

BASEMENT
SCALE 1/4" = 1'-0"

CALC: C1255 EP BSMT.WXF
 BASEMENT
 HYDRAULIC DATA:
 BASIS OF DESIGN:
 DENSITY OF DESIGN 0.15
 AREA OF COVERAGE 1030
 TOTAL ORIFICE TEMP SPRINKLERS 09 1/2" 155°
 SYSTEM DEMAND:
 PRESSURE 46.623
 FLOW 194.176
 HOSE 0
 SAFETY MARGIN 15.26 PSI
 OCCUPANCY: ORDINARY I

HEAD LEGEND
 ○ 20/155 RELIABLE MODEL F1FR56 BRASS UPRIGHT
 QUICK RESPONSE, STANDARD COVERAGE
 K=56, 1/2" NPT, SIN RA1425

SYSTEM CLASSIFICATION

THE WET PIPE SYSTEM OF AUTOMATIC SPRINKLERS IS DESIGNED IN ACCORDANCE WITH NFPA-13R, STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS, 2007 EDITION. RESIDENTIAL HAZARD FOR ALL COMMON ROOMS AND LIVING QUARTERS. ORDINARY HAZARD, GROUP 1 FOR GENERAL STORAGE AREAS, MECHANICAL EQUIPMENT ROOMS, BUILDING SERVICE AREAS AND ELECTRICAL EQUIPMENT ROOMS.

SCOPE OF WORK

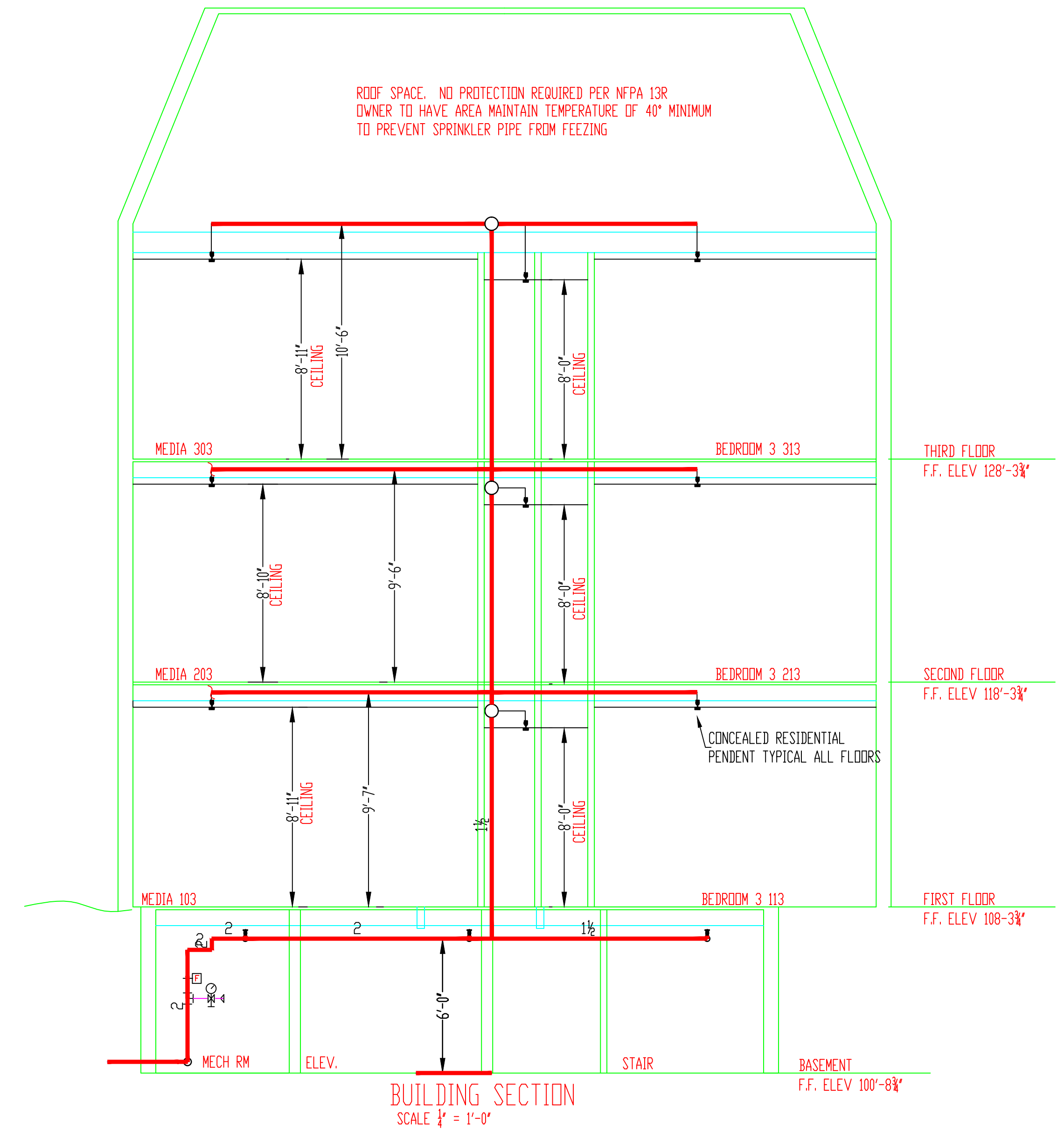
DESIGN AND INSTALL A WET PIPE SYSTEM OF AUTOMATIC SPRINKLERS THROUGHOUT HEATED AREAS OF 130 EASTERN PROMENADE PORTLAND, MAINE.

