose (Demand) : _____
- D3 - System Demand : 66.136
- Safety Margin : 6.403