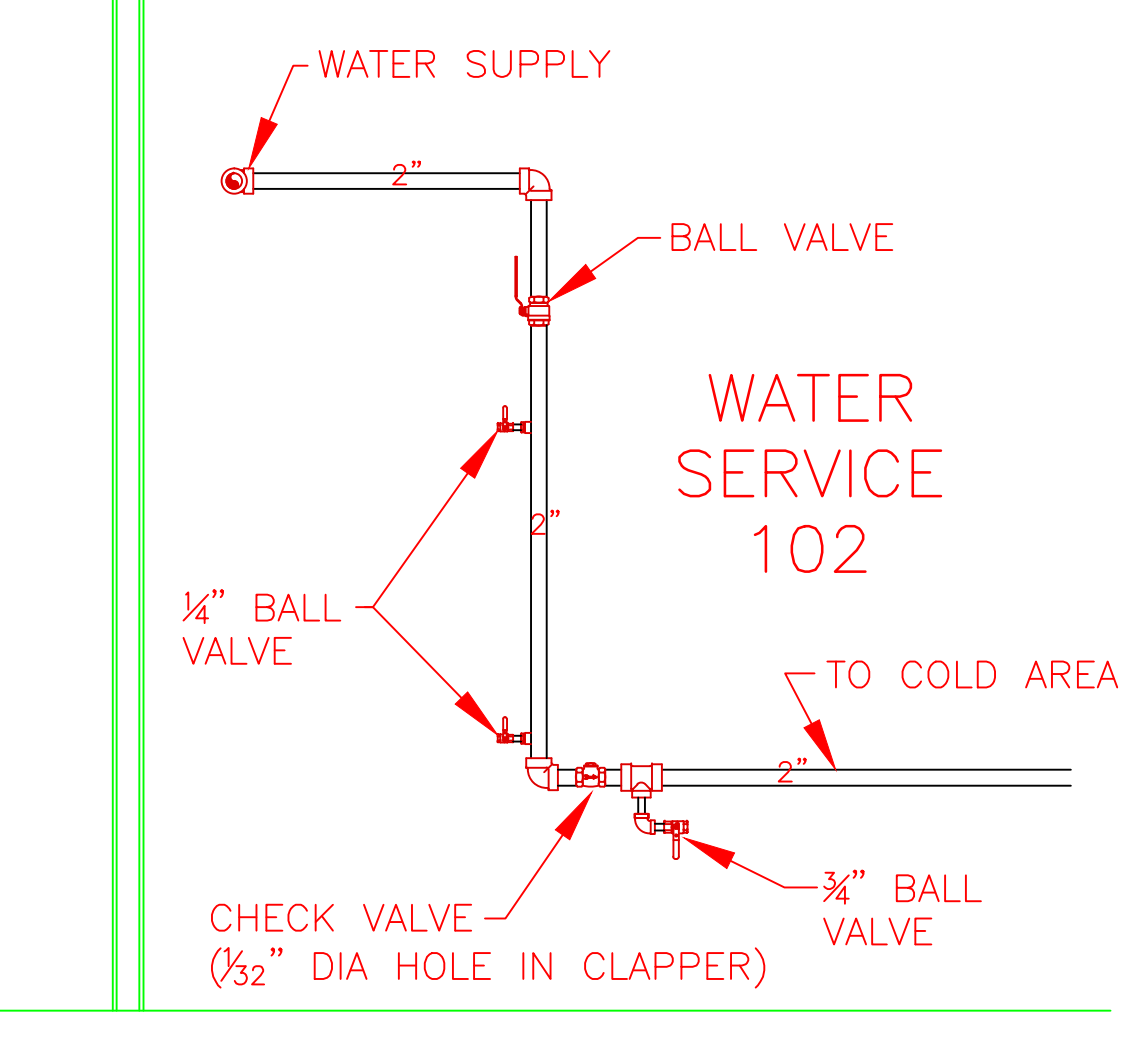


GENERAL NOTES:

- IT IS THE BUILDING OWNERS RESPONSIBILITY TO PROVIDE ADEQUATE HEAT FOR ALL AREAS IN THE BUILDING PROTECTED BY WET SPRINKLER SYSTEMS AND FOR ALL WATER FILLED SUPPLY PIPES, VALVES AND SYSTEM RISERS IN ALL DRY PIPE SPRINKLER SYSTEMS.
- ALL NEW PIPING IS TO BE HYDROSTATICALLY TESTED AT NOT LESS THAN 200 PSI FOR 2 HOURS, OR AT 50 PSI IN EXCESS OF THE MAXIMUM PRESSURE, WHEN THE MAXIMUM PRESSURE TO BE MAINTAINED IS IN EXCESS OF 150 PSI. (PER NFPA 13)
- WHETHER OR NOT INDICATED ON DRAWINGS, THE FOLLOWING ITEMS ARE TO BE PROVIDED:
 - 3. SPARE HEAD CABINET WITH WRENCH (NFPA 13)
 - PROVISIONS FOR FLUSHING CONNECTIONS AND DRAINING OF ALL PIPE.
 - INSPECTORS TEST CONNECTION SHALL BE PROVIDED FOR EACH SYSTEM
 - A) FOR WET PIPE SYSTEMS SEE NFPA 13)
 - B) FOR DRY PIPE SYSTEMS SEE NFPA 13)
 - AIR PRESSURE SHALL BE MAINTAINED ON ALL DRY PIPE SYSTEMS BY AN APPROVED AUTOMATIC AIR COMPRESSOR OR PLANT AIR SYSTEM SPECIFICALLY APPROVED FOR AND CAPABLE OF AUTOMATICALLY MAINTAINING THE REQUIRED AIR PRESSURE.
 - WET PIPE SYSTEMS SHALL BE PROVIDED WITH A RELIEF VALVE NOT LESS THAN 1/2" IN SIZE. (NFPA 13).
- ALL PIPE 1" SHALL BE SCHEDULE 40 STEEL WITH MALLEABLE IRON FITTINGS.
- ALL PIPE 1 1/2" AND LARGER, SHALL BE SCHEDULE 10 STEEL, WITH GROOVED COUPLINGS AND VICTAULIC MECHANICAL FITTINGS OR EQUIVALENT.
- ALL MECHANICAL TRADES ARE TO COORDINATE THEIR WORK WITH SPRINKLER WORK AS SHOWN ON THESE PLANS.
- ALL HANGERS AND LOCATIONS ARE TO BE IN ACCORDANCE WITH N.F.P.A. 13.
- ALL SPRINKLER HEADS IN SUSPENDED CEILING TILES ARE TO BE LOCATED IN THE CENTER OF THE ACOUSTICAL CEILING PANEL.
- ALL PIPING IS TO BE PITCHED IN ACCORDANCE WITH N.F.P.A. 13.
- HYDRAULIC DATA REFERENCE POINTS: (25) (12'-0") BELOW DECK (12")
- CENTER LINE OF PIPE ABOVE FINISH FLOOR (12'-0") BELOW DECK (12")
- PROTECTIVE CAPS ARE TO REMAIN ON THE SPRINKLER HEADS UNTIL AFTER CEILINGS ARE INSTALLED.
- WHERE SURFACE MOUNTED OBSTRUCTIONS EXIST DEEP ESCUTCHEON SPRINKLER HEADS WILL BE INSTALLED.
- WORK IS LIMITED TO THE WORK SHOWN ON THESE DOCUMENTS.



ANTI-FREEZE LOOP DETAIL NOT TO SCALE

ANTI-FREEZE SYSTEMS NOTES

- GLYCERINE (ANTI-FREEZE) IS TO BE USED FOR THE DRIVE THRU CANOPY.
- ANTI-FREEZE IS TO BE PREMIXED AND LISTED FOR USE IN SPRINKLER SYSTEMS (48% GLYCERINE).
- A PLACARD SHALL BE PLACED ON THE ANTI-FREEZE SYSTEM MAIN VALVE THAT INDICATES THE MANUFACTURER TYPE AND BRAND OF ANTI-FREEZE SOLUTION, THE CONCENTRATION BY VOLUME OF THE ANTI-FREEZE SOLUTION USED, AND THE VOLUME OF THE ANTI-FREEZE SOLUTION USED IN THE SYSTEM.
- THE FREEZE POINT OF THE ANTI-FREEZE SOLUTION IS TO 15' BELOW ZERO. (-15°F)
- THE OWNER IS RESPONSIBLE FOR MAINTAINING THIS LEVEL OF PROTECTION THROUGH REGULAR MAINTENANCE IN ACCORDANCE WITH THE STATE FIRE MARSHAL REQUIREMENTS AND N.F.P.A. 25.
- THE SIZE OF THE ANTI-FREEZE SYSTEM IS 17.2 GALLONS.

CANOPY

HYDRAULIC DATA NAMEPLATE
This Building is protected by a hydraulically designed Automatic Sprinkler System

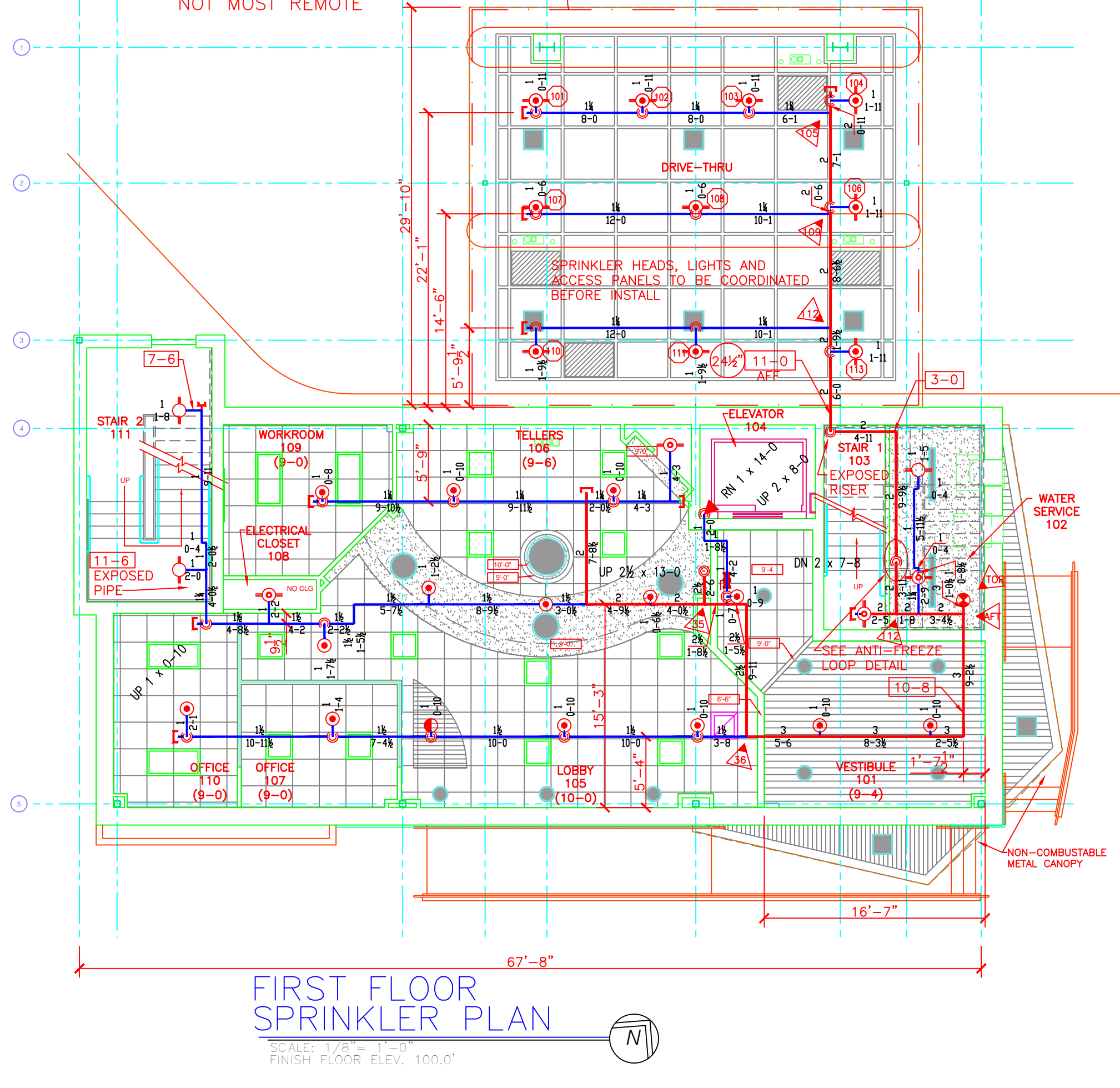
Location: AREA-3
No. of Sprinkler: 10
Basis of design:

1. Density: 1.15 gpm/ft²
2. Design area of discharge: 945 sq ft

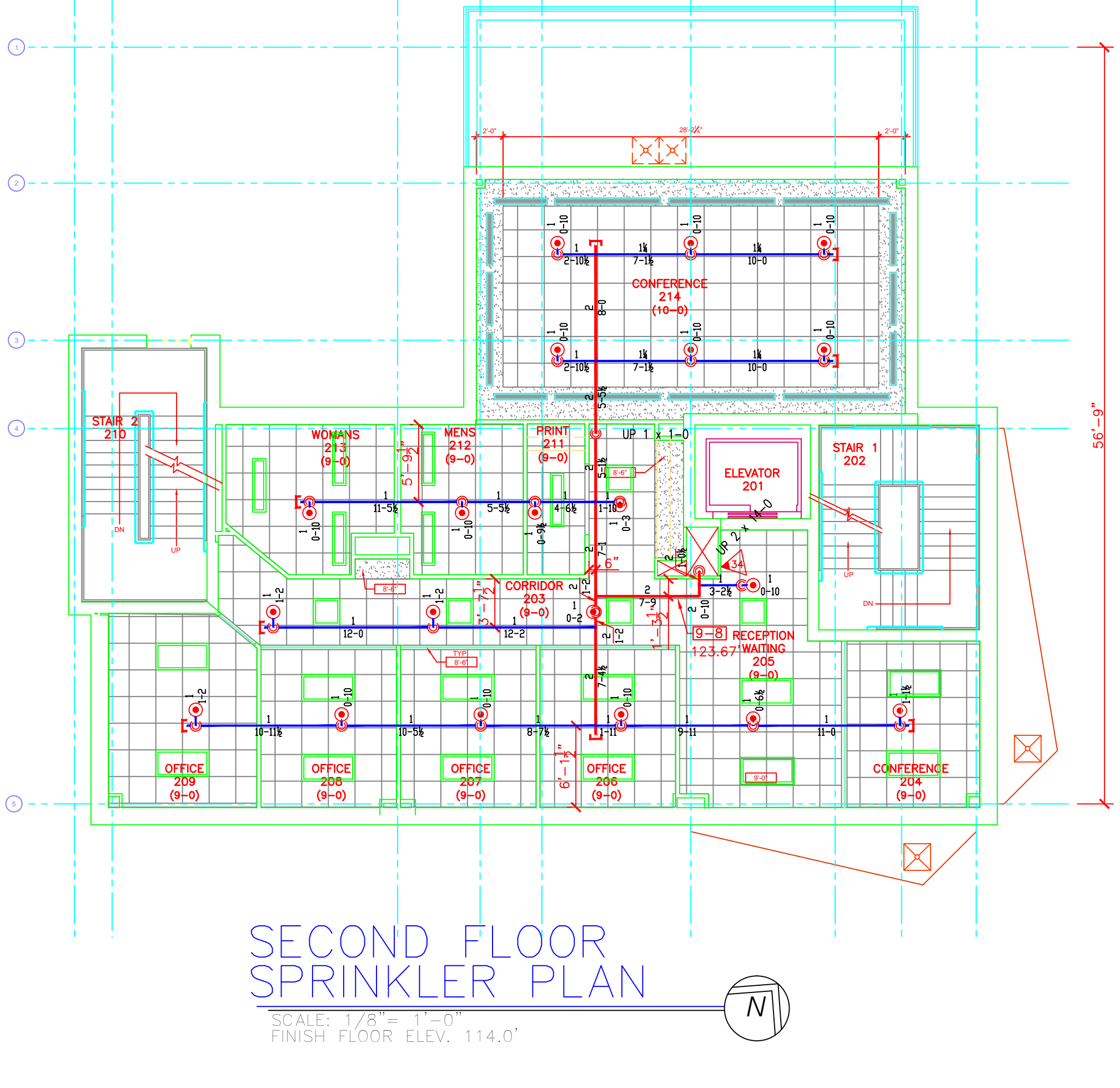
System Demand:

1. Water Flow Rate: 212.47 gpm
2. Residual Pressure: 70.675 psi

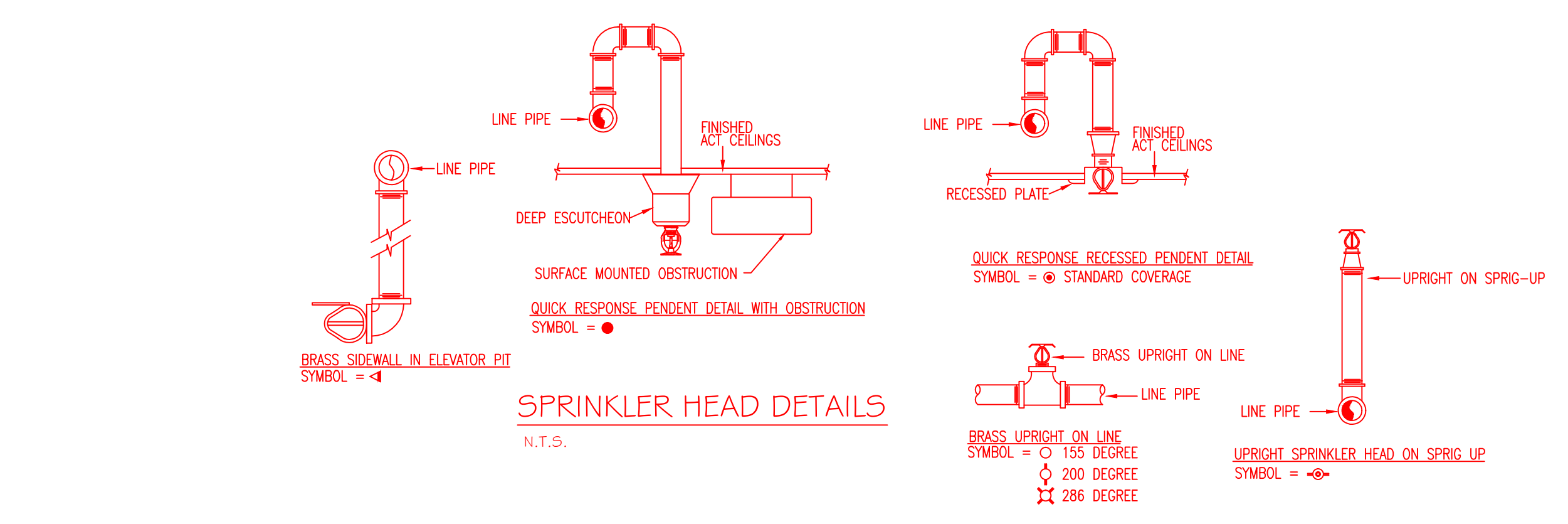
Base/Pump: 70.675 psi
CUSHION = 39.74 psi



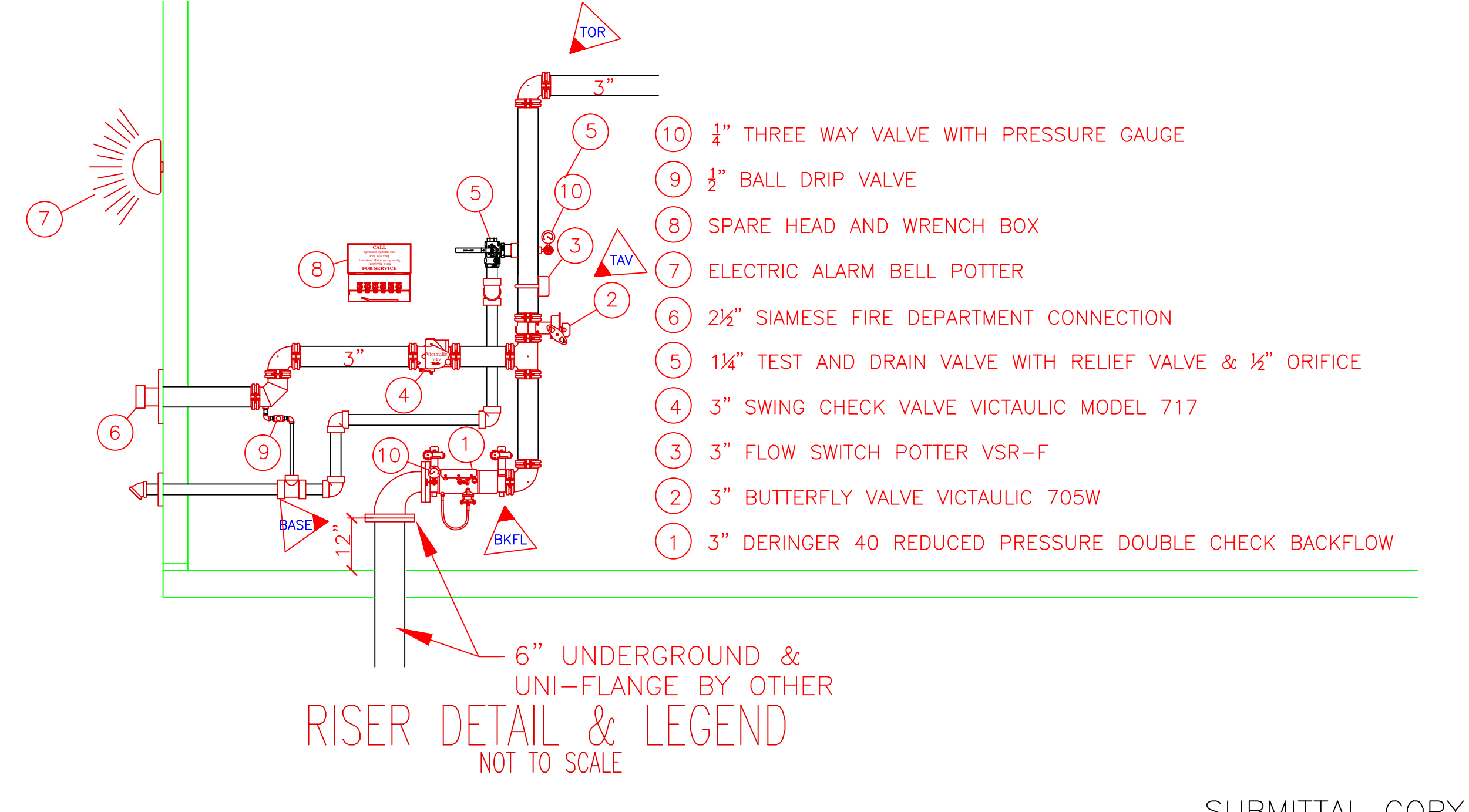
FIRST FLOOR SPRINKLER PLAN
SCALE: 1/8" = 1'-0"
FINISH FLOOR ELEV. 100.0'



SECOND FLOOR SPRINKLER PLAN
SCALE: 1/8" = 1'-0"
FINISH FLOOR ELEV. 114.0'

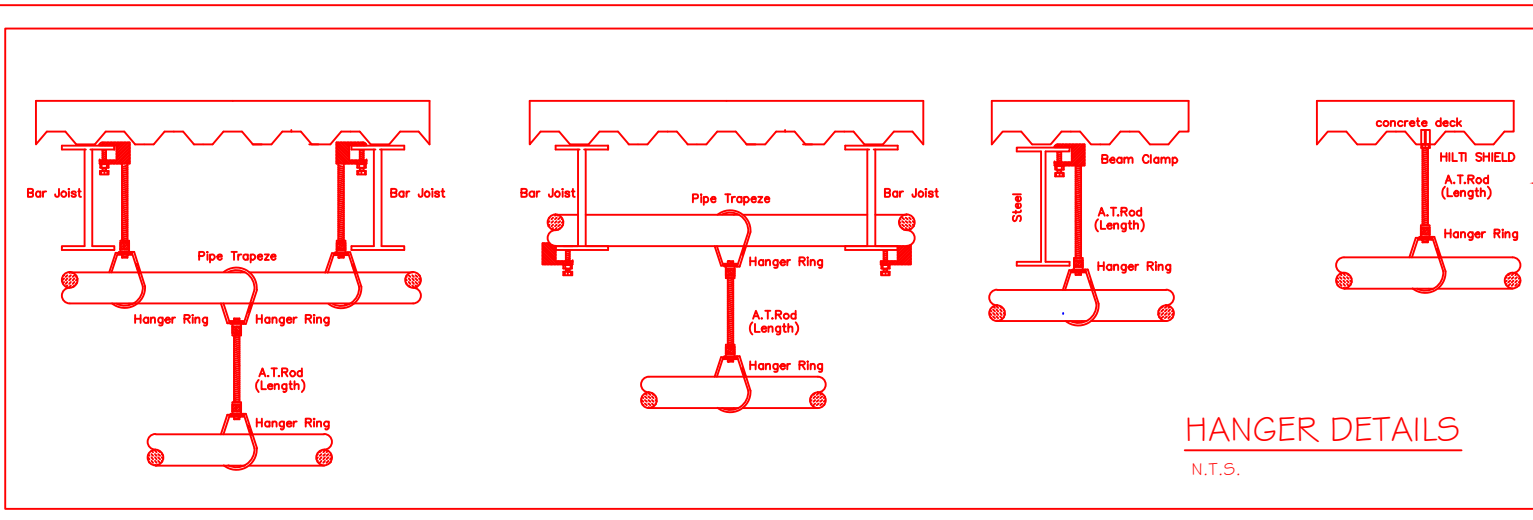


SPRINKLER HEAD DETAILS
N.T.S.



RISER DETAIL & LEGEND
NOT TO SCALE

1. Type of Hazard: LIGHT/ORDINARY
2. Deflector Distance: PER SPEC
3. Pipe Type Used: BLK_SCH 10/40
4. Sprinkler Area: PER SPEC
5. Type of Construction: NON COMBUSTIBLE
6. Maximum Spacing Allowed: PER NFPA 13
7. PIPE SIZING METHOD: PIPE SCHEDULE ()
HYDRAULICALLY CALCULATED ()
8. ALL HANGERS AND LOCATIONS TO BE IN ACCORDANCE WITH N.F.P.A. PAMPHLET NO. 13
9. HIGH DEGREE TEMPERATURE SPRINKLER HEADS TO BE INSTALLED IN ACCORDANCE WITH N.F.P.A. PAMPHLET NO. 13



HANGERS

AS SHOWN IN DETAIL

ABBREVIATIONS

B Bottom of Beam
D Bottom of Deck
P Bottom of Pipe
H/V Hose Valve
N & C Nipple and Cap
N/C Not in Contact
O/U Open Bar Joints
P/RV Pressure Red Valve
R/RV Road Machine
SP Standpipe
TOP Top of Beam
TOP Top of Pipe
TOP Top of Steel
UN/ Unless Otherwise Noted
CL/ Centerline
N/A No Automatic Sprinklers
OTA Open to Above

CONTRACT RESPONSIBILITIES

ITEM	FFC	OTHERS
STREET CORR		
LOG MAN		
EXCAVATION		
FLUSHING		
WIRING		
PAINTING		
TAMPER SWITCHES		
FLOW SWITCHES		
STREET CORR		

SPRINKLER HEAD LEGEND

SYMBOL	MAKE	MODEL	SIN	FINISH	TYPE	TEMP	NPT	ORIFICE	K-FACTOR	TOTAL
(Symbol)	RELIABLE	F1FR 56	RA1414	WHITE	SEMI-REC PENDENT	155F	1/2"	1/2"	5.6	42
(Symbol)	RELIABLE	F1FR 56	RA1425	Bronze	UPRIGHT	200F	1/2"	1/2"	5.6	17
(Symbol)	RELIABLE	F1FR 56	RA1435	Bronze	HORIZ SIDE WALL	200F	1/2"	1/2"	5.6	1
(Symbol)	RELIABLE	F1FR 56	RA1414	WHITE	SEMI-REC PENDENT	200F	1/2"	1/2"	5.6	10
TOTAL										90

SUBMITTALS

SENT TO	DATE SENT	DATE RECEIVED
STATE FIRE		
LOCAL FIRE		
LOCAL WATER		
OWNER		

BANGOR SAVINGS BANK
20 MARGINAL WAY
PORTLAND, MAINE 04101

CONTRACT WITH: LANDRY FRENCH

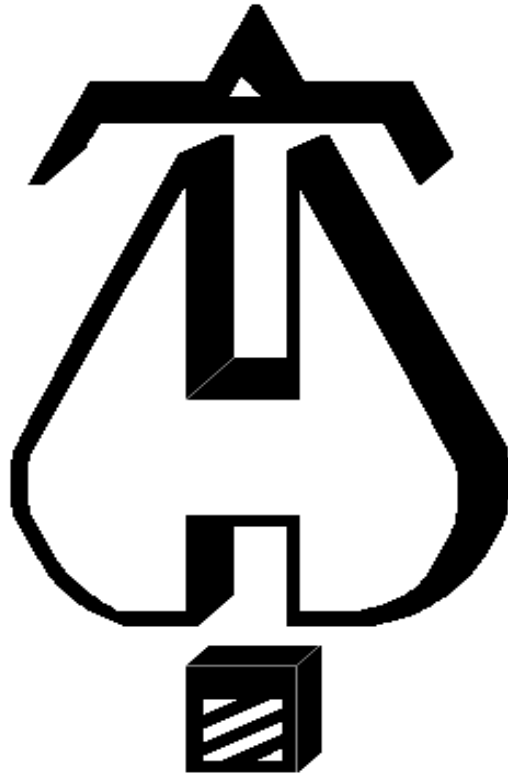
SYSTEM TYPE: WET, DRY, DELUGE, PREACTION, ME. LIFE, HYDRO-PRO, ANTI-FREEZE

REVISIONS: NO. DATE DESCRIPTION

DATE: 11/30/2015
DRAWN BY: JJP
CHECKED BY: CDS
TOTAL SPRKS ON JOB: 90
SHEET# 1 of 2
JOB# 15154

SPRINKLER SYSTEMS INC.
P.O. BOX 1285
LEWISTON MAINE
04243-1285

SCALE: AS NOTED



... Fire Protection by Computer Design

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

Job Name : Bangor Savings Portland Area 1
Building : NEW
Location : 20 MARGINAL WAY PORTLAND, MAINE
System : 1 WET
Contract : 15-154
Data File : Bangor Savings Portland Area 1.WXF

Hydraulic Design Information Sheet

Name - BANGOR SAVINGS PORTLAND AREA 1 Date - 12-22-15
 Location - 20 MARGINAL WAY PORTLAND, MAINE
 Building - NEW System No. - 1 WET
 Contractor - SPRINKLER SYSTEMS INC. Contract No. - 15-154
 Calculated By - CDS Drawing No. - 1-2 OF 2
 Construction: () Combustible (X) Non-Combustible Ceiling Height - VARIES
 Occupancy - OFFICE BUILDING / MECHANICAL ROOM

S (X) NFPA 13 () Lt. Haz. Ord.Haz.Gp. (X) 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	- 945	System Type	Sprinkler/Nozzle
	Density	- .15	(X) Wet	Make RELIABLE
D	Area Per Sprinkler	- 130	() Dry	Model F1FR56
E	Elevation at Highest Outlet	- 151.500	() 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 - 234.91 Press Required - 100.349 AT BASE
 Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 05-23-15		Cap. -
T	Time of Test - AM	Rated Cap.-	Elev.-
E	Static Press - 112	@ Press -	
R	Residual Press - 106	Elev. -	Well
	Flow - 1591		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:	%	Palletized % Rack
	() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S	() Double Row	() Slave Pallet	() Solid Shelf () Non
T	() Mult. Row		() Open Shelf

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

E Horizontal Barriers Provided:

Fittings Used Summary

SPRINKLER SYSTEMS INC.
Bangor Savings Portland Area 1

Page 2
Date

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																				
Bvcb	B Fly Vic 705W	0	0	0	0	0	0	5	5	0	12	12	8	11	12	14	0	0	0	0	0
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

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

SPRINKLER SYSTEMS INC.
Bangor Savings Portland Area 1

Page 3
Date

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
TYP	0.0	5.6	12.13	na	19.5	0.15	130	7.0
TYP1	0.0	5.6	12.25	na	19.6	0.1	196	7.0
10	151.5	K = K @ SPRG	14.43	na	20.6			
8	151.5	K = K @ SPRG	13.69	na	20.06			
9	151.5	K = K @ SPRG	13.85	na	20.18			
11	151.5		14.65	na				
14	151.5	K = K @ SPRG	21.73	na	25.28			
ARM1	151.5	5.6	12.59	na	19.87	0.15	130	7.0
ARM2	151.5	5.6	13.97	na	20.93	0.15	130	7.0
1	151.5	K = K @ ARM	13.69	na	19.6			
2	151.5		13.82	na				
3	151.5	K = K @ ARM	13.84	na	19.7			
4	151.5		14.2	na				
5	151.5	K = K @ SPRG	14.4	na	20.57			
6	151.5		15.74	na				
7	151.5	K = K @ SPRG	16.0	na	21.69			
12	151.5		17.49	na				
15	151.5		21.95	na				
16	151.5	K = K @ SPRG	23.74	na	26.42			
17	151.5		31.26	na				
18	139.0		46.43	na				
22	139.0		47.26	na				
32	139.0		50.97	na				
33	139.0		54.67	na				
34	123.75		64.39	na				
35	110.75		75.71	na				
36	110.75		81.12	na				
AFT	110.75		82.83	na				
TOR	110.75		83.34	na				
BKFL	101.5		91.2	na				
BASE	100.0		100.35	na				
HOSE	100.0		100.68	na	250.0			
TEST	100.0		101.45	na				

The maximum velocity is 20.62 and it occurs in the pipe between nodes 16 and 17

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
Bangor Savings Portland Area 1

Page 4
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 SPRG	19.50 19.5	1.049 120.0 0.1242	T 5.0 0.0 0.0	1.500 5.000 6.500	12.125 0.0 0.807		K Factor = 5.60		
	0.0 19.50				12.932		K Factor = 5.42		
TYP1 to ARM	19.60 19.6	1.049 120.0 0.1254	2E 4.0 T 5.0 0.0	2.500 9.000 11.500	12.250 0.0 1.442		K Factor = 5.60		
	0.0 19.60				13.692		K Factor = 5.30		
10 to 11	20.60 20.6	1.682 120.0 0.0138	T 9.9 0.0 0.0	6.500 9.900 16.400	14.426 0.0 0.226		K Factor @ node SPRG		
	0.0 20.60				14.652		K Factor = 5.38		
8 to 9	20.06 20.06	1.682 120.0 0.0131		0.0 0.0 12.250	12.250 0.0 0.161		K Factor @ node SPRG		
							Vel = 2.90		
9 to 11	20.18 40.24	1.682 120.0 0.0476	T 9.9 0.0 0.0	7.000 9.900 16.900	13.848 0.0 0.804		K Factor @ node SPRG		
							Vel = 5.81		
11 to 12	20.59 60.83	1.682 120.0 0.1022	2E 9.9 T 9.9 0.0	8.000 19.800 27.800	14.652 0.0 2.842			Vel = 8.78	
	0.0 60.83				17.494		K Factor = 14.54		
14 to 15	25.28 25.28	1.682 120.0 0.0202	T 9.9 0.0 0.0	1.000 9.900 10.900	21.734 0.0 0.220		K Factor @ node SPRG		
	0.0 25.28				21.954		K Factor = 5.40		
ARM1 to 4	19.87 19.87	1.049 120.0 0.1286	E 2.0 T 5.0 0.0	5.500 7.000 12.500	12.593 0.0 1.608		K Factor = 5.60		
	0.0 19.87				14.201		K Factor = 5.27		
ARM2 to 6	20.93 20.93	1.049 120.0 0.1416	E 2.0 T 5.0 0.0	5.500 7.000 12.500	13.974 0.0 1.770		K Factor = 5.60		
	0.0 20.93				15.744		K Factor = 5.27		
1 to 2	19.60 19.6	1.682 120.0 0.0126		0.0 0.0 10.500	13.692 0.0 0.132		K Factor @ node ARM		
							Vel = 2.83		
2 to 3	0.0 19.6	1.682 120.0 0.0120		0.0 0.0 1.000	13.824 0.0 0.012			Vel = 2.83	

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
Bangor Savings Portland Area 1

Page 5
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	*****
3 to 4	19.70 39.3	1.682 120.0 0.0456		0.0 0.0 0.0	8.000 0.0 8.000	13.836 0.0 0.365			K Factor @ node ARM Vel = 5.67	
4 to 5	19.88 59.18	1.682 120.0 0.0970		0.0 0.0 0.0	2.000 0.0 2.000	14.201 0.0 0.194			Vel = 8.55	
5 to 6	20.57 79.75	1.682 120.0 0.1686		0.0 0.0 0.0	8.000 0.0 8.000	14.395 0.0 1.349			K Factor @ node SPRG Vel = 11.52	
6 to 7	20.93 100.68	1.682 120.0 0.2600		0.0 0.0 0.0	1.000 0.0 1.000	15.744 0.0 0.260			Vel = 14.54	
7 to 12	21.70 122.38	1.682 120.0 0.3725		0.0 0.0 0.0	4.000 0.0 4.000	16.004 0.0 1.490			K Factor @ node SPRG Vel = 17.67	
12 to 15	60.83 183.21	2.157 120.0 0.2340	T	12.307 0.0 0.0	6.750 12.307 19.057	17.494 0.0 4.460			Vel = 16.09	
15 to 16	25.28 208.49	2.157 120.0 0.2972		0.0 0.0 0.0	6.000 0.0 6.000	21.954 0.0 1.783			Vel = 18.31	
16 to 17	26.42 234.91	2.157 120.0 0.3707	2E	12.307 0.0 0.0	8.000 12.307 20.307	23.737 0.0 7.527			K Factor @ node SPRG Vel = 20.62	
17 to 18	0.0 234.91	2.157 120.0 0.3706	T	12.307 0.0 0.0	14.000 12.307 26.307	31.264 5.414 9.750			Vel = 20.62	
18 to 22	0.0 234.91	2.157 120.0 0.3707		0.0 0.0 0.0	2.250 0.0 2.250	46.428 0.0 0.834			Vel = 20.62	
22 to 32	0.0 234.91	2.157 120.0 0.3707		0.0 0.0 0.0	10.000 0.0 10.000	47.262 0.0 3.707			Vel = 20.62	
32 to 33	0.0 234.91	2.635 120.0 0.1398	2E	16.474 0.0 0.0	10.000 16.474 26.474	50.969 0.0 3.702			Vel = 13.82	
33 to 34	0.0 234.91	2.635 120.0 0.1398	E	8.237 0.0 0.0	14.000 8.237 22.237	54.671 6.605 3.109			Vel = 13.82	
34 to 35	0.0 234.91	2.635 120.0 0.1398	E T	8.237 16.474 0.0	16.000 24.711 40.711	64.385 5.630 5.693			Vel = 13.82	
35 to 36	0.0 234.91	2.635 120.0 0.1398	E T	8.237 16.474 0.0	14.000 24.711 38.711	75.708 0.0 5.413			Vel = 13.82	

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
Bangor Savings Portland Area 1

Page 6
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	*****
36 to AFT	0.0 234.91	3.26 120.0 0.0496	E	9.408 0.0 34.408	25.000 9.408 34.408	81.121 0.0 1.707		Vel = 9.03	
AFT to TOR	0.0 234.91	3.26 120.0 0.0496	E	9.408 0.0 10.408	1.000 9.408 10.408	82.828 0.0 0.516		Vel = 9.03	
TOR to BKFL	0.0 234.91	3.26 120.0 0.0496	Bvcb E	6.72 9.408 0.0	1.000 16.128 17.128	83.344 7.006 0.850		** Fixed Loss = 3 Vel = 9.03	
BKFL to BASE	0.0 234.91	3.068 120.0 0.0665	E	7.0 0.0 0.0	0.500 7.000 7.500	91.200 8.650 0.499		** Fixed Loss = 8 Vel = 10.19	
BASE to HOSE	0.0 234.91	6.16 140.0 0.0017	2E T G	40.168 43.037 4.304	110.000 87.509 197.509	100.349 0.0 0.332		Vel = 2.53	
HOSE to TEST	250.00 484.91	8.27 140.0 0.0015		0.0 0.0 0.0	500.000 0.0 500.000	100.681 0.0 0.766		Qa = 250 Vel = 2.90	
	0.0 484.91					101.447		K Factor = 48.14	

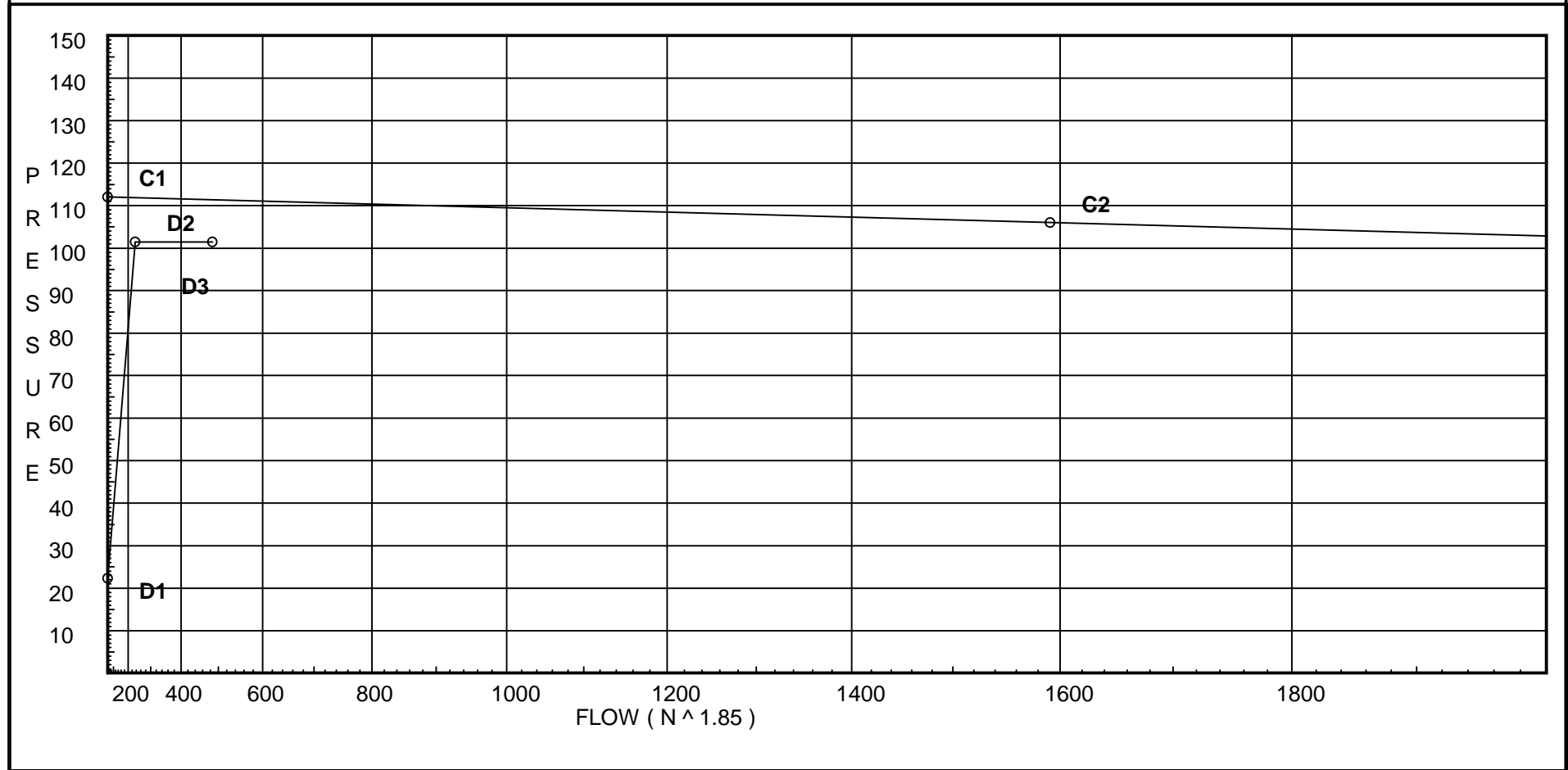
Water Supply Curve C

SPRINKLER SYSTEMS INC.
Bangor Savings Portland Area 1

Page 7
Date

City Water Supply:
C1 - Static Pressure : 112
C2 - Residual Pressure: 106
C2 - Residual Flow : 1591

Demand:
D1 - Elevation : 22.305
D2 - System Flow : 234.908
D2 - System Pressure : 101.447
Hose (Demand) : 250
D3 - System Demand : 484.908
Safety Margin : 9.887



Hydraulic Design Information Sheet

Name - BANGOR SAVINGS PORTLAND AREA 2 Date - 12-22-15
 Location - 20 MARGINAL WAY PORTLAND, MAINE
 Building - NEW System No. - 1 WET
 Contractor - SPRINKLER SYSTEMS INC. Contract No. - 15-154
 Calculated By - CDS Drawing No. - 1-2 OF 2
 Construction: () Combustible (X) Non-Combustible Ceiling Height - VARIES
 Occupancy - OFFICE BUILDING / 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	- 196	() Dry	Model F1FR56
E	Elevation at Highest Outlet	- 138	() 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 - 190.48 Press Required - 64.616 AT BASE
 Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 05-23-15		Cap. -
T	Time of Test - AM	Rated Cap.-	Elev.-
E	Static Press - 112	@ Press -	
R	Residual Press - 106	Elev. -	Well
	Flow - 1591		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:	%	Palletized % Rack
	() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S	() Double Row	() Slave Pallet	() Solid Shelf () Non
T	() Mult. Row		() Open Shelf

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

E Horizontal Barriers Provided:

Pressure / Flow Summary - STANDARD

SPRINKLER SYSTEMS INC.
Bangor Savings Portland Area 2

Page 9
Date

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
TYP1	0.0	5.6	12.25	na	19.6	0.1	196	7.0
ARM1	138.0	5.6	14.72	na	21.48	0.15	100	7.0
21	138.0	K = K @ ARM	20.11	na	23.75			
22	138.0		20.52	na				
23	138.0	K = K @ ARM	15.22	na	20.66			
24	138.0	K = K @ ARM	15.51	na	20.86			
25	138.0		16.5	na				
26	138.0	K = K @ ARM	17.19	na	21.96			
27	138.0	K = K @ ARM	13.69	na	19.6			
28	138.0	K = K @ ARM	13.93	na	19.77			
29	138.0	K = K @ ARM	14.95	na	20.48			
30	138.0	K = K @ ARM	17.1	na	21.9			
31	138.0		20.16	na				
32	139.0		20.14	na				
33	139.0		22.66	na				
34	123.75		31.37	na				
35	110.75		40.86	na				
36	110.75		44.54	na				
AFT	110.75		45.69	na				
TOR	110.75		46.04	na				
BKFL	101.5		53.63	na				
BASE	100.0		64.62	na				
HOSE	100.0		64.84	na	100.0			
TEST	100.0		65.14	na				

The maximum velocity is 16.69 and it occurs in the pipe between nodes 26 and 32

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
Bangor Savings Portland Area 2

Page 10
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	*****
TYP1 to ARM	19.60 19.6	1.049 120.0 0.1254	2E T 0.0	4.0 5.0 0.0	2.500 9.000 11.500	12.250 0.0 1.442		K Factor = 5.60 Vel = 7.28	
	0.0 19.60					13.692		K Factor = 5.30	
ARM1 to 25	21.48 21.48	1.049 120.0 0.1486	E T 0.0	2.0 5.0 0.0	5.000 7.000 12.000	14.717 0.0 1.783		K Factor = 5.60 Vel = 7.97	
	0.0 21.48					16.500		K Factor = 5.29	
21 to 22	23.75 23.75	1.442 120.0 0.0380	T 0.0 0.0	7.432 0.0 0.0	3.500 7.432 10.932	20.109 0.0 0.415		K Factor @ node ARM Vel = 4.67	
22 to 32	0.0 23.75	2.157 120.0 0.0053	0.0 0.0 0.0	0.0 0.0 0.0	10.000 0.0 10.000	20.524 -0.433 0.053		Vel = 2.09	
	0.0 23.75					20.144		K Factor = 5.29	
23 to 24	20.66 20.66	1.442 120.0 0.0293	0.0 0.0 0.0	0.0 0.0 0.0	10.000 0.0 10.000	15.219 0.0 0.293		K Factor @ node ARM Vel = 4.06	
24 to 25	20.87 41.53	1.442 120.0 0.1068	0.0 0.0 0.0	0.0 0.0 0.0	9.250 0.0 9.250	15.512 0.0 0.988		K Factor @ node ARM Vel = 8.16	
25 to 26	21.48 63.01	1.442 120.0 0.2307	0.0 0.0 0.0	0.0 0.0 0.0	3.000 0.0 3.000	16.500 0.0 0.692		Vel = 12.38	
26 to 32	21.96 84.97	1.442 120.0 0.4014	T 0.0 0.0	7.432 0.0 0.0	1.000 7.432 8.432	17.192 -0.433 3.385		K Factor @ node ARM Vel = 16.69	
	0.0 84.97					20.144		K Factor = 18.93	
27 to 28	19.60 19.6	1.442 120.0 0.0266	0.0 0.0 0.0	0.0 0.0 0.0	9.000 0.0 9.000	13.692 0.0 0.239		K Factor @ node ARM Vel = 3.85	
28 to 29	19.77 39.37	1.442 120.0 0.0968	0.0 0.0 0.0	0.0 0.0 0.0	10.500 0.0 10.500	13.931 0.0 1.016		K Factor @ node ARM Vel = 7.73	
29 to 30	20.48 59.85	1.442 120.0 0.2099	0.0 0.0 0.0	0.0 0.0 0.0	10.250 0.0 10.250	14.947 0.0 2.151		K Factor @ node ARM Vel = 11.76	
30 to 31	21.90 81.75	1.442 120.0 0.3739	T 0.0 0.0	7.432 0.0 0.0	0.750 7.432 8.182	17.098 0.0 3.059		K Factor @ node ARM Vel = 16.06	
31 to 32	0.0 81.75	2.157 120.0 0.0525	0.0 0.0 0.0	0.0 0.0 0.0	8.000 0.0 8.000	20.157 -0.433 0.420		Vel = 7.18	

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
Bangor Savings Portland Area 2

Page 11
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	*****
32	108.73	2.635	2E	16.474	10.000	20.144			
to		120.0		0.0	16.474	0.0			
33	190.48	0.0949		0.0	26.474	2.512	Vel = 11.21		
33	0.0	2.635	E	8.237	14.000	22.656			
to		120.0		0.0	8.237	6.605			
34	190.48	0.0949		0.0	22.237	2.110	Vel = 11.21		
34	0.0	2.635	E	8.237	16.000	31.371			
to		120.0	T	16.474	24.711	5.630			
35	190.48	0.0949		0.0	40.711	3.863	Vel = 11.21		
35	0.0	2.635	E	8.237	14.000	40.864			
to		120.0	T	16.474	24.711	0.0			
36	190.48	0.0949		0.0	38.711	3.673	Vel = 11.21		
36	0.0	3.26	E	9.408	25.000	44.537			
to		120.0		0.0	9.408	0.0			
AFT	190.48	0.0336		0.0	34.408	1.157	Vel = 7.32		
AFT	0.0	3.26	E	9.408	1.000	45.694			
to		120.0		0.0	9.408	0.0			
TOR	190.48	0.0337		0.0	10.408	0.351	Vel = 7.32		
TOR	0.0	3.26	Bvcb	6.72	1.000	46.045			
to		120.0	E	9.408	16.128	7.006	** Fixed Loss = 3		
BKFL	190.48	0.0336	Fsp	0.0	17.128	0.576	Vel = 7.32		
BKFL	0.0	3.068	E	7.0	0.500	53.627			
to		120.0		0.0	7.000	10.650	** Fixed Loss = 10		
BASE	190.48	0.0452		0.0	7.500	0.339	Vel = 8.27		
BASE	0.0	6.16	2E	40.168	110.000	64.616			
to		140.0	T	43.037	87.509	0.0			
HOSE	190.48	0.0011	G	4.304	197.509	0.226	Vel = 2.05		
HOSE	100.00	8.27		0.0	500.000	64.842	Qa = 100		
to		140.0		0.0	0.0	0.0			
TEST	290.48	0.0006		0.0	500.000	0.296	Vel = 1.73		
	0.0								
	290.48					65.138	K Factor = 35.99		

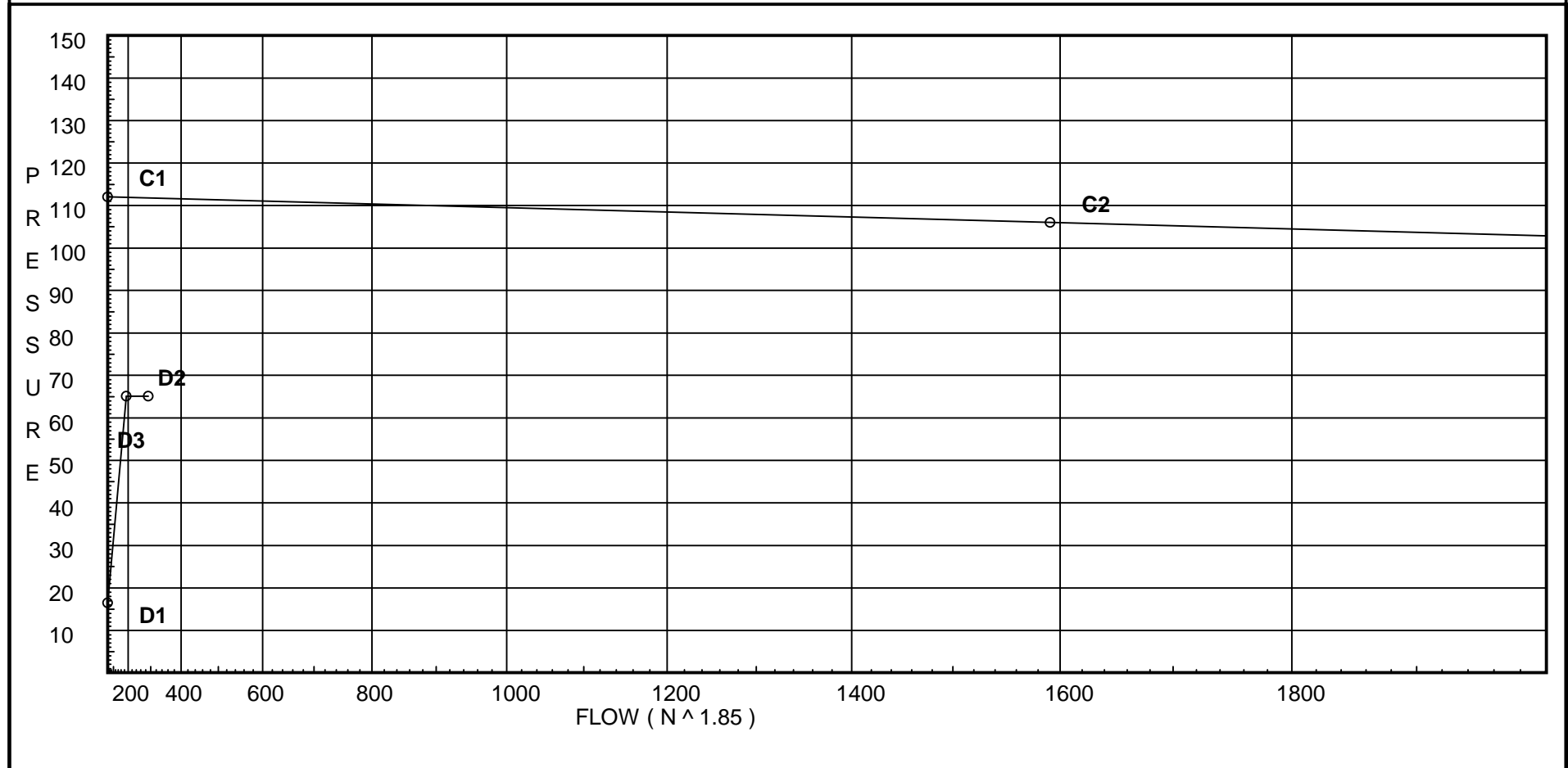
Water Supply Curve C

SPRINKLER SYSTEMS INC.
Bangor Savings Portland Area 2

Page 12
Date

City Water Supply:
C1 - Static Pressure : 112
C2 - Residual Pressure: 106
C2 - Residual Flow : 1591

Demand:
D1 - Elevation : 16.458
D2 - System Flow : 190.479
D2 - System Pressure : 65.138
Hose (Demand) : 100
D3 - System Demand : 290.479
Safety Margin : 46.604



Hydraulic Design Information Sheet

Name - BANGOR SAVINGS PORTLAND AREA 3 Date - 12-22-15
 Location - 20 MARGINAL WAY PORTLAND, MAINE
 Building - NEW System No. - 1 WET
 Contractor - SPRINKLER SYSTEMS INC. Contract No. - 15-154
 Calculated By - CDS Drawing No. - 1-2 OF 2
 Construction: () Combustible (X) Non-Combustible Ceiling Height - VARIES
 Occupancy - OFFICE BUILDING / DRIVE THRU CANOPY

S (X) NFPA 13 () Lt. Haz. Ord.Haz.Gp. (X) 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 - 945	System Type	Sprinkler/Nozzle
	Density - .15	(X) Wet	Make RELIABLE
D	Area Per Sprinkler - 130	() 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.200 DEG.
G	Hose Allowance - Outside - 250		

N Note

Calculation Flow Required - 212.74 Press Required - 70.675 AT BASE
 Summary C-Factor Used: 120 Overhead 140 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:
 A Date of Test - 05-23-15 Cap. -
 T Time of Test - AM Rated Cap.- Elev.-
 E Static Press - 112 @ Press -
 R Residual Press - 106 Elev. - Well
 Flow - 1591 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

G
 E Horizontal Barriers Provided:

Pressure / Flow Summary - STANDARD

SPRINKLER SYSTEMS INC.
Bangor Savings Portland Area 3

Page 14
Date

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
TYP1	0.0	5.6	12.13	na	19.5	0.15	130	7.0
ARM1	111.0	5.6	17.44	na	23.39	0.15	130	7.0
ARM2	111.0	5.6	15.76	na	22.23	0.15	130	7.0
110	111.0	K = K @ ARM	16.67	na	21.63			
111	111.0	K = K @ ARM	17.06	na	21.88			
107	111.0	K = K @ ARM	15.5	na	20.85			
108	111.0	K = K @ ARM	15.85	na	21.09			
101	111.0	K = K @ ARM	13.55	na	19.5			
102	111.0	K = K @ ARM	13.76	na	19.65			
103	111.0	K = K @ ARM	14.53	na	20.19			
104	111.0	K = K @ ARM	17.35	na	22.06			
105	111.0		17.36	na				
106	111.0		17.74	na				
109	111.0		17.78	na				
112	111.0		19.11	na				
113	111.0		19.61	na				
114	110.75		46.14	na				
AFT	110.75		51.47	na				
TOR	110.75		51.9	na				
BKFL	101.5		59.61	na				
BASE	100.0		70.68	na				
HOSE	100.0		70.95	na	250.0			
TEST	100.0		71.65	na				

The maximum velocity is 18.65 and it occurs in the pipe between nodes 113 and 114

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
Bangor Savings Portland Area 3

Page 15
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	*****
TYP1 to ARM	19.50 19.5	1.049 120.0 0.1242	2E T	4.0 5.0 0.0	2.500 9.000 11.500	12.125 0.0 1.428			K Factor = 5.60	
	0.0 19.50								Vel = 7.24	
										K Factor = 5.30
ARM1 to 113	23.39 23.39	1.049 120.0 0.1738	2E T	4.0 5.0 0.0	3.500 9.000 12.500	17.438 0.0 2.173			K Factor = 5.60	
	0.0 23.39								Vel = 8.68	
										K Factor = 5.28
ARM2 to 106	22.23 22.23	1.049 120.0 0.1582	2E T	4.0 5.0 0.0	3.500 9.000 12.500	15.758 0.0 1.978			K Factor = 5.60	
	0.0 22.23								Vel = 8.25	
										K Factor = 5.28
110 to 111	21.63 21.63	1.442 120.0 0.0319		0.0 0.0 0.0	12.000 0.0 12.000	16.674 0.0 0.383			K Factor @ node ARM	
									Vel = 4.25	
111 to 112	21.87 43.5	1.442 120.0 0.1164	T	7.432 0.0 0.0	10.250 7.432 17.682	17.057 0.0 2.058			K Factor @ node ARM	
	0.0 43.50								Vel = 8.55	
										K Factor = 9.95
107 to 108	20.85 20.85	1.442 120.0 0.0298		0.0 0.0 0.0	12.000 0.0 12.000	15.496 0.0 0.358			K Factor @ node ARM	
									Vel = 4.10	
108 to 109	21.09 41.94	1.442 120.0 0.1087	T	7.432 0.0 0.0	10.250 7.432 17.682	15.854 0.0 1.922			K Factor @ node ARM	
	0.0 41.94								Vel = 8.24	
										K Factor = 9.95
101 to 102	19.50 19.5	1.442 120.0 0.0264		0.0 0.0 0.0	8.000 0.0 8.000	13.553 0.0 0.211			K Factor @ node ARM	
									Vel = 3.83	
102 to 103	19.65 39.15	1.442 120.0 0.0958		0.0 0.0 0.0	8.000 0.0 8.000	13.764 0.0 0.766			K Factor @ node ARM	
									Vel = 7.69	
103 to 105	20.19 59.34	1.442 120.0 0.2066	T	7.432 0.0 0.0	6.250 7.432 13.682	14.530 0.0 2.827			K Factor @ node ARM	
	0.0 59.34								Vel = 11.66	
										K Factor = 14.24
104 to 105	22.06 22.06	2.157 120.0 0.0040		0.0 0.0 0.0	1.000 0.0 1.000	17.353 0.0 0.004			K Factor @ node ARM	
									Vel = 1.94	

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
Bangor Savings Portland Area 3

Page 16
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	*****
105	59.35	2.157		7.250	17.357				
to		120.0		0.0	0.0				
106	81.41	0.0523		7.250	0.379		Vel = 7.15		
106	22.23	2.157		0.500	17.736				
to		120.0		0.0	0.0				
109	103.64	0.0800		0.500	0.040		Vel = 9.10		
109	41.94	2.157		8.750	17.776				
to		120.0		0.0	0.0				
112	145.58	0.1530		8.750	1.339		Vel = 12.78		
112	43.50	2.157		2.000	19.115				
to		120.0		0.0	0.0				
113	189.08	0.2480		2.000	0.496		Vel = 16.60		
113	23.39	2.157	5E	30.767	40.000	19.611			
to		120.0	T	12.307	45.843	0.108			
114	212.47	0.3078	Ball	2.769	85.843	26.424	Vel = 18.65		
114	0.0	2.157	T	12.307	5.000	46.143			
to		120.0		0.0	12.307	0.0			
AFT	212.47	0.3078		0.0	17.307	5.327	Vel = 18.65		
AFT	0.0	3.26	E	9.408	1.000	51.470			
to		120.0		0.0	9.408	0.0			
TOR	212.47	0.0412		0.0	10.408	0.429	Vel = 8.17		
TOR	0.0	3.26	Bvcb	6.72	1.000	51.899			
to		120.0	E	9.408	16.128	7.006	** Fixed Loss = 3		
BKFL	212.47	0.0412	Fsp	0.0	17.128	0.706	Vel = 8.17		
BKFL	0.0	3.068	E	7.0	0.500	59.611			
to		120.0		0.0	7.000	10.650	** Fixed Loss = 10		
BASE	212.47	0.0552		0.0	7.500	0.414	Vel = 9.22		
BASE	0.0	6.16	2E	40.168	110.000	70.675			
to		140.0	T	43.037	87.509	0.0			
HOSE	212.47	0.0014	G	4.304	197.509	0.276	Vel = 2.29		
HOSE	250.00	8.27		0.0	500.000	70.951	Qa = 250		
to		140.0		0.0	0.0	0.0			
TEST	462.47	0.0014		0.0	500.000	0.702	Vel = 2.76		
	0.0								
	462.47					71.653	K Factor = 54.63		

Water Supply Curve C

SPRINKLER SYSTEMS INC.
Bangor Savings Portland Area 3

Page 17
Date

City Water Supply:
C1 - Static Pressure : 112
C2 - Residual Pressure: 106
C2 - Residual Flow : 1591

Demand:
D1 - Elevation : 4.764
D2 - System Flow : 212.467
D2 - System Pressure : 71.653
Hose (Demand) : 250
D3 - System Demand : 462.467
Safety Margin : 39.737