GENERAL NOTES

ALL 1" TO 2" PIPE IS TO BE SCH. 40 BLACK STEEL U/W.
 ALL THREADED PIPE FITTINGS ARE TO BE BLACK CAST IRON, CLASS 125 U/W.
 DIMENSIONS SHOWN ON THREADED PIPE ARE CENTER TO CENTER U/W.
 SUFFICIENT HEAT TO PREVENT FREEZING OF THE WET PIPE SPRINKLER SYSTEM AND WATER FILLED COMPONENTS OF THE DRY PIPE SPRINKLER SYSTEM IS REQUIRED TO BE FURNISHED BY THE BUYER/OWNER.
 HEADS ARE NOT REQUIRED IN BATHROOMS UNDER 55 SQUARE FEET.
 PLEASE NOTE: POTENTIAL OBSTRUCTIONS MAY BE CAUSED BY SURFACE MOUNT

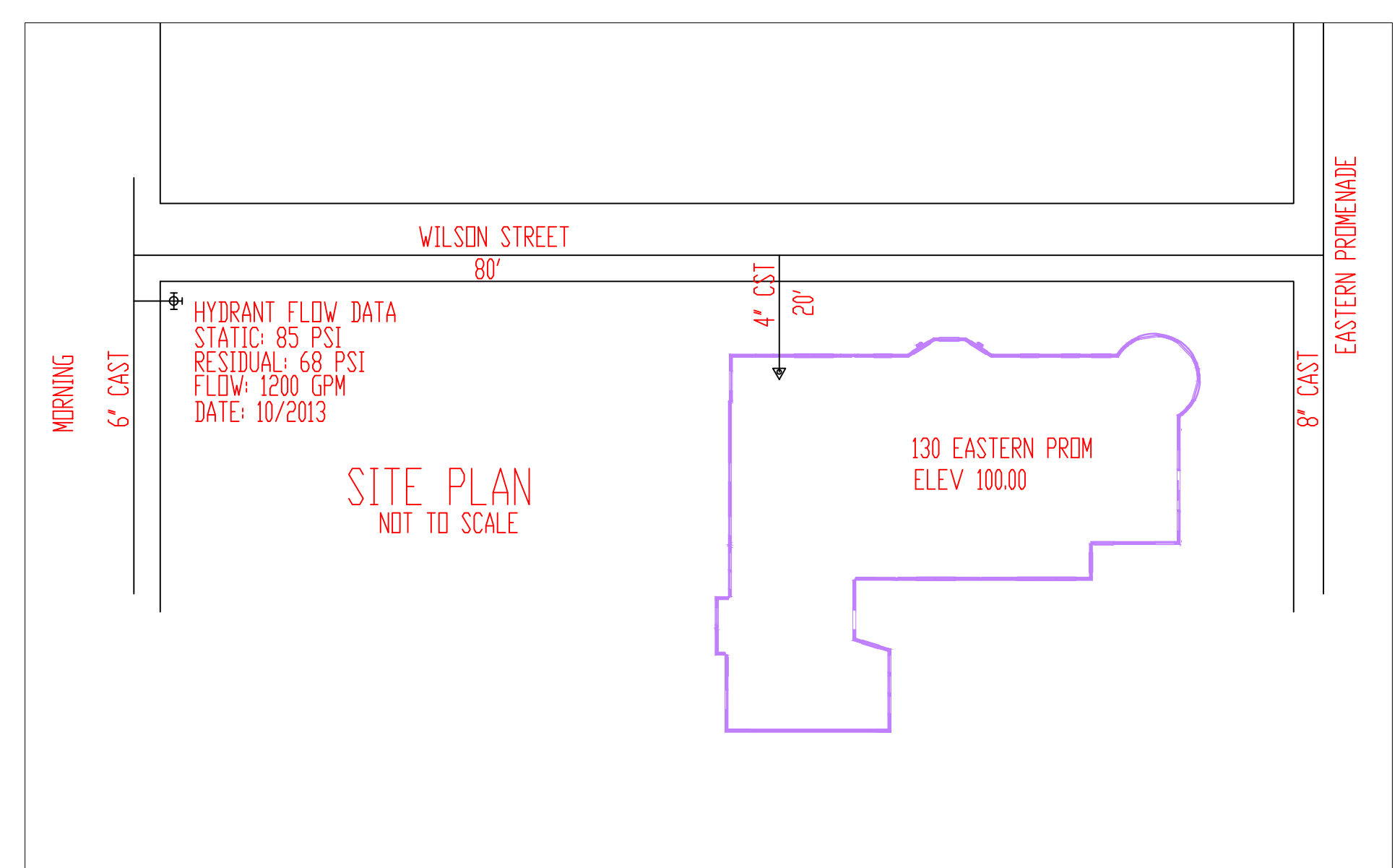
LEGEND

- UPRIGHT SPRINKLER ON A BRANCH LINE
- CONCEALED PENDENT SPRINKLER ON A 1" DROP RISE OR DROP
- GROOVED RIGID COUPLING
- XX HYDRAULIC REFERENCE POINT
- X'-X' CEILING HEIGHT HANGER
- F Q = X'-X" FINISHED FLOOR TO PIPE CENTERLINE
- TS Q = X'-X" TOP OF STEEL BEAM TO PIPE CENTERLINE
- BB Q = X'-X" BOTTOM OF BEAM TO PIPE CENTERLINE
- C Q = X'-X" CEILING TO PIPE CENTERLINE
- BEAM PENETRATIONS



