

... Fire Protection by Computer Design

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

Job Name : Safelite Area 1
Building : NEW
Location : 421 WARREN AVENUE PORTLAND, MAINE
System : 1 WET
Contract : 16-059
Data File : Safelite Area 1.WXF

Hydraulic Design Information Sheet

Name - SAFELITE Date - 6-24-16
 Location - 421 WARREN AVENUE PORTLAND, MAINE
 Building - NEW System No. - 1 WET
 Contractor - SPRINKLER SYSTEMS INC Contract No. - 16-059
 Calculated By - CDS Drawing No. - 1-2 OF 2
 Construction: () Combustible (X) Non-Combustible Ceiling Height - VARIES
 Occupancy - WAREHOUSE

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

S Other ESFR

T Specific Ruling Made By Date

E				
M	Area of Sprinkler Operation	- 12 HEADS	System Type	Sprinkler/Nozzle
	Density	- 1.0	(X) Wet	Make RELIABLE
D	Area Per Sprinkler	- 100	() Dry	Model N25
E	Elevation at Highest Outlet	- 120	() Deluge	Size 1" X 1"
S	Hose Allowance - Inside	- 0	() Preaction	K-Factor 25.2
I	Rack Sprinkler Allowance	- 0	() Other	Temp.Rat.165 DEG.
G	Hose Allowance - Outside	- 250		

N Note

Calculation Flow Required - 1243.93 Press Required - 65.098 AT BASE
 Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 10-15-2015		Cap. -
T	Time of Test - AM	Rated Cap.-	Elev.-
E	Static Press - 84	@ Press -	
R	Residual Press - 82	Elev. -	Well
	Flow - 1453		Proof Flow
S	Elevation - 100.0		

U Location - ON SITE

P Source of Information - OWNER AND WATER DISTRICT

C	Commodity WINDSHIELDS	Class II	Location
O	Storage Ht. 16' MAX.	Area	Aisle W. 8'
M	Storage Method: Solid Piled	% Palletized	% Rack 100
M	(X) Single Row () Conven. Pallet	() Auto. Storage	() Encap.
S	(X) Double Row () Slave Pallet	() Solid Shelf	() Non
T	() Mult. Row	() Open Shelf	

R K Flue Spacing Clearance:Storage to Ceiling 4'
 A Longitudinal Transverse

E Horizontal Barriers Provided:

Fittings Used Summary

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Fitting Legend		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	
Abbrev.	Name																					
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	
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																				

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.
TYP	0.0	25.5	15.38	na	100.0	1.0	100	15.0
1	120.0	25.2	16.87	na	103.52	1.0	100	15.0
5	120.0	25.2	17.89	na	106.58	1.0	100	15.0
6	118.0		33.1	na				
12	118.0		33.2	na				
18	118.0		33.52	na				
24	118.0		34.41	na				
26	118.0		34.97	na				
28	118.0		35.46	na				
30	118.0		36.03	na				
32	118.0		36.39	na				
34	118.0		36.74	na				
36	117.0		39.0	na				
38	117.0		39.29	na				
40	117.0		39.63	na				
42	117.0		40.0	na				
44	117.0		40.33	na				
46	117.0		40.62	na				
48	117.0		40.9	na				
50	117.0		41.15	na				
52	117.0		41.38	na				
54	117.0		41.6	na				
56	117.0		41.81	na				
58	117.0		42.0	na				
60	117.0		42.18	na				
62	117.0		42.35	na				
64	117.0		42.5	na				
66	117.0		42.64	na				
68	117.0		42.76	na				
70	117.0		42.85	na				
73	117.0		43.32	na				
76	117.0		43.39	na				
79	117.0		43.43	na				
82	117.0		43.44	na				
81	117.0		43.84	na				
7	115.5		38.42	na				
8.	120.0	25.2	17.68	na	105.96	1.0	100	15.0
9	120.0	25.2	16.9	na	103.59	1.0	100	15.0
10	120.0	25.2	16.91	na	103.61	1.0	100	15.0
11	120.0	25.2	17.93	na	106.69	1.0	100	15.0
13	115.5		38.46	na				
14	120.0	K = K @ ARM	18.96	na	101.98			
15	120.0	K = K @ ARM	18.23	na	100.0			
16	120.0	K = K @ ARM	18.24	na	100.02			
17	120.0	K = K @ ARM	19.2	na	102.61			
19	115.5		38.57	na				
20	120.0		35.2	na				
21	120.0		34.96	na				
22	120.0		34.73	na				
23	120.0		34.49	na				
25	115.5		38.66	na				
27	115.5		38.77	na				
29	115.5		38.93	na				
31	115.5		39.06	na				
33	115.5		39.21	na				
35	115.5		39.42	na				
37	115.5		39.57	na				
39	115.5		39.73	na				
41	115.5		41.31	na				
43	115.5		41.47	na				
45	115.5		41.64	na				
47	115.5		41.82	na				
49	115.5		42.0	na				
51	115.5		42.19	na				
53	115.5		42.39	na				

Flow Summary - Standard

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
55	115.5		42.59	na				
57	115.5		42.79	na				
59	115.5		43.0	na				
61	115.5		43.21	na				
63	115.5		43.43	na				
65	115.5		43.66	na				
67	115.5		43.89	na				
69	115.5		44.13	na				
71	111.0		47.69	na				
72	120.0		42.25	na				
74	111.0		48.09	na				
75	120.0		42.36	na				
77	111.0		48.37	na				
78	120.0		42.43	na				
2	120.0	25.2	16.87	na	103.5	1.0	100	15.0
3	120.0	25.2	17.65	na	105.87	1.0	100	15.0
4	115.5		38.41	na				
80	111.0		48.83	na				
83	111.0		49.27	na				
84	111.0		49.69	na				
86	111.0		51.45	na				
TOR	111.0		52.36	na				
BKFL	104.5		56.43	na				
BASE	100.0		65.1	na				
HOSE	100.0		69.18	na	250.0			
TEST	100.0		69.24	na				

The maximum velocity is 19.12 and it occurs in the pipe between nodes 11 and 12

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	*****
TYP to ARM	100.00 100.0	1.61 120.0 0.3172	T	8.0 0.0 0.0	1.000 8.000 9.000	15.379 0.0 2.855			K Factor = 25.50	
	0.0 100.00									
						18.234			K Factor = 23.42	
1 to 5	110.70 110.7	2.157 120.0 0.0922		0.0 0.0 0.0	11.000 0.0 11.000	16.874 0.0 1.014			K Factor = 25.20	
5 to 6	106.58 217.28	2.157 120.0 0.3208	E T	6.153 12.307 0.0	26.250 18.460 44.710	17.888 0.866 14.344			K Factor = 25.20	
6 to 12	0.0 217.28	4.26 120.0 0.0118		0.0 0.0 0.0	8.330 0.0 8.330	33.098 0.0 0.098				Vel = 4.89
12 to 18	217.76 435.04	4.26 120.0 0.0421		0.0 0.0 0.0	7.600 0.0 7.600	33.196 0.0 0.320				Vel = 9.79
18 to 24	209.87 644.91	4.26 120.0 0.0873		0.0 0.0 0.0	10.250 0.0 10.250	33.516 0.0 0.895				Vel = 14.52
24 to 26	-50.09 594.82	4.26 120.0 0.0751		0.0 0.0 0.0	7.500 0.0 7.500	34.411 0.0 0.563				Vel = 13.39
26 to 28	-46.45 548.37	4.26 120.0 0.0648		0.0 0.0 0.0	7.500 0.0 7.500	34.974 0.0 0.486				Vel = 12.34
28 to 30	-42.68 505.69	4.26 120.0 0.0556		0.0 0.0 0.0	10.250 0.0 10.250	35.460 0.0 0.570				Vel = 11.38
30 to 32	-38.27 467.42	4.26 120.0 0.0481		0.0 0.0 0.0	7.500 0.0 7.500	36.030 0.0 0.361				Vel = 10.52
32 to 34	-35.58 431.84	4.26 120.0 0.0415		0.0 0.0 0.0	8.330 0.0 8.330	36.391 0.0 0.346				Vel = 9.72
34 to 36	-33.04 398.8	4.26 120.0 0.0359	3E	39.501 0.0 0.0	11.500 39.501 51.001	36.737 0.433 1.830				Vel = 8.98
36 to 38	12.60 411.4	4.26 120.0 0.0380		0.0 0.0 0.0	7.500 0.0 7.500	39.000 0.0 0.285				Vel = 9.26
38 to 40	16.14 427.54	4.26 120.0 0.0408		0.0 0.0 0.0	8.330 0.0 8.330	39.285 0.0 0.340				Vel = 9.62
40 to 42	20.01 447.55	4.26 120.0 0.0444		0.0 0.0 0.0	8.330 0.0 8.330	39.625 0.0 0.370				Vel = 10.07

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	*****
42	-26.31	4.26		0.0	8.330	39.995				
to		120.0		0.0	0.0	0.0				
44	421.24	0.0397		0.0	8.330	0.331		Vel =	9.48	
44	-22.47	4.26		0.0	8.330	40.326				
to		120.0		0.0	0.0	0.0				
46	398.77	0.0359		0.0	8.330	0.299		Vel =	8.98	
46	-19.12	4.26		0.0	8.330	40.625				
to		120.0		0.0	0.0	0.0				
48	379.65	0.0328		0.0	8.330	0.273		Vel =	8.55	
48	-16.27	4.26		0.0	8.330	40.898				
to		120.0		0.0	0.0	0.0				
50	363.38	0.0301		0.0	8.330	0.251		Vel =	8.18	
50	-13.96	4.26		0.0	8.330	41.149				
to		120.0		0.0	0.0	0.0				
52	349.42	0.0281		0.0	8.330	0.234		Vel =	7.87	
52	-12.25	4.26		0.0	8.330	41.383				
to		120.0		0.0	0.0	0.0				
54	337.17	0.0263		0.0	8.330	0.219		Vel =	7.59	
54	-11.19	4.26		0.0	8.330	41.602				
to		120.0		0.0	0.0	0.0				
56	325.98	0.0247		0.0	8.330	0.206		Vel =	7.34	
56	-10.89	4.26		0.0	8.330	41.808				
to		120.0		0.0	0.0	0.0				
58	315.09	0.0232		0.0	8.330	0.193		Vel =	7.09	
58	-11.33	4.26		0.0	8.330	42.001				
to		120.0		0.0	0.0	0.0				
60	303.76	0.0217		0.0	8.330	0.181		Vel =	6.84	
60	-12.48	4.26		0.0	8.330	42.182				
to		120.0		0.0	0.0	0.0				
62	291.28	0.0200		0.0	8.330	0.167		Vel =	6.56	
62	-14.23	4.26		0.0	8.330	42.349				
to		120.0		0.0	0.0	0.0				
64	277.05	0.0184		0.0	8.330	0.153		Vel =	6.24	
64	-16.49	4.26		0.0	8.330	42.502				
to		120.0		0.0	0.0	0.0				
66	260.56	0.0163		0.0	8.330	0.136		Vel =	5.87	
66	-19.16	4.26		0.0	8.330	42.638				
to		120.0		0.0	0.0	0.0				
68	241.4	0.0142		0.0	8.330	0.118		Vel =	5.43	
68	-22.21	4.26		0.0	8.330	42.756				
to		120.0		0.0	0.0	0.0				
70	219.19	0.0118		0.0	8.330	0.098		Vel =	4.93	
70	-25.58	4.26	2E	26.334	23.000	42.854				
to		120.0		0.0	26.334	0.0				
73	193.61	0.0094		0.0	49.334	0.465		Vel =	4.36	

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	*****
73	-41.98	4.26		0.0	12.500	43.319				
to		120.0		0.0	0.0	0.0				
76	151.63	0.0060		0.0	12.500	0.075		Vel =	3.41	
76	-45.91	4.26		0.0	12.250	43.394				
to		120.0		0.0	0.0	0.0				
79	105.72	0.0031		0.0	12.250	0.038		Vel =	2.38	
79	-48.76	4.26		0.0	12.000	43.432				
to		120.0		0.0	0.0	0.0				
82	56.96	0.0010		0.0	12.000	0.012		Vel =	1.28	
82	0.0	2.157	T	12.307	2.500	43.444				
to		120.0		0.0	12.307	0.0				
81	56.96	0.0269		0.0	14.807	0.399		Vel =	5.00	
81	0.0	2.157	3E	18.46	58.000	43.843				
to		120.0	T	12.307	30.767	2.599				
80	56.96	0.0269		0.0	88.767	2.392		Vel =	5.00	
	0.0									
	56.96					48.834		K Factor =	8.15	
7	-202.10	2.157	T	12.307	48.500	38.417				
to		120.0	E	6.153	18.460	-1.949				
8.	-202.1	-0.2806		0.0	66.960	-18.788		Vel =	17.74	
8.	105.96	2.157		0.0	11.000	17.680		K Factor =	25.20	
to		120.0		0.0	0.0	0.0				
9	-96.14	-0.0710		0.0	11.000	-0.781		Vel =	8.44	
9	103.60	2.157		0.0	11.000	16.899		K Factor =	25.20	
to		120.0		0.0	0.0	0.0				
10	7.46	0.0006		0.0	11.000	0.007		Vel =	0.65	
10	103.61	2.157		0.0	11.000	16.906		K Factor =	25.20	
to		120.0		0.0	0.0	0.0				
11	111.07	0.0927		0.0	11.000	1.020		Vel =	9.75	
11	106.69	2.157	E	6.153	26.250	17.926		K Factor =	25.20	
to		120.0	T	12.307	18.460	0.866				
12	217.76	0.3222		0.0	44.710	14.404		Vel =	19.12	
	0.0									
	217.76					33.196		K Factor =	37.80	
13	-194.74	2.157	T	12.307	48.500	38.456				
to		120.0	E	6.153	18.460	-1.949				
14	-194.74	-0.2620		0.0	66.960	-17.542		Vel =	17.10	
14	101.99	2.157		0.0	11.000	18.965		K Factor @ node	ARM	
to		120.0		0.0	0.0	0.0				
15	-92.75	-0.0665		0.0	11.000	-0.731		Vel =	8.14	
15	100.00	2.157		0.0	11.000	18.234		K Factor @ node	ARM	
to		120.0		0.0	0.0	0.0				
16	7.25	0.0006		0.0	11.000	0.007		Vel =	0.64	
16	100.01	2.157		0.0	11.000	18.241		K Factor @ node	ARM	
to		120.0		0.0	0.0	0.0				
17	107.26	0.0869		0.0	11.000	0.956		Vel =	9.42	

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 18	102.61 209.87	2.157 120.0 0.3009	E T	6.153 12.307 0.0	26.250 18.460 44.710	19.197 0.866 13.453		K Factor @ node ARM Vel = 18.43	
	0.0 209.87					33.516		K Factor = 36.25	
19 to 20	-50.09 -50.09	2.157 120.0 -0.0213	T E	12.307 6.153 0.0	48.500 18.460 66.960	38.568 -1.949 -1.423		Vel = 4.40	
20 to 21	0.0 -50.09	2.157 120.0 -0.0213		0.0 0.0 0.0	11.000 0.0 11.000	35.196 0.0 -0.234		Vel = 4.40	
21 to 22	0.0 -50.09	2.157 120.0 -0.0213		0.0 0.0 0.0	11.000 0.0 11.000	34.962 0.0 -0.234		Vel = 4.40	
22 to 23	0.0 -50.09	2.157 120.0 -0.0212		0.0 0.0 0.0	11.000 0.0 11.000	34.728 0.0 -0.233		Vel = 4.40	
23 to 24	0.0 -50.09	2.157 120.0 -0.0212	E T	6.153 12.307 0.0	26.250 18.460 44.710	34.495 0.866 -0.950		Vel = 4.40	
	0.0 -50.09					34.411		K Factor = -8.54	
25 to 26	-46.45 -46.45	2.157 120.0 -0.0185	2T 2E	24.613 12.307 0.0	104.000 36.920 140.920	38.662 -1.083 -2.605		Vel = 4.08	
	0.0 -46.45					34.974		K Factor = -7.85	
27 to 28	-42.68 -42.68	2.157 120.0 -0.0158	2T 2E	24.613 12.307 0.0	104.000 36.920 140.920	38.769 -1.083 -2.226		Vel = 3.75	
	0.0 -42.68					35.460		K Factor = -7.17	
29 to 30	-38.27 -38.27	2.157 120.0 -0.0129	2T 2E	24.613 12.307 0.0	104.000 36.920 140.920	38.933 -1.083 -1.820		Vel = 3.36	
	0.0 -38.27					36.030		K Factor = -6.38	
31 to 32	-35.58 -35.58	2.157 120.0 -0.0113	2T 2E	24.613 12.307 0.0	104.000 36.920 140.920	39.064 -1.083 -1.590		Vel = 3.12	
	0.0 -35.58					36.391		K Factor = -5.90	
33 to 34	-33.04 -33.04	2.157 120.0 -0.0098	2T 2E	24.613 12.307 0.0	104.000 36.920 140.920	39.207 -1.083 -1.387		Vel = 2.90	

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	*****
	0.0 -33.04					36.737		K Factor = -5.45	
35 to 36	12.60 12.6	2.157 120.0 0.0017	2T 2E	24.613 12.307 0.0	104.000 36.920 140.920	39.417 -0.650 0.233		Vel = 1.11	
	0.0 12.60					39.000		K Factor = 2.02	
37 to 38	16.14 16.14	2.157 120.0 0.0026	2T 2E	24.613 12.307 0.0	104.000 36.920 140.920	39.566 -0.650 0.369		Vel = 1.42	
	0.0 16.14					39.285		K Factor = 2.58	
39 to 40	20.01 20.01	2.157 120.0 0.0039	2T 2E	24.613 12.307 0.0	104.000 36.920 140.920	39.727 -0.650 0.548		Vel = 1.76	
	0.0 20.01					39.625		K Factor = 3.18	
41 to 42	-26.31 -26.31	2.157 120.0 -0.0065	2T 2E	24.613 12.307 0.0	66.000 36.920 102.920	41.309 -0.650 -0.664		Vel = 2.31	
	0.0 -26.31					39.995		K Factor = -4.16	
43 to 44	-22.47 -22.47	2.157 120.0 -0.0048	2T 2E	24.613 12.307 0.0	66.000 36.920 102.920	41.472 -0.650 -0.496		Vel = 1.97	
	0.0 -22.47					40.326		K Factor = -3.54	
45 to 46	-19.12 -19.12	2.157 120.0 -0.0036	2T 2E	24.613 12.307 0.0	66.000 36.920 102.920	41.642 -0.650 -0.367		Vel = 1.68	
	0.0 -19.12					40.625		K Factor = -3.00	
47 to 48	-16.27 -16.27	2.157 120.0 -0.0026	2T 2E	24.613 12.307 0.0	66.000 36.920 102.920	41.820 -0.650 -0.272		Vel = 1.43	
	0.0 -16.27					40.898		K Factor = -2.54	
49 to 50	-13.96 -13.96	2.157 120.0 -0.0020	2T 2E	24.613 12.307 0.0	66.000 36.920 102.920	42.005 -0.650 -0.206		Vel = 1.23	
	0.0 -13.96					41.149		K Factor = -2.18	
51 to 52	-12.24 -12.24	2.157 120.0 -0.0016	2T 2E	24.613 12.307 0.0	66.000 36.920 102.920	42.194 -0.650 -0.161		Vel = 1.07	

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
Safelite Area 1

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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	*****
	0.0 -12.24					41.383		K Factor = -1.90	
53 to 54	-11.20 -11.2	2.157 120.0 -0.0013	2T 2E	24.613 12.307 0.0	66.000 36.920 102.920	42.389 -0.650 -0.137		Vel = 0.98	
	0.0 -11.20					41.602		K Factor = -1.74	
55 to 56	-10.89 -10.89	2.157 120.0 -0.0013	2T 2E	24.613 12.307 0.0	66.000 36.920 102.920	42.588 -0.650 -0.130		Vel = 0.96	
	0.0 -10.89					41.808		K Factor = -1.68	
57 to 58	-11.33 -11.33	2.157 120.0 -0.0014	2T 2E	24.613 12.307 0.0	66.000 36.920 102.920	42.791 -0.650 -0.140		Vel = 0.99	
	0.0 -11.33					42.001		K Factor = -1.75	
59 to 60	-12.48 -12.48	2.157 120.0 -0.0016	2T 2E	24.613 12.307 0.0	66.000 36.920 102.920	42.999 -0.650 -0.167		Vel = 1.10	
	0.0 -12.48					42.182		K Factor = -1.92	
61 to 62	-14.23 -14.23	2.157 120.0 -0.0021	2T 2E	24.613 12.307 0.0	66.000 36.920 102.920	43.212 -0.650 -0.213		Vel = 1.25	
	0.0 -14.23					42.349		K Factor = -2.19	
63 to 64	-16.48 -16.48	2.157 120.0 -0.0027	2T 2E	24.613 12.307 0.0	66.000 36.920 102.920	43.431 -0.650 -0.279		Vel = 1.45	
	0.0 -16.48					42.502		K Factor = -2.53	
65 to 66	-19.16 -19.16	2.157 120.0 -0.0036	2T 2E	24.613 12.307 0.0	66.000 36.920 102.920	43.657 -0.650 -0.369		Vel = 1.68	
	0.0 -19.16					42.638		K Factor = -2.93	
67 to 68	-22.21 -22.21	2.157 120.0 -0.0047	2T 2E	24.613 12.307 0.0	66.000 36.920 102.920	43.891 -0.650 -0.485		Vel = 1.95	
	0.0 -22.21					42.756		K Factor = -3.40	
69 to 70	-25.58 -25.58	2.157 120.0 -0.0061	2T 2E	24.613 12.307 0.0	66.000 36.920 102.920	44.135 -0.650 -0.631		Vel = 2.25	

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
Safelite Area 1

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Date

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 -25.58				42.854			K Factor = -3.91	
71 to 72	-41.97	2.157 120.0	2T 3E	24.613 18.46	58.000 43.073	47.693 -3.898			
	-41.97	-0.0153		0.0	101.073	-1.548		Vel = 3.68	
72 to 73	0.0	2.157 120.0	T	12.307 0.0	2.500 12.307	42.247 1.299			
	-41.97	-0.0153		0.0	14.807	-0.227		Vel = 3.68	
	0.0 -41.97				43.319			K Factor = -6.38	
74 to 75	-45.91	2.157 120.0	2T 3E	24.613 18.46	58.000 43.073	48.089 -3.898			
	-45.91	-0.0181		0.0	101.073	-1.828		Vel = 4.03	
75 to 76	0.0	2.157 120.0	T	12.307 0.0	2.500 12.307	42.363 1.299			
	-45.91	-0.0181		0.0	14.807	-0.268		Vel = 4.03	
	0.0 -45.91				43.394			K Factor = -6.97	
77 to 78	-48.76	2.157 120.0	2T 3E	24.613 18.46	58.000 43.073	48.373 -3.898			
	-48.76	-0.0202		0.0	101.073	-2.043		Vel = 4.28	
78 to 79	0.0	2.157 120.0	T	12.307 0.0	2.500 12.307	42.432 1.299			
	-48.76	-0.0202		0.0	14.807	-0.299		Vel = 4.28	
	0.0 -48.76				43.432			K Factor = -7.40	
1 to 2	-7.18	2.157 120.0		0.0 0.0	11.000 0.0	16.874 0.0			
	-7.18	-0.0005		0.0	11.000	-0.006		Vel = 0.63	
2 to 3	103.50	2.157 120.0		0.0 0.0	11.000 0.0	16.868 0.0			
	96.32	0.0712		0.0	11.000	0.783		Vel = 8.46	
3 to 4	105.87	2.157 120.0	E T	6.153 12.307	48.500 18.460	17.651 1.949			
	202.19	0.2808		0.0	66.960	18.805		Vel = 17.75	
4 to 7	0.0	6.357 120.0		0.0 0.0	8.330 0.0	38.405 0.0			
	202.19	0.0014		0.0	8.330	0.012		Vel = 2.04	
7 to 13	202.09	6.357 120.0		0.0 0.0	7.500 0.0	38.417 0.0			
	404.28	0.0052		0.0	7.500	0.039		Vel = 4.09	
13 to 19	194.74	6.357 120.0		0.0 0.0	10.250 0.0	38.456 0.0			
	599.02	0.0109		0.0	10.250	0.112		Vel = 6.06	
19 to 25	50.09	6.357 120.0		0.0 0.0	7.500 0.0	38.568 0.0			
	649.11	0.0125		0.0	7.500	0.094		Vel = 6.56	

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
Safelite Area 1

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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	*****
25	46.45	6.357		0.0	7.500	38.662				
to		120.0		0.0	0.0	0.0				
27	695.56	0.0143		0.0	7.500	0.107		Vel =	7.03	
27	42.68	6.357		0.0	10.250	38.769				
to		120.0		0.0	0.0	0.0				
29	738.24	0.0160		0.0	10.250	0.164		Vel =	7.46	
29	38.27	6.357		0.0	7.500	38.933				
to		120.0		0.0	0.0	0.0				
31	776.51	0.0175		0.0	7.500	0.131		Vel =	7.85	
31	35.58	6.357		0.0	7.500	39.064				
to		120.0		0.0	0.0	0.0				
33	812.09	0.0191		0.0	7.500	0.143		Vel =	8.21	
33	33.04	6.357		0.0	10.250	39.207				
to		120.0		0.0	0.0	0.0				
35	845.13	0.0205		0.0	10.250	0.210		Vel =	8.54	
35	-12.60	6.357		0.0	7.500	39.417				
to		120.0		0.0	0.0	0.0				
37	832.53	0.0199		0.0	7.500	0.149		Vel =	8.42	
37	-16.14	6.357		0.0	8.330	39.566				
to		120.0		0.0	0.0	0.0				
39	816.39	0.0193		0.0	8.330	0.161		Vel =	8.25	
39	-20.01	6.357	2E	35.205	51.000	39.727				
to		120.0		0.0	35.205	0.0				
41	796.38	0.0184		0.0	86.205	1.582		Vel =	8.05	
41	26.31	6.357		0.0	8.330	41.309				
to		120.0		0.0	0.0	0.0				
43	822.69	0.0196		0.0	8.330	0.163		Vel =	8.32	
43	22.47	6.357		0.0	8.330	41.472				
to		120.0		0.0	0.0	0.0				
45	845.16	0.0204		0.0	8.330	0.170		Vel =	8.54	
45	19.12	6.357		0.0	8.330	41.642				
to		120.0		0.0	0.0	0.0				
47	864.28	0.0214		0.0	8.330	0.178		Vel =	8.74	
47	16.28	6.357		0.0	8.330	41.820				
to		120.0		0.0	0.0	0.0				
49	880.56	0.0222		0.0	8.330	0.185		Vel =	8.90	
49	13.96	6.357		0.0	8.330	42.005				
to		120.0		0.0	0.0	0.0				
51	894.52	0.0227		0.0	8.330	0.189		Vel =	9.04	
51	12.24	6.357		0.0	8.330	42.194				
to		120.0		0.0	0.0	0.0				
53	906.76	0.0234		0.0	8.330	0.195		Vel =	9.17	
53	11.20	6.357		0.0	8.330	42.389				
to		120.0		0.0	0.0	0.0				
55	917.96	0.0239		0.0	8.330	0.199		Vel =	9.28	

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
Safelite Area 1

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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	*****
55	10.88	6.357		0.0	8.330	42.588				
to		120.0		0.0	0.0	0.0				
57	928.84	0.0244		0.0	8.330	0.203		Vel =	9.39	
57	11.34	6.357		0.0	8.330	42.791				
to		120.0		0.0	0.0	0.0				
59	940.18	0.0250		0.0	8.330	0.208		Vel =	9.50	
59	12.48	6.357		0.0	8.330	42.999				
to		120.0		0.0	0.0	0.0				
61	952.66	0.0256		0.0	8.330	0.213		Vel =	9.63	
61	14.23	6.357		0.0	8.330	43.212				
to		120.0		0.0	0.0	0.0				
63	966.89	0.0263		0.0	8.330	0.219		Vel =	9.77	
63	16.48	6.357		0.0	8.330	43.431				
to		120.0		0.0	0.0	0.0				
65	983.37	0.0271		0.0	8.330	0.226		Vel =	9.94	
65	19.16	6.357		0.0	8.330	43.657				
to		120.0		0.0	0.0	0.0				
67	1002.53	0.0281		0.0	8.330	0.234		Vel =	10.13	
67	22.22	6.357		0.0	8.330	43.891				
to		120.0		0.0	0.0	0.0				
69	1024.75	0.0293		0.0	8.330	0.244		Vel =	10.36	
69	25.58	6.357	2E	35.205	17.330	44.135				
to		120.0		0.0	35.205	1.949				
71	1050.33	0.0306		0.0	52.535	1.609		Vel =	10.62	
71	41.97	6.357		0.0	12.000	47.693				
to		120.0		0.0	0.0	0.0				
74	1092.3	0.0330		0.0	12.000	0.396		Vel =	11.04	
74	45.91	6.357		0.0	8.000	48.089				
to		120.0		0.0	0.0	0.0				
77	1138.21	0.0355		0.0	8.000	0.284		Vel =	11.51	
77	48.76	6.357		0.0	12.000	48.373				
to		120.0		0.0	0.0	0.0				
80	1186.97	0.0384		0.0	12.000	0.461		Vel =	12.00	
80	56.96	6.357		0.0	10.500	48.834				
to		120.0		0.0	0.0	0.0				
83	1243.93	0.0419		0.0	10.500	0.440		Vel =	12.57	
83	0.0	6.357		0.0	10.000	49.274				
to		120.0		0.0	0.0	0.0				
84	1243.93	0.0419		0.0	10.000	0.419		Vel =	12.57	
84	0.0	6.357	T	37.72	4.330	49.693				
to		120.0		0.0	37.720	0.0				
86	1243.93	0.0419		0.0	42.050	1.762		Vel =	12.57	
86	0.0	6.357	E	17.603	4.000	51.455				
to		120.0		0.0	17.603	0.0				
TOR	1243.93	0.0419		0.0	21.603	0.905		Vel =	12.57	

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
Safelite Area 1

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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	*****
TOR to BKFL	0.0 1243.93	6.357 120.0 0.0418	Fsp 0.0 0.0	6.000 0.0 6.000	52.360 3.815 0.251			** Fixed Loss = 1 Vel = 12.57	
BKFL to BASE	0.0 1243.93	6.065 120.0 0.0540	Zac 0.0 0.0	0.500 0.0 0.500	56.426 8.645 0.027			** Fixed Loss = 6.696 Vel = 13.81	
BASE to HOSE	0.0 1243.93	8.27 140.0 0.0087	2E 3F 2T G	56.936 42.702 110.709 6.326	250.000 216.673 466.673	65.098 0.0 4.082		Vel = 7.43	
HOSE to TEST	250.00 1493.93	20.57 140.0 0.0001		0.0 0.0 400.000	400.000 0.0 0.058			Qa = 250 Vel = 1.44	
	0.0 1493.93							K Factor = 179.54	

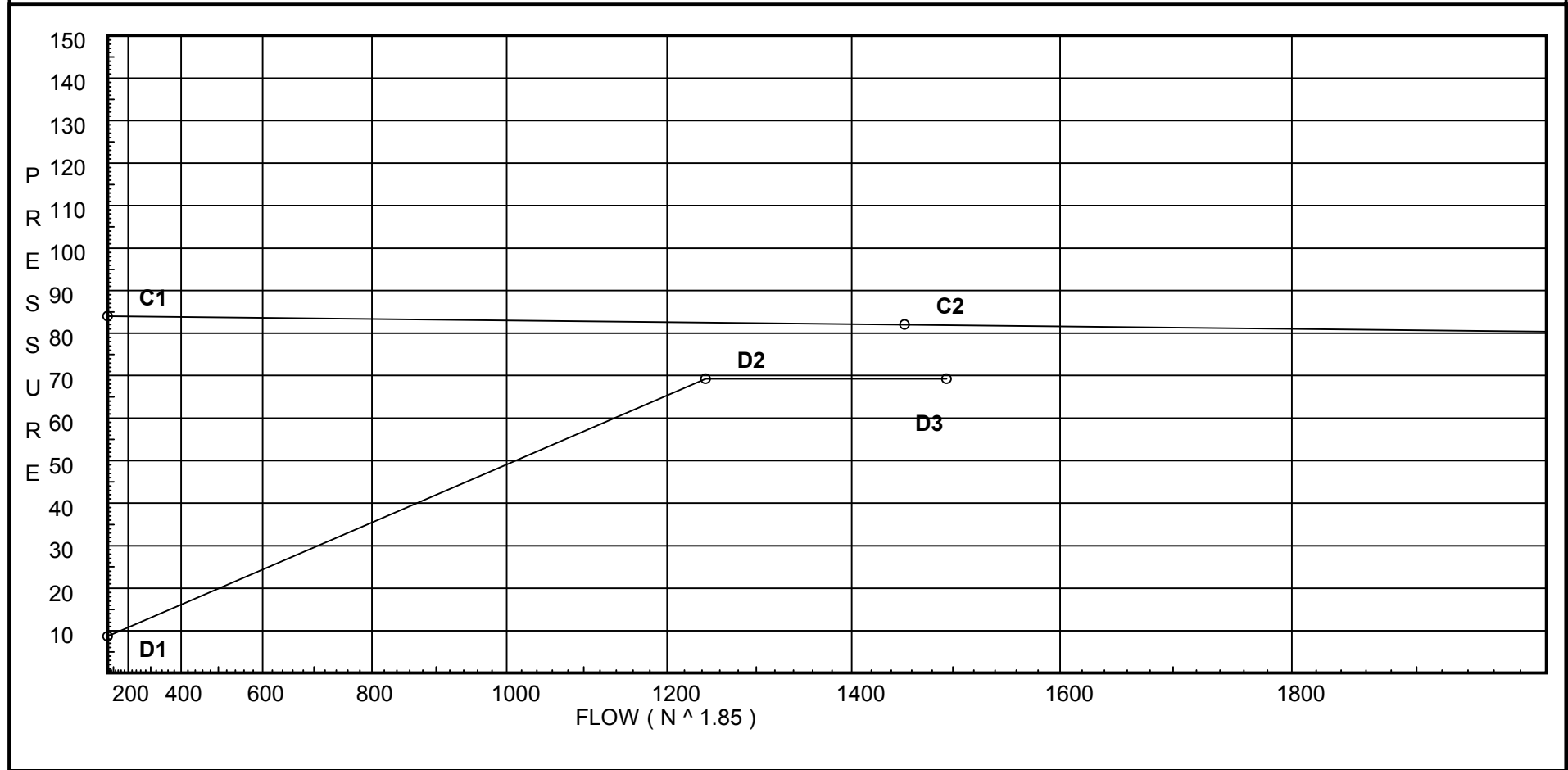
Water Supply Curve C

SPRINKLER SYSTEMS INC.
Safelite Area 1

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City Water Supply:
C1 - Static Pressure : 84
C2 - Residual Pressure: 82
C2 - Residual Flow : 1453

Demand:
D1 - Elevation : 8.662
D2 - System Flow : 1243.93
D2 - System Pressure : 69.238
Hose (Demand) : 250
D3 - System Demand : 1493.93
Safety Margin : 12.656



Hydraulic Design Information Sheet

Name - SAFELITE AREA 2 Date - 6-24-16
 Location - 421 WARREN AVENUE PORTLAND, MAINE
 Building - NEW System No. - 1 WET
 Contractor - SPRINKLER SYSTEMS INC Contract No. - 16-059
 Calculated By - CDS Drawing No. - 1-2 OF 2
 Construction: () Combustible (X) Non-Combustible Ceiling Height - VARIES
 Occupancy - OFFICES

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

E				
M	Area of Sprinkler Operation	- 900	System Type	Sprinkler/Nozzle
	Density	- .10	(X) Wet	Make RELIABLE
D	Area Per Sprinkler	- 200	() Dry	Model F1FR56
E	Elevation at Highest Outlet	- 111	() Deluge	Size 1/2" X 1/2"
S	Hose Allowance - Inside	- 0	() Preaction	K-Factor 5.6
I	Rack Sprinkler Allowance	- 0	() Other	Temp.Rat.155 DEG.
G	Hose Allowance - Outside	- 100		

N Note

Calculation Flow Required - 320.42 Press Required - 45.787 AT BASE
 Summary C-Factor Used: 120 Overhead 140 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:
 A Date of Test - 10-15-2015 Cap. -
 T Time of Test - AM Rated Cap.- Elev.-
 E Static Press - 84 @ Press -
 R Residual Press - 82 Elev. - Well
 Flow - 1453 Proof Flow
 S Elevation - 100.0'

U Location - ON SITE

P Source of Information - OWNER AND WATER DISTRICT

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

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

E Horizontal Barriers Provided:

Pressure / Flow Summary - STANDARD

SPRINKLER SYSTEMS INC.
Safelite Area 2

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Date

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
TYP	0.0	5.6	12.25	na	19.6	0.1	196	7.0
ARM1	111.0	5.6	22.15	na	26.35	0.1	196	7.0
ARM2	111.0	5.6	22.1	na	26.33	0.1	196	7.0
111	111.0		23.84	na				
112	111.0		24.1	na				
113	111.0	K = K @ DROP	24.94	na	27.81			
114	111.0	K = K @ DROP	27.17	na	29.02			
85	111.0		37.15	na				
108	111.0	K = K @ DROP	32.08	na	31.54			
109	111.0	K = K @ DROP	32.44	na	31.72			
W4	111.0	5.6	16.47	na	22.72	0.1	200	7.0
W3	111.0	5.6	14.4	na	21.25	0.1	200	7.0
W2	111.0	5.6	13.3	na	20.43	0.1	200	7.0
W1	111.0	5.6	12.76	na	20.0	0.1	200	7.0
ARM3	111.0	5.6	12.64	na	19.91	0.1	196	7.0
101	111.0		14.26	na				
102	111.0	K = K @ DROP	14.43	na	21.15			
103	111.0		14.51	na				
104	111.0		15.13	na				
105	111.0	K = K @ DROP	15.89	na	22.2			
106	111.0		16.37	na				
107	111.0		18.69	na				
83	111.0		37.09	na				
84	111.0		37.1	na				
86	111.0		37.17	na				
TOR	111.0		37.24	na				
BKFL	104.5		41.08	na				
BASE	100.0		45.79	na				
HOSE	100.0		46.12	na	100.0			
TEST	100.0		46.12	na				

The maximum velocity is 21.32 and it occurs in the pipe between nodes 107 and 83

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
Safelite Area 2

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Date

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
TYP to DROP	19.60 19.6	1.61 120.0 0.0156	T	8.0 0.0 0.0	1.000 8.000 9.000	12.250 0.0 0.140			K Factor = 5.60	
	0.0 19.60								K Factor = 5.57	
ARM1 to 112	26.35 26.35	1.049 120.0 0.2168	E T	2.0 5.0 0.0	2.000 7.000 9.000	22.145 0.0 1.951			K Factor = 5.60	
	0.0 26.35								K Factor = 5.37	
ARM2 to 111	26.33 26.33	1.049 120.0 0.2165	E T	2.0 5.0 0.0	1.000 7.000 8.000	22.104 0.0 1.732			K Factor = 5.60	
111 to 112	0.0 26.33	1.682 120.0 0.0217		0.0 0.0 0.0	12.000 0.0 12.000	23.836 0.0 0.260				Vel = 3.80
112 to 113	26.35 52.68	1.682 120.0 0.0783		0.0 0.0 0.0	10.750 0.0 10.750	24.096 0.0 0.842				Vel = 7.61
113 to 114	27.81 80.49	1.682 120.0 0.1716		0.0 0.0 0.0	13.000 0.0 13.000	24.938 0.0 2.231			K Factor @ node DROP	
114 to 85	29.02 109.51	1.682 120.0 0.3033	T	9.9 0.0 0.0	23.000 9.900 32.900	27.169 0.0 9.979			K Factor @ node DROP	
85 to 86	0.0 109.51	6.357 120.0 0.0005	T	37.72 0.0 0.0	2.750 37.720 40.470	37.148 0.0 0.019				Vel = 1.11
	0.0 109.51								K Factor = 17.96	
108 to 109	31.54 31.54	1.682 120.0 0.0303		0.0 0.0 0.0	12.000 0.0 12.000	32.078 0.0 0.364			K Factor @ node DROP	
109 to 84	31.71 63.25	1.682 120.0 0.1099	T	9.9 0.0 0.0	32.500 9.900 42.400	32.442 0.0 4.658			K Factor @ node DROP	
	0.0 63.25								K Factor = 10.38	
W4 to 107	22.72 22.72	1.049 120.0 0.1649	2T	10.0 0.0 0.0	3.500 10.000 13.500	16.466 0.0 2.226			K Factor = 5.60	
	0.0 22.72								K Factor = 5.26	
W3 to 106	21.25 21.25	1.049 120.0 0.1456	2T	10.0 0.0 0.0	3.500 10.000 13.500	14.404 0.0 1.965			K Factor = 5.60	

Final Calculations - Hazen-Williams

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Safelite Area 2

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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	*****
	0.0 21.25					16.369		K Factor = 5.25	
W2 to 104	20.42 20.42	1.049 120.0 0.1353	2T 0.0 0.0	10.0 0.0 13.500	3.500 10.000 13.500	13.303 0.0 1.827		K Factor = 5.60 Vel = 7.58	
	0.0 20.42					15.130		K Factor = 5.25	
W1 to 103	20.00 20.0	1.049 120.0 0.1301	2T 0.0 0.0	10.0 0.0 13.500	3.500 10.000 13.500	12.755 0.0 1.757		K Factor = 5.60 Vel = 7.42	
	0.0 20.00					14.512		K Factor = 5.25	
ARM3 to 101	19.91 19.91	1.049 120.0 0.1290	E T 0.0	2.0 5.0 0.0	5.500 7.000 12.500	12.644 0.0 1.613		K Factor = 5.60 Vel = 7.39	
101 to 102	0.0 19.91	1.682 120.0 0.0129	0.0 0.0 0.0	0.0 0.0 13.000	13.000 0.0 13.000	14.257 0.0 0.168		Vel = 2.87	
102 to 103	21.15 41.06	1.682 120.0 0.0497	0.0 0.0 0.0	0.0 0.0 1.750	1.750 0.0 1.750	14.425 0.0 0.087		K Factor @ node DROP Vel = 5.93	
103 to 104	20.00 61.06	1.682 120.0 0.1030	0.0 0.0 0.0	0.0 0.0 6.000	6.000 0.0 6.000	14.512 0.0 0.618		Vel = 8.82	
104 to 105	20.43 81.49	1.682 120.0 0.1755	0.0 0.0 0.0	0.0 0.0 4.330	4.330 0.0 4.330	15.130 0.0 0.760		Vel = 11.77	
105 to 106	22.19 103.68	1.682 120.0 0.2737	0.0 0.0 0.0	0.0 0.0 1.750	1.750 0.0 1.750	15.890 0.0 0.479		K Factor @ node DROP Vel = 14.97	
106 to 107	21.26 124.94	1.682 120.0 0.3872	0.0 0.0 0.0	0.0 0.0 6.000	6.000 0.0 6.000	16.369 0.0 2.323		Vel = 18.04	
107 to 83	22.72 147.66	1.682 120.0 0.5272	T 0.0 0.0	9.9 0.0 34.900	25.000 9.900 34.900	18.692 0.0 18.400		Vel = 21.32	
83 to 84	0.0 147.66	6.357 120.0 0.0008	0.0 0.0 0.0	0.0 0.0 10.000	10.000 0.0 10.000	37.092 0.0 0.008		Vel = 1.49	
84 to 86	63.25 210.91	6.357 120.0 0.0016	T 0.0 0.0	37.72 0.0 42.050	4.330 37.720 42.050	37.100 0.0 0.067		Vel = 2.13	
86 to TOR	109.51 320.42	6.357 120.0 0.0034	E 0.0 0.0	17.603 0.0 21.603	4.000 17.603 21.603	37.167 0.0 0.073		Vel = 3.24	

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
Safelite Area 2

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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	*****
TOR to BKFL	0.0 320.42	6.357 120.0 0.0035	Fsp 0.0 0.0	6.000 0.0 6.000	37.240 3.815 0.021		** Fixed Loss = 1 Vel = 3.24		
BKFL to BASE	0.0 320.42	6.065 120.0 0.0040	Zac 0.0 0.0	0.500 0.0 0.500	41.076 4.709 0.002		** Fixed Loss = 2.76 Vel = 3.56		
BASE to HOSE	0.0 320.42	8.27 140.0 0.0007	2E 3F 2T G	56.936 42.702 110.709 6.326	250.000 216.673 466.673	45.787 0.0 0.332	Vel = 1.91		
HOSE to TEST	100.00 420.42	20.57 140.0 0.0		0.0 0.0 400.000	46.119 0.0 0.005		Qa = 100 Vel = 0.41		
	0.0 420.42					46.124	K Factor = 61.90		

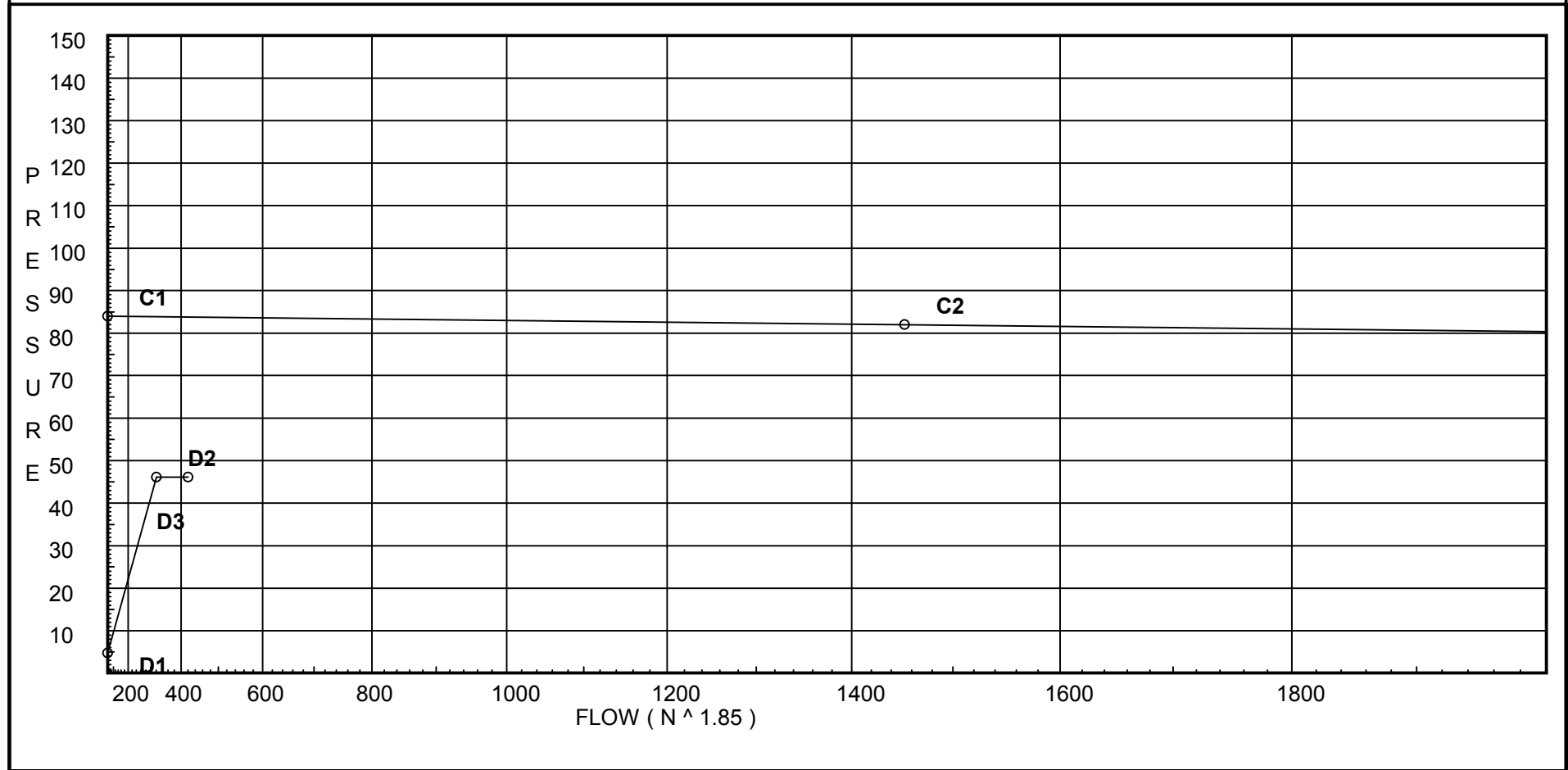
Water Supply Curve C

SPRINKLER SYSTEMS INC.
Safelite Area 2

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City Water Supply:
C1 - Static Pressure : 84
C2 - Residual Pressure: 82
C2 - Residual Flow : 1453

Demand:
D1 - Elevation : 4.764
D2 - System Flow : 320.424
D2 - System Pressure : 46.124
Hose (Demand) : 100
D3 - System Demand : 420.424
Safety Margin : 37.674



Hydraulic Design Information Sheet

Name - SAFELITE AREA 3 Date - 6-24-16
 Location - 421 WARREN AVENUE PORTLAND, MAINE
 Building - NEW System No. - 1 WET
 Contractor - SPRINKLER SYSTEMS INC Contract No. - 16-059
 Calculated By - CDS Drawing No. - 1-2 OF 2
 Construction: () Combustible (X) Non-Combustible Ceiling Height - VARIES
 Occupancy - LOADING DOCK

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

E				
M	Area of Sprinkler Operation	- 1125	System Type	Sprinkler/Nozzle
	Density	- .20	(X) Wet	Make RELIABLE
D	Area Per Sprinkler	- 110	() Dry	Model F1FR56
E	Elevation at Highest Outlet	- 119.500	() Deluge	Size 1/2" X 1/2"
S	Hose Allowance - Inside	- 0	() Preaction	K-Factor 5.6
I	Rack Sprinkler Allowance	- 0	() Other	Temp.Rat.200 DEG.
G	Hose Allowance - Outside	- 250		

N Note

Calculation Flow Required - 347.94 Press Required - 49.909 AT BASE
 Summary C-Factor Used: 120 Overhead 140 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:
 A Date of Test - 10-15-2015 Cap. -
 T Time of Test - AM Rated Cap.- Elev.-
 E Static Press - 84 @ Press -
 R Residual Press - 82 Elev. - Well
 Flow - 1453 Proof Flow
 S Elevation - 100.0'

U Location - ON SITE

P Source of Information - OWNER AND WATER DISTRICT

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

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

E Horizontal Barriers Provided:

Pressure / Flow Summary - STANDARD

SPRINKLER SYSTEMS INC.
Safelite Area 3

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
TYP	0.0	25.5	15.38	na	100.0	1.0	100	15.0
133	119.5	5.6	15.48	na	22.03	0.2	110	7.0
134	119.5	5.6	15.68	na	22.17	0.2	110	7.0
135	119.5	5.6	16.4	na	22.68	0.2	110	7.0
136	119.5	5.6	17.95	na	23.73	0.2	110	7.0
137	119.5	5.6	20.68	na	25.46	0.2	110	7.0
127	119.5	5.6	15.45	na	22.01	0.2	110	7.0
128	119.5	5.6	15.65	na	22.15	0.2	110	7.0
129	119.5	5.6	16.37	na	22.66	0.2	110	7.0
130	119.5	5.6	17.92	na	23.7	0.2	110	7.0
131	119.5	5.6	20.64	na	25.44	0.2	110	7.0
121	119.5	5.6	15.43	na	22.0	0.2	110	7.0
122	119.5	5.6	15.63	na	22.14	0.2	110	7.0
123	119.5	5.6	16.35	na	22.65	0.2	110	7.0
124	119.5	5.6	17.9	na	23.69	0.2	110	7.0
125	119.5	5.6	20.62	na	25.43	0.2	110	7.0
126	115.5		37.88	na				
132	115.5		37.91	na				
138	115.5		37.98	na				
1	120.0		36.34	na				
5	120.0		36.35	na				
6	118.0		37.29	na				
12	118.0		37.29	na				
18	118.0		37.29	na				
24	118.0		37.29	na				
26	118.0		37.3	na				
28	118.0		37.3	na				
30	118.0		37.31	na				
32	118.0		37.32	na				
34	118.0		37.34	na				
36	117.0		37.86	na				
38	117.0		37.88	na				
40	117.0		37.9	na				
42	117.0		37.92	na				
44	117.0		37.95	na				
46	117.0		37.97	na				
48	117.0		37.99	na				
50	117.0		38.01	na				
52	117.0		38.03	na				
54	117.0		38.05	na				
56	117.0		38.07	na				
58	117.0		38.08	na				
60	117.0		38.1	na				
62	117.0		38.12	na				
64	117.0		38.13	na				
66	117.0		38.14	na				
68	117.0		38.15	na				
70	117.0		38.16	na				
73	117.0		38.21	na				
76	117.0		38.21	na				
79	117.0		38.22	na				
82	117.0		38.22	na				
81	117.0		38.26	na				
7	115.5		38.18	na				
8.	120.0		36.32	na				
9	120.0		36.34	na				
10	120.0		36.35	na				
11	120.0		36.36	na				
13	115.5		38.21	na				
14	120.0		36.34	na				
15	120.0		36.35	na				
16	120.0		36.36	na				
17	120.0		36.37	na				
19	115.5		38.24	na				
20	120.0		36.36	na				

Flow Summary - Standard

SPRINKLER SYSTEMS INC.
Safelite Area 3

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
21	120.0		36.37	na				
22	120.0		36.38	na				
23	120.0		36.39	na				
25	115.5		38.27	na				
27	115.5		38.29	na				
29	115.5		38.32	na				
31	115.5		38.34	na				
33	115.5		38.36	na				
35	115.5		38.38	na				
37	115.5		38.4	na				
39	115.5		38.42	na				
41	115.5		38.59	na				
43	115.5		38.61	na				
45	115.5		38.63	na				
47	115.5		38.65	na				
49	115.5		38.67	na				
51	115.5		38.68	na				
53	115.5		38.7	na				
55	115.5		38.72	na				
57	115.5		38.74	na				
59	115.5		38.76	na				
61	115.5		38.78	na				
63	115.5		38.8	na				
65	115.5		38.83	na				
67	115.5		38.85	na				
69	115.5		38.87	na				
71	111.0		40.97	na				
72	120.0		36.93	na				
74	111.0		41.01	na				
75	120.0		36.94	na				
77	111.0		41.04	na				
78	120.0		36.95	na				
2	120.0		36.32	na				
3	120.0		36.3	na				
4	115.5		38.15	na				
80	111.0		41.08	na				
83	111.0		41.12	na				
84	111.0		41.16	na				
86	111.0		41.33	na				
TOR	111.0		41.41	na				
BKFL	104.5		45.25	na				
BASE	100.0		49.91	na				
HOSE	100.0		50.3	na	250.0			
TEST	100.0		50.31	na				

The maximum velocity is 16.76 and it occurs in the pipe between nodes 137 and 138

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
Safelite Area 3

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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	*****
TYP to ARM	100.00 100.0	1.61 120.0 0.3172	T	8.0 0.0 0.0	1.000 8.000 9.000	15.379 0.0 2.855			K Factor = 25.50	
	0.0 100.00									
									18.234	K Factor = 23.42
133 to 134	22.03	1.682 120.0		0.0 0.0	12.750 0.0	15.477 0.0				K Factor = 5.60
134 to 135	22.03	0.0156 120.0		0.0 0.0	12.750 0.0	0.199 0.0				Vel = 3.18
134 to 135	22.17	1.682 120.0		0.0 0.0	12.750 0.0	15.676 0.0				K Factor = 5.60
135 to 136	44.2	0.0566 120.0		0.0 0.0	12.750 0.0	0.722 0.0				Vel = 6.38
135 to 136	22.68	1.682 120.0		0.0 0.0	12.750 0.0	16.398 0.0				K Factor = 5.60
136 to 137	66.88	0.1219 120.0		0.0 0.0	12.750 0.0	1.554 0.0				Vel = 9.66
136 to 137	23.73	1.682 120.0		0.0 0.0	12.750 0.0	17.952 0.0				K Factor = 5.60
137 to 138	90.61	0.2136 120.0		0.0 0.0	12.750 0.0	2.723 0.0				Vel = 13.08
137 to 138	25.46	1.682 120.0	E T	4.95 9.9	31.250 14.850	20.675 1.732				K Factor = 5.60
	116.07	0.3378		0.0	46.100	15.571				Vel = 16.76
	0.0 116.07									
									37.978	K Factor = 18.83
127 to 128	22.01	1.682 120.0		0.0 0.0	12.750 0.0	15.448 0.0				K Factor = 5.60
128 to 129	22.01	0.0156 120.0		0.0 0.0	12.750 0.0	0.199 0.0				Vel = 3.18
128 to 129	22.15	1.682 120.0		0.0 0.0	12.750 0.0	15.647 0.0				K Factor = 5.60
129 to 130	44.16	0.0565 120.0		0.0 0.0	12.750 0.0	0.720 0.0				Vel = 6.38
129 to 130	22.66	1.682 120.0		0.0 0.0	12.750 0.0	16.367 0.0				K Factor = 5.60
130 to 131	66.82	0.1216 120.0		0.0 0.0	12.750 0.0	1.551 0.0				Vel = 9.65
130 to 131	23.70	1.682 120.0		0.0 0.0	12.750 0.0	17.918 0.0				K Factor = 5.60
131 to 132	90.52	0.2132 120.0		0.0 0.0	12.750 0.0	2.718 0.0				Vel = 13.07
131 to 132	25.44	1.682 120.0	E T	4.95 9.9	31.250 14.850	20.636 1.732				K Factor = 5.60
	115.96	0.3372		0.0	46.100	15.545				Vel = 16.74
	0.0 115.96									
									37.913	K Factor = 18.83
121 to 122	22.00	1.682 120.0		0.0 0.0	12.750 0.0	15.434 0.0				K Factor = 5.60
122 to 123	22.0	0.0155 120.0		0.0 0.0	12.750 0.0	0.198 0.0				Vel = 3.18
122 to 123	22.14	1.682 120.0		0.0 0.0	12.750 0.0	15.632 0.0				K Factor = 5.60
	44.14	0.0565		0.0	12.750	0.720				Vel = 6.37

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
Safelite Area 3

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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	*****
123 to 124	22.65 66.79	1.682 120.0 0.1215		0.0	12.750 0.0 12.750	16.352 0.0 1.549			K Factor = 5.60 Vel = 9.64	
124 to 125	23.69 90.48	1.682 120.0 0.2131		0.0	12.750 0.0 12.750	17.901 0.0 2.717			K Factor = 5.60 Vel = 13.06	
125 to 126	25.43 115.91	1.682 120.0 0.3369	E T	4.95 9.9 0.0	31.250 14.850 46.100	20.618 1.732 15.531			K Factor = 5.60 Vel = 16.74	
126 to 132	0.0 115.91	4.26 120.0 0.0037		0.0	8.750 0.0 8.750	37.881 0.0 0.032			Vel = 2.61	
132 to 138	115.96 231.87	4.26 120.0 0.0130		0.0	5.000 0.0 5.000	37.913 0.0 0.065			Vel = 5.22	
138 to 4	116.07 347.94	4.26 120.0 0.0280		0.0	6.250 0.0 6.250	37.978 0.0 0.175			Vel = 7.83	
	0.0 347.94					38.153			K Factor = 56.33	
1 to 5	11.98 11.98	2.157 120.0 0.0015		0.0	11.000 0.0 11.000	36.338 0.0 0.016			Vel = 1.05	
5 to 6	0.0 11.98	2.157 120.0 0.0015	E T	6.153 12.307 0.0	26.250 18.460 44.710	36.354 0.866 0.068			Vel = 1.05	
6 to 12	0.0 11.98	4.26 120.0 0.0		0.0	8.330 0.0 8.330	37.288 0.0 0.0			Vel = 0.27	
12 to 18	11.04 23.02	4.26 120.0 0.0003		0.0	7.600 0.0 7.600	37.288 0.0 0.002			Vel = 0.52	
18 to 24	10.22 33.24	4.26 120.0 0.0003		0.0	10.250 0.0 10.250	37.290 0.0 0.003			Vel = 0.75	
24 to 26	9.15 42.39	4.26 120.0 0.0007		0.0	7.500 0.0 7.500	37.293 0.0 0.005			Vel = 0.95	
26 to 28	8.53 50.92	4.26 120.0 0.0008		0.0	7.500 0.0 7.500	37.298 0.0 0.006			Vel = 1.15	
28 to 30	7.85 58.77	4.26 120.0 0.0010		0.0	10.250 0.0 10.250	37.304 0.0 0.010			Vel = 1.32	
30 to 32	7.01 65.78	4.26 120.0 0.0013		0.0	7.500 0.0 7.500	37.314 0.0 0.010			Vel = 1.48	

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
Safelite Area 3

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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	*****
32	6.49	4.26		0.0	8.330	37.324				
to		120.0		0.0	0.0	0.0				
34	72.27	0.0016		0.0	8.330	0.013		Vel =	1.63	
34	6.13	4.26	3E	39.501	11.500	37.337				
to		120.0		0.0	39.501	0.433				
36	78.4	0.0018		0.0	51.001	0.090		Vel =	1.76	
36	9.05	4.26		0.0	7.500	37.860				
to		120.0		0.0	0.0	0.0				
38	87.45	0.0021		0.0	7.500	0.016		Vel =	1.97	
38	9.01	4.26		0.0	8.330	37.876				
to		120.0		0.0	0.0	0.0				
40	96.46	0.0026		0.0	8.330	0.022		Vel =	2.17	
40	9.14	4.26		0.0	8.330	37.898				
to		120.0		0.0	0.0	0.0				
42	105.6	0.0030		0.0	8.330	0.025		Vel =	2.38	
42	-4.05	4.26		0.0	8.330	37.923				
to		120.0		0.0	0.0	0.0				
44	101.55	0.0029		0.0	8.330	0.024		Vel =	2.29	
44	-3.33	4.26		0.0	8.330	37.947				
to		120.0		0.0	0.0	0.0				
46	98.22	0.0028		0.0	8.330	0.023		Vel =	2.21	
46	-2.73	4.26		0.0	8.330	37.970				
to		120.0		0.0	0.0	0.0				
48	95.49	0.0025		0.0	8.330	0.021		Vel =	2.15	
48	-2.26	4.26		0.0	8.330	37.991				
to		120.0		0.0	0.0	0.0				
50	93.23	0.0024		0.0	8.330	0.020		Vel =	2.10	
50	-1.94	4.26		0.0	8.330	38.011				
to		120.0		0.0	0.0	0.0				
52	91.29	0.0024		0.0	8.330	0.020		Vel =	2.05	
52	-1.80	4.26		0.0	8.330	38.031				
to		120.0		0.0	0.0	0.0				
54	89.49	0.0022		0.0	8.330	0.018		Vel =	2.01	
54	-1.84	4.26		0.0	8.330	38.049				
to		120.0		0.0	0.0	0.0				
56	87.65	0.0023		0.0	8.330	0.019		Vel =	1.97	
56	-2.08	4.26		0.0	8.330	38.068				
to		120.0		0.0	0.0	0.0				
58	85.57	0.0020		0.0	8.330	0.017		Vel =	1.93	
58	-2.47	4.26		0.0	8.330	38.085				
to		120.0		0.0	0.0	0.0				
60	83.1	0.0019		0.0	8.330	0.016		Vel =	1.87	
60	-2.98	4.26		0.0	8.330	38.101				
to		120.0		0.0	0.0	0.0				
62	80.12	0.0019		0.0	8.330	0.016		Vel =	1.80	

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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	*****
62	-3.62	4.26		0.0	8.330	38.117				
to		120.0		0.0	0.0	0.0				
64	76.5	0.0017		0.0	8.330	0.014		Vel =	1.72	
64	-4.34	4.26		0.0	8.330	38.131				
to		120.0		0.0	0.0	0.0				
66	72.16	0.0014		0.0	8.330	0.012		Vel =	1.62	
66	-5.15	4.26		0.0	8.330	38.143				
to		120.0		0.0	0.0	0.0				
68	67.01	0.0013		0.0	8.330	0.011		Vel =	1.51	
68	-6.05	4.26		0.0	8.330	38.154				
to		120.0		0.0	0.0	0.0				
70	60.96	0.0012		0.0	8.330	0.010		Vel =	1.37	
70	-7.01	4.26	2E	26.334	23.000	38.164				
to		120.0		0.0	26.334	0.0				
73	53.95	0.0009		0.0	49.334	0.043		Vel =	1.21	
73	-11.69	4.26		0.0	12.500	38.207				
to		120.0		0.0	0.0	0.0				
76	42.26	0.0006		0.0	12.500	0.007		Vel =	0.95	
76	-12.78	4.26		0.0	12.250	38.214				
to		120.0		0.0	0.0	0.0				
79	29.48	0.0003		0.0	12.250	0.004		Vel =	0.66	
79	-13.59	4.26		0.0	12.000	38.218				
to		120.0		0.0	0.0	0.0				
82	15.89	0.0001		0.0	12.000	0.001		Vel =	0.36	
82	0.0	2.157	T	12.307	2.500	38.219				
to		120.0		0.0	12.307	0.0				
81	15.89	0.0026		0.0	14.807	0.038		Vel =	1.40	
81	0.0	2.157	3E	18.46	58.000	38.257				
to		120.0	T	12.307	30.767	2.599				
80	15.89	0.0025		0.0	88.767	0.225		Vel =	1.40	
	0.0									
	15.89					41.081		K Factor =	2.48	
7	11.04	2.157	T	12.307	48.500	38.184				
to		120.0	E	6.153	18.460	-1.949				
8.	11.04	0.0013		0.0	66.960	0.087		Vel =	0.97	
8.	0.0	2.157		0.0	11.000	36.322				
to		120.0		0.0	0.0	0.0				
9	11.04	0.0013		0.0	11.000	0.014		Vel =	0.97	
9	0.0	2.157		0.0	11.000	36.336				
to		120.0		0.0	0.0	0.0				
10	11.04	0.0013		0.0	11.000	0.014		Vel =	0.97	
10	0.0	2.157		0.0	11.000	36.350				
to		120.0		0.0	0.0	0.0				
11	11.04	0.0013		0.0	11.000	0.014		Vel =	0.97	
11	0.0	2.157	E	6.153	26.250	36.364				
to		120.0	T	12.307	18.460	0.866				
12	11.04	0.0013		0.0	44.710	0.058		Vel =	0.97	

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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	*****
	0.0 11.04					37.288		K Factor = 1.81	
13 to 14	10.22	2.157 120.0	T E	12.307 6.153	48.500 18.460	38.210 -1.949			
	10.22	0.0011		0.0	66.960	0.075		Vel = 0.90	
14 to 15	0.0	2.157 120.0		0.0 0.0	11.000 0.0	36.336 0.0			
	10.22	0.0012		0.0	11.000	0.013		Vel = 0.90	
15 to 16	0.0	2.157 120.0		0.0 0.0	11.000 0.0	36.349 0.0			
	10.22	0.0011		0.0	11.000	0.012		Vel = 0.90	
16 to 17	0.0	2.157 120.0		0.0 0.0	11.000 0.0	36.361 0.0			
	10.22	0.0011		0.0	11.000	0.012		Vel = 0.90	
17 to 18	0.0	2.157 120.0	E T	6.153 12.307	26.250 18.460	36.373 0.866			
	10.22	0.0011		0.0	44.710	0.051		Vel = 0.90	
	0.0 10.22					37.290		K Factor = 1.67	
19 to 20	9.15	2.157 120.0	T E	12.307 6.153	48.500 18.460	38.244 -1.949			
	9.15	0.0009		0.0	66.960	0.061		Vel = 0.80	
20 to 21	0.0	2.157 120.0		0.0 0.0	11.000 0.0	36.356 0.0			
	9.15	0.0009		0.0	11.000	0.010		Vel = 0.80	
21 to 22	0.0	2.157 120.0		0.0 0.0	11.000 0.0	36.366 0.0			
	9.15	0.0009		0.0	11.000	0.010		Vel = 0.80	
22 to 23	0.0	2.157 120.0		0.0 0.0	11.000 0.0	36.376 0.0			
	9.15	0.0009		0.0	11.000	0.010		Vel = 0.80	
23 to 24	0.0	2.157 120.0	E T	6.153 12.307	26.250 18.460	36.386 0.866			
	9.15	0.0009		0.0	44.710	0.041		Vel = 0.80	
	0.0 9.15					37.293		K Factor = 1.50	
25 to 26	8.53	2.157 120.0	2T 2E	24.613 12.307	104.000 36.920	38.267 -1.083			
	8.53	0.0008		0.0	140.920	0.114		Vel = 0.75	
	0.0 8.53					37.298		K Factor = 1.40	
27 to 28	7.85	2.157 120.0	2T 2E	24.613 12.307	104.000 36.920	38.289 -1.083			
	7.85	0.0007		0.0	140.920	0.098		Vel = 0.69	
	0.0								

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	7.85					37.304			K Factor = 1.29	
29 to 30	7.01	2.157 120.0	2T 2E	24.613 12.307	104.000 36.920	38.318 -1.083				
	7.01	0.0006		0.0	140.920	0.079			Vel = 0.62	
	0.0 7.01					37.314			K Factor = 1.15	
31 to 32	6.48	2.157 120.0	2T 2E	24.613 12.307	104.000 36.920	38.338 -1.083				
	6.48	0.0005		0.0	140.920	0.069			Vel = 0.57	
	0.0 6.48					37.324			K Factor = 1.06	
33 to 34	6.13	2.157 120.0	2T 2E	24.613 12.307	104.000 36.920	38.358 -1.083				
	6.13	0.0004		0.0	140.920	0.062			Vel = 0.54	
	0.0 6.13					37.337			K Factor = 1.00	
35 to 36	9.05	2.157 120.0	2T 2E	24.613 12.307	104.000 36.920	38.383 -0.650				
	9.05	0.0009		0.0	140.920	0.127			Vel = 0.79	
	0.0 9.05					37.860			K Factor = 1.47	
37 to 38	9.01	2.157 120.0	2T 2E	24.613 12.307	104.000 36.920	38.401 -0.650				
	9.01	0.0009		0.0	140.920	0.125			Vel = 0.79	
	0.0 9.01					37.876			K Factor = 1.46	
39 to 40	9.14	2.157 120.0	2T 2E	24.613 12.307	104.000 36.920	38.419 -0.650				
	9.14	0.0009		0.0	140.920	0.129			Vel = 0.80	
	0.0 9.14					37.898			K Factor = 1.48	
41 to 42	-4.05	2.157 120.0	2T 2E	24.613 12.307	66.000 36.920	38.594 -0.650				
	-4.05	-0.0002		0.0	102.920	-0.021			Vel = 0.36	
	0.0 -4.05					37.923			K Factor = -0.66	
43 to 44	-3.33	2.157 120.0	2T 2E	24.613 12.307	66.000 36.920	38.611 -0.650				
	-3.33	-0.0001		0.0	102.920	-0.014			Vel = 0.29	
	0.0 -3.33					37.947			K Factor = -0.54	
45 to 46	-2.73	2.157 120.0	2T 2E	24.613 12.307	66.000 36.920	38.629 -0.650				
	-2.73	-0.0001		0.0	102.920	-0.009			Vel = 0.24	
	0.0									

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	-2.73					37.970		K Factor = -0.44	
47 to 48	-2.26	2.157 120.0	2T 24.613 2E 12.307	66.000 36.920	38.648 -0.650				
	-2.26	-0.0001	0.0	102.920	-0.007			Vel = 0.20	
	0.0								
	-2.26					37.991		K Factor = -0.37	
49 to 50	-1.94	2.157 120.0	2T 24.613 2E 12.307	66.000 36.920	38.666 -0.650				
	-1.94	0.0	0.0	102.920	-0.005			Vel = 0.17	
	0.0								
	-1.94					38.011		K Factor = -0.31	
51 to 52	-1.79	2.157 120.0	2T 24.613 2E 12.307	66.000 36.920	38.685 -0.650				
	-1.79	0.0	0.0	102.920	-0.004			Vel = 0.16	
	0.0								
	-1.79					38.031		K Factor = -0.29	
53 to 54	-1.84	2.157 120.0	2T 24.613 2E 12.307	66.000 36.920	38.704 -0.650				
	-1.84	0.0	0.0	102.920	-0.005			Vel = 0.16	
	0.0								
	-1.84					38.049		K Factor = -0.30	
55 to 56	-2.08	2.157 120.0	2T 24.613 2E 12.307	66.000 36.920	38.723 -0.650				
	-2.08	0.0	0.0	102.920	-0.005			Vel = 0.18	
	0.0								
	-2.08					38.068		K Factor = -0.34	
57 to 58	-2.47	2.157 120.0	2T 24.613 2E 12.307	66.000 36.920	38.743 -0.650				
	-2.47	-0.0001	0.0	102.920	-0.008			Vel = 0.22	
	0.0								
	-2.47					38.085		K Factor = -0.40	
59 to 60	-2.99	2.157 120.0	2T 24.613 2E 12.307	66.000 36.920	38.763 -0.650				
	-2.99	-0.0001	0.0	102.920	-0.012			Vel = 0.26	
	0.0								
	-2.99					38.101		K Factor = -0.48	
61 to 62	-3.61	2.157 120.0	2T 24.613 2E 12.307	66.000 36.920	38.783 -0.650				
	-3.61	-0.0002	0.0	102.920	-0.016			Vel = 0.32	
	0.0								
	-3.61					38.117		K Factor = -0.58	
63 to 64	-4.34	2.157 120.0	2T 24.613 2E 12.307	66.000 36.920	38.804 -0.650				
	-4.34	-0.0002	0.0	102.920	-0.023			Vel = 0.38	
	0.0								

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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	*****
	-4.34					38.131			K Factor = -0.70	
65 to 66	-5.15	2.157 120.0	2T 2E	24.613 12.307	66.000 36.920	38.826 -0.650				
	-5.15	-0.0003		0.0	102.920	-0.033			Vel = 0.45	
	0.0									
	-5.15					38.143			K Factor = -0.83	
67 to 68	-6.05	2.157 120.0	2T 2E	24.613 12.307	66.000 36.920	38.848 -0.650				
	-6.05	-0.0004		0.0	102.920	-0.044			Vel = 0.53	
	0.0									
	-6.05					38.154			K Factor = -0.98	
69 to 70	-7.02	2.157 120.0	2T 2E	24.613 12.307	66.000 36.920	38.871 -0.650				
	-7.02	-0.0006		0.0	102.920	-0.057			Vel = 0.62	
	0.0									
	-7.02					38.164			K Factor = -1.14	
71 to 72	-11.68	2.157 120.0	2T 3E	24.613 18.46	58.000 43.073	40.973 -3.898				
	-11.68	-0.0014		0.0	101.073	-0.146			Vel = 1.03	
72 to 73	0.0	2.157 120.0	T	12.307 0.0	2.500 12.307	36.929 1.299				
	-11.68	-0.0014		0.0	14.807	-0.021			Vel = 1.03	
	0.0									
	-11.68					38.207			K Factor = -1.89	
74 to 75	-12.79	2.157 120.0	2T 3E	24.613 18.46	58.000 43.073	41.010 -3.898				
	-12.79	-0.0017		0.0	101.073	-0.172			Vel = 1.12	
75 to 76	0.0	2.157 120.0	T	12.307 0.0	2.500 12.307	36.940 1.299				
	-12.79	-0.0017		0.0	14.807	-0.025			Vel = 1.12	
	0.0									
	-12.79					38.214			K Factor = -2.07	
77 to 78	-13.59	2.157 120.0	2T 3E	24.613 18.46	58.000 43.073	41.037 -3.898				
	-13.59	-0.0019		0.0	101.073	-0.192			Vel = 1.19	
78 to 79	0.0	2.157 120.0	T	12.307 0.0	2.500 12.307	36.947 1.299				
	-13.59	-0.0019		0.0	14.807	-0.028			Vel = 1.19	
	0.0									
	-13.59					38.218			K Factor = -2.20	
1 to 2	-11.98	2.157 120.0		0.0 0.0	11.000 0.0	36.338 0.0				
	-11.98	-0.0015		0.0	11.000	-0.017			Vel = 1.05	
2 to 3	0.0	2.157 120.0		0.0 0.0	11.000 0.0	36.321 0.0				
	-11.98	-0.0015		0.0	11.000	-0.016			Vel = 1.05	

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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	*****
3 to 4	0.0 -11.98	2.157 120.0 -0.0015	E T 12.307	6.153 18.460 0.0	48.500 66.960 -0.101	36.305 1.949			
							Vel =	1.05	
4 to 7	347.94 335.96	6.357 120.0 0.0037	0.0 0.0 0.0	8.330 0.0 8.330	38.153 0.0 0.031				
							Vel =	3.40	
7 to 13	-11.04 324.92	6.357 120.0 0.0035	0.0 0.0 0.0	7.500 0.0 7.500	38.184 0.0 0.026				
							Vel =	3.28	
13 to 19	-10.22 314.7	6.357 120.0 0.0033	0.0 0.0 0.0	10.250 0.0 10.250	38.210 0.0 0.034				
							Vel =	3.18	
19 to 25	-9.15 305.55	6.357 120.0 0.0031	0.0 0.0 0.0	7.500 0.0 7.500	38.244 0.0 0.023				
							Vel =	3.09	
25 to 27	-8.53 297.02	6.357 120.0 0.0029	0.0 0.0 0.0	7.500 0.0 7.500	38.267 0.0 0.022				
							Vel =	3.00	
27 to 29	-7.85 289.17	6.357 120.0 0.0028	0.0 0.0 0.0	10.250 0.0 10.250	38.289 0.0 0.029				
							Vel =	2.92	
29 to 31	-7.01 282.16	6.357 120.0 0.0027	0.0 0.0 0.0	7.500 0.0 7.500	38.318 0.0 0.020				
							Vel =	2.85	
31 to 33	-6.49 275.67	6.357 120.0 0.0027	0.0 0.0 0.0	7.500 0.0 7.500	38.338 0.0 0.020				
							Vel =	2.79	
33 to 35	-6.13 269.54	6.357 120.0 0.0024	0.0 0.0 0.0	10.250 0.0 10.250	38.358 0.0 0.025				
							Vel =	2.72	
35 to 37	-9.05 260.49	6.357 120.0 0.0024	0.0 0.0 0.0	7.500 0.0 7.500	38.383 0.0 0.018				
							Vel =	2.63	
37 to 39	-9.01 251.48	6.357 120.0 0.0022	0.0 0.0 0.0	8.330 0.0 8.330	38.401 0.0 0.018				
							Vel =	2.54	
39 to 41	-9.14 242.34	6.357 120.0 0.0020	2E 0.0 0.0	35.205 35.205 86.205	51.000 0.0 0.175	38.419			
							Vel =	2.45	
41 to 43	4.05 246.39	6.357 120.0 0.0020	0.0 0.0 0.0	8.330 0.0 8.330	38.594 0.0 0.017				
							Vel =	2.49	
43 to 45	3.33 249.72	6.357 120.0 0.0022	0.0 0.0 0.0	8.330 0.0 8.330	38.611 0.0 0.018				
							Vel =	2.52	

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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	*****
45	2.73	6.357		0.0	8.330	38.629				
to		120.0		0.0	0.0	0.0				
47	252.45	0.0023		0.0	8.330	0.019		Vel =	2.55	
47	2.26	6.357		0.0	8.330	38.648				
to		120.0		0.0	0.0	0.0				
49	254.71	0.0022		0.0	8.330	0.018		Vel =	2.57	
49	1.94	6.357		0.0	8.330	38.666				
to		120.0		0.0	0.0	0.0				
51	256.65	0.0023		0.0	8.330	0.019		Vel =	2.59	
51	1.79	6.357		0.0	8.330	38.685				
to		120.0		0.0	0.0	0.0				
53	258.44	0.0023		0.0	8.330	0.019		Vel =	2.61	
53	1.85	6.357		0.0	8.330	38.704				
to		120.0		0.0	0.0	0.0				
55	260.29	0.0023		0.0	8.330	0.019		Vel =	2.63	
55	2.08	6.357		0.0	8.330	38.723				
to		120.0		0.0	0.0	0.0				
57	262.37	0.0024		0.0	8.330	0.020		Vel =	2.65	
57	2.46	6.357		0.0	8.330	38.743				
to		120.0		0.0	0.0	0.0				
59	264.83	0.0024		0.0	8.330	0.020		Vel =	2.68	
59	2.99	6.357		0.0	8.330	38.763				
to		120.0		0.0	0.0	0.0				
61	267.82	0.0024		0.0	8.330	0.020		Vel =	2.71	
61	3.62	6.357		0.0	8.330	38.783				
to		120.0		0.0	0.0	0.0				
63	271.44	0.0025		0.0	8.330	0.021		Vel =	2.74	
63	4.34	6.357		0.0	8.330	38.804				
to		120.0		0.0	0.0	0.0				
65	275.78	0.0026		0.0	8.330	0.022		Vel =	2.79	
65	5.15	6.357		0.0	8.330	38.826				
to		120.0		0.0	0.0	0.0				
67	280.93	0.0026		0.0	8.330	0.022		Vel =	2.84	
67	6.05	6.357		0.0	8.330	38.848				
to		120.0		0.0	0.0	0.0				
69	286.98	0.0028		0.0	8.330	0.023		Vel =	2.90	
69	7.01	6.357	2E	35.205	17.330	38.871				
to		120.0		0.0	35.205	1.949				
71	293.99	0.0029		0.0	52.535	0.153		Vel =	2.97	
71	11.69	6.357		0.0	12.000	40.973				
to		120.0		0.0	0.0	0.0				
74	305.68	0.0031		0.0	12.000	0.037		Vel =	3.09	
74	12.78	6.357		0.0	8.000	41.010				
to		120.0		0.0	0.0	0.0				
77	318.46	0.0034		0.0	8.000	0.027		Vel =	3.22	

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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	*****
77	13.59	6.357		12.000	41.037				
to		120.0		0.0	0.0				
80	332.05	0.0037		12.000	0.044		Vel = 3.36		
80	15.89	6.357		10.500	41.081				
to		120.0		0.0	0.0				
83	347.94	0.0039		10.500	0.041		Vel = 3.52		
83	0.0	6.357		10.000	41.122				
to		120.0		0.0	0.0				
84	347.94	0.0040		10.000	0.040		Vel = 3.52		
84	0.0	6.357	T	37.72	4.330	41.162			
to		120.0		0.0	37.720	0.0			
86	347.94	0.0040		0.0	42.050	0.167	Vel = 3.52		
86	0.0	6.357	E	17.603	4.000	41.329			
to		120.0		0.0	17.603	0.0			
TOR	347.94	0.0040		0.0	21.603	0.086	Vel = 3.52		
TOR	0.0	6.357	Fsp	0.0	6.000	41.415			
to		120.0		0.0	0.0	3.815	** Fixed Loss = 1		
BKFL	347.94	0.0040		0.0	6.000	0.024	Vel = 3.52		
BKFL	0.0	6.065	Zac	0.0	0.500	45.254			
to		120.0		0.0	0.0	4.653	** Fixed Loss = 2.704		
BASE	347.94	0.0040		0.0	0.500	0.002	Vel = 3.86		
BASE	0.0	8.27	2E	56.936	250.000	49.909			
to		140.0	3F	42.702	216.673	0.0			
HOSE	347.94	0.0008	2T	110.709	466.673	0.387	Vel = 2.08		
			G	6.326					
HOSE	250.00	20.57		0.0	400.000	50.296	Qa = 250		
to		140.0		0.0	0.0	0.0			
TEST	597.94	0.0		0.0	400.000	0.010	Vel = 0.58		
	0.0								
	597.94					50.306	K Factor = 84.30		

Water Supply Curve C

SPRINKLER SYSTEMS INC.
Safelite Area 3

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City Water Supply:
C1 - Static Pressure : 84
C2 - Residual Pressure: 82
C2 - Residual Flow : 1453

Demand:
D1 - Elevation : 8.445
D2 - System Flow : 347.939
D2 - System Pressure : 50.306
Hose (Demand) : 250
D3 - System Demand : 597.939
Safety Margin : 33.307