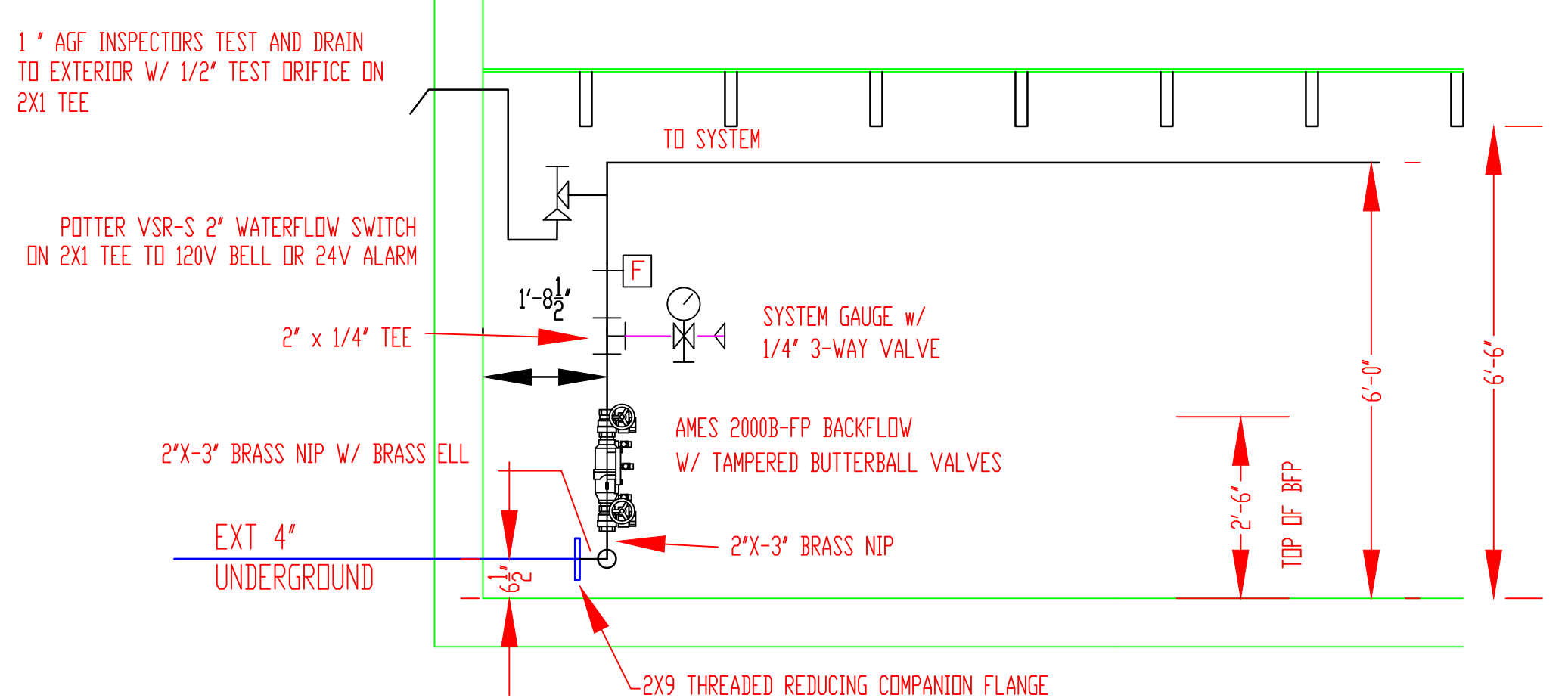
BUILDING SECTION
SCALE 1/4" = 1'-0"

ROOF SPACE: NO PROTECTION REQUIRED PER NFPA 13R. OWNER TO HAVE AREA MAINTAIN TEMPERATURE OF 40° MINIMUM TO PREVENT SPRINKLER PIPE FROM FREEZING.



SITE PLAN
NOT TO SCALE

HYDRANT FLOW DATA
 STATIC: 85 PSI
 RESIDUAL: 68 PSI
 FLOW: 1200 GPM
 DATE: 10/2013



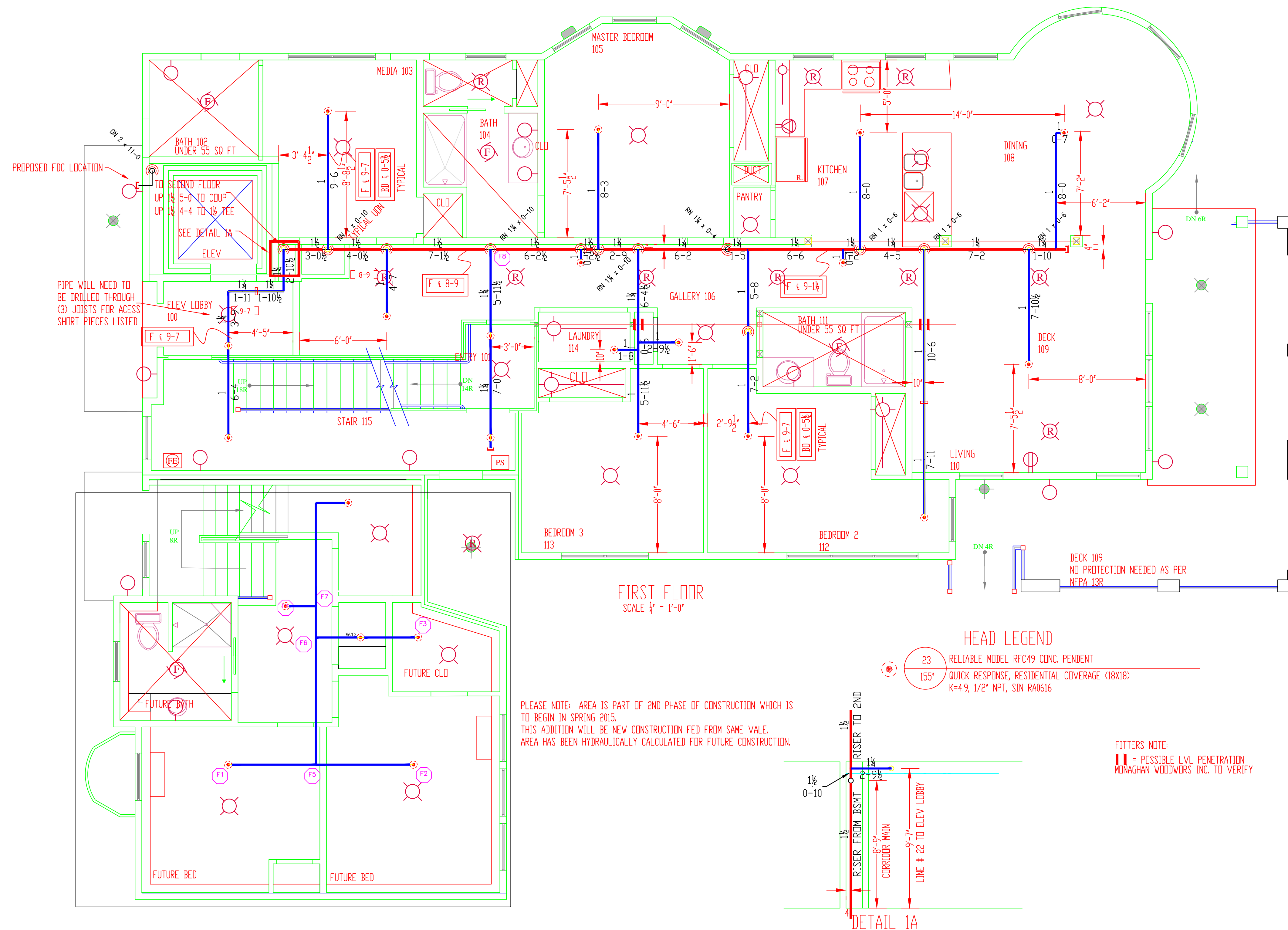
VALVE SECTION
1/2" = 1'-0"

1" AGF INSPECTORS TEST AND DRAIN TO EXTERIOR W/ 1/2" TEST DRIFICE ON 2X1 TEE

POTTER VSR-S 2" WATERFLOW SWITCH ON 2X1 TEE TO 120V BELL DR 24V ALARM

DEAN & ALLYN, INC.
 FIRE PROTECTION • SPECIAL HAZARD
 116 LEWISTON ROAD, GRAY, MAINE 04039
 (207)657-5646 FAX:(207)657-5647

	DANA A. STEWART NICET IV - #064544	DRAWING TITLE: SPRINKLER DETAILS/BASEMENT LAYOUT JOB: 130 EASTERN PROMENADE PORTLAND, MAINE	SUBMITTAL NO. OF SPRINKLERS SHOWN ON THIS SHEET: 20 NO. OF SPRINKLERS ON JOB: 83 CONTRACT NO.: C151255
APPROVED BY: [Signature] DATE: [Blank]	SURVEYED BY: [Blank] DRAWN BY: [Blank] CHECKED BY: [Blank]	JOB: [Blank]	NO. OF SPRINKLERS SHOWN ON THIS SHEET: 20 NO. OF SPRINKLERS ON JOB: 83 CONTRACT NO.: C151255
REVISIONS: [Blank]	DATE: [Blank]	CONTRACT WITH: [Blank]	SHEET NO. 1 OF 3

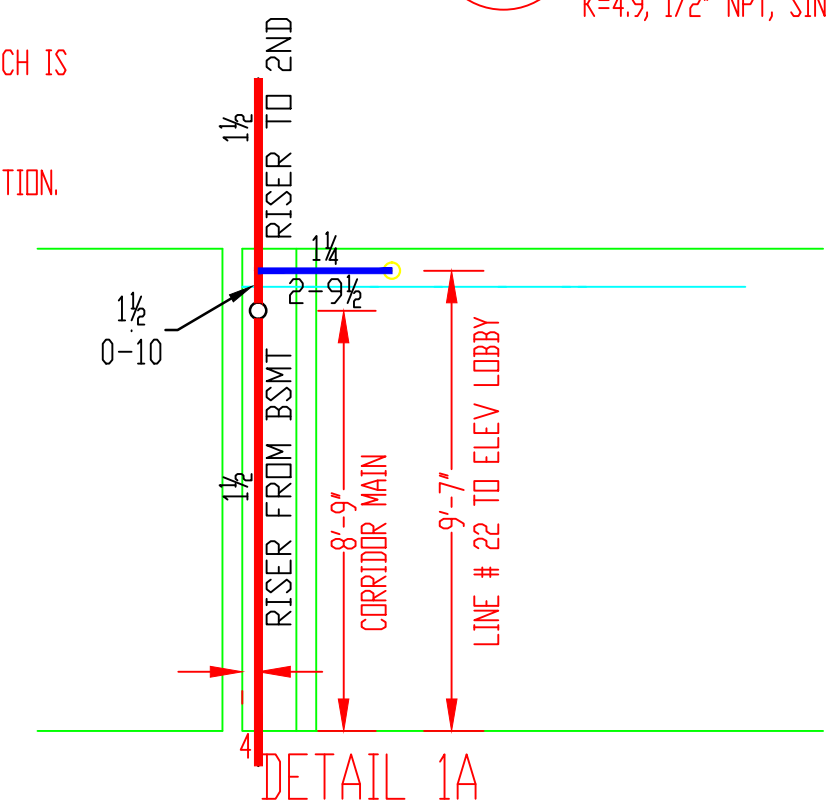


FIRST FLOOR
SCALE 1/4" = 1'-0"

HEAD LEGEND

- 23 RELIABLE MODEL RFC49 CONC. PENDENT
- 155* QUICK RESPONSE, RESIDENTIAL COVERAGE (18X18)
K=4.9, 1/2" NPT, SIN RA0616

PLEASE NOTE: AREA IS PART OF 2ND PHASE OF CONSTRUCTION WHICH IS TO BEGIN IN SPRING 2015. THIS ADDITION WILL BE NEW CONSTRUCTION FED FROM SAME VALE. AREA HAS BEEN HYDRAULICALLY CALCULATED FOR FUTURE CONSTRUCTION.

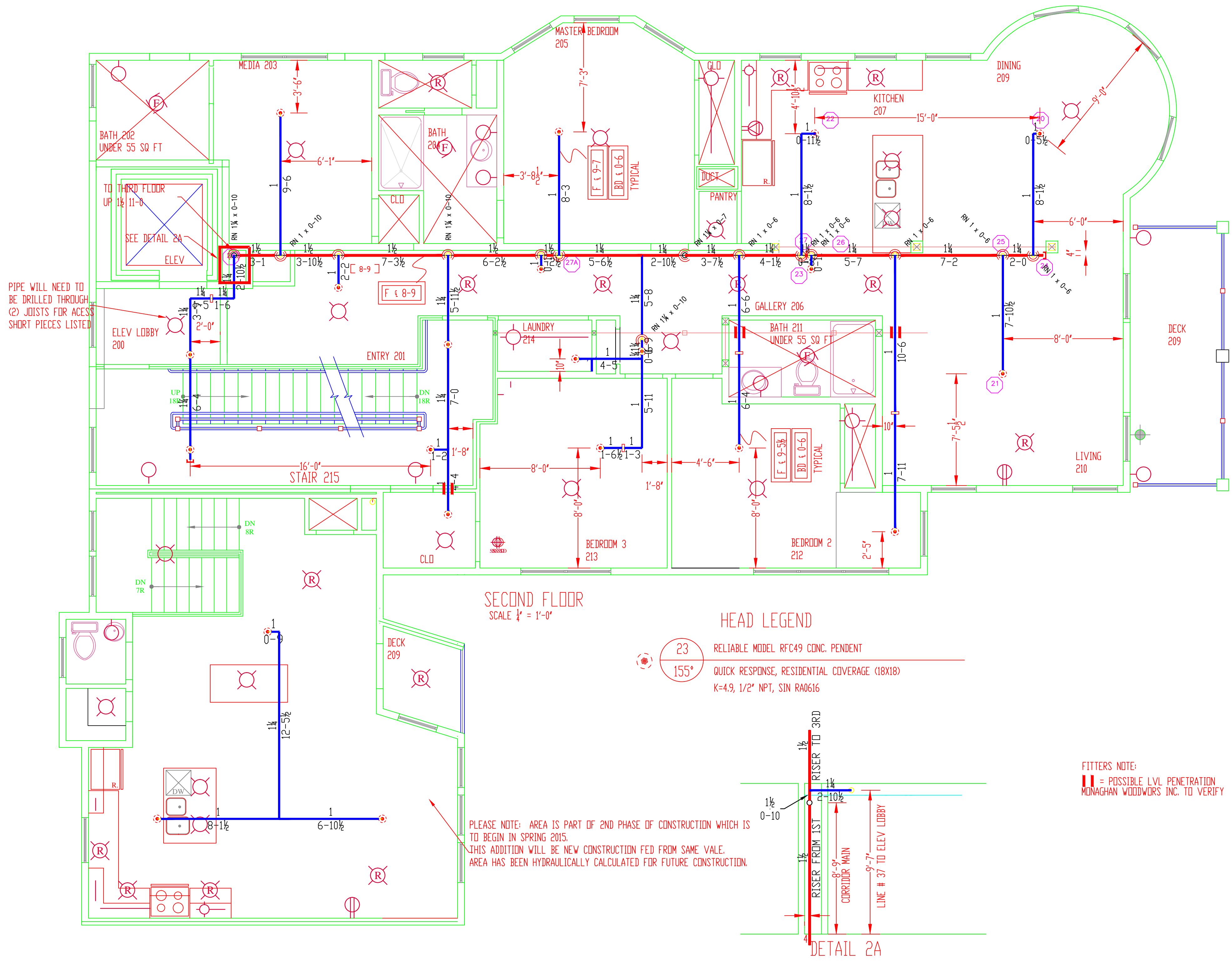


FITTERS NOTE:
|| = POSSIBLE LVL PENETRATION
MONAGHAN WOODWARDS INC. TO VERIFY

DEAN & ALLYN, INC.

FIRE PROTECTION • SPECIAL HAZARD
116 LEWISTON ROAD, GRAY, MAINE 04039
(207)657-5646 FAX:(207)657-5647

		DANA A. STEWART NICET IV - #064544		DRAWING TITLE: SPRINKLER LAYOUT FIRST FLOOR SUBMITTAL	
APPROVED BY	DATE	SURVEYED BY	SEC	DATE	JOB: 130 EASTERN PROMENADE PORTLAND, MAINE
		DRAWN BY	SEC	DATE	NO. OF SPRINKLERS SHOWN ON THIS SHEET: 22 NO. OF SPRINKLERS ON JOB: 83 CONTRACT NO.: C151255
		CHECKED BY	DAS	3/1/15	
		AT DEAN & ALLYN, INC			CONTRACT WITH:
		SCALE	AS NOTED		
		SHEET NO.	1 OF 3		
REVISIONS	DATE				
① SUBMIT FOR APPROVAL	2/27/15				



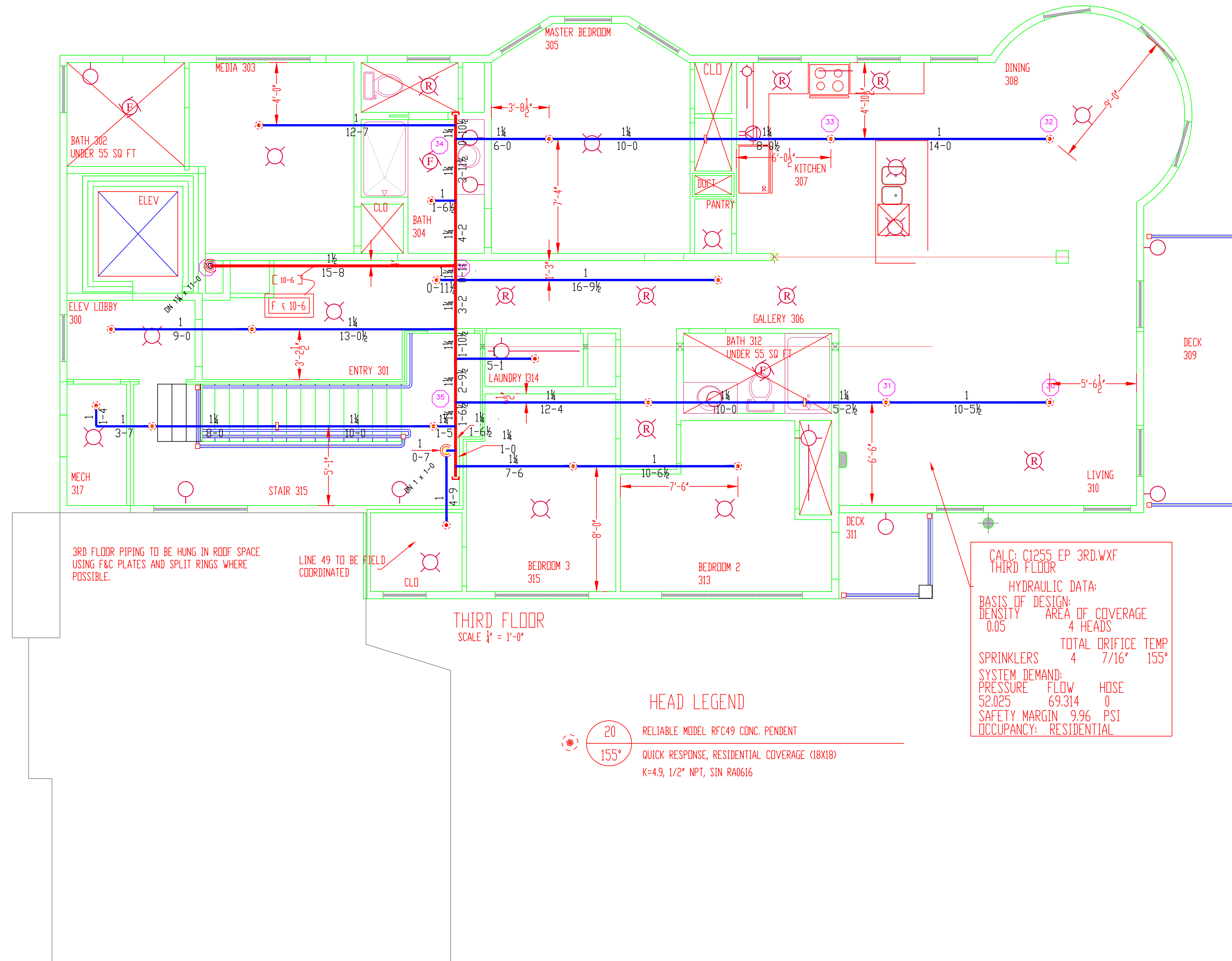
PIPE WILL NEED TO BE DRILLED THROUGH (2) JOISTS FOR ACCESS SHORT PIECES LISTED

PLEASE NOTE: AREA IS PART OF 2ND PHASE OF CONSTRUCTION WHICH IS TO BEGIN IN SPRING 2015. THIS ADDITION WILL BE NEW CONSTRUCTION FED FROM SAME VALE. AREA HAS BEEN HYDRAULICALLY CALCULATED FOR FUTURE CONSTRUCTION.

FITTERS NOTE:
 ■ = POSSIBLE LVL PENETRATION
 MONAGHAN WOODWORKS INC. TO VERIFY

DEAN & ALLYN, INC.
 FIRE PROTECTION • SPECIAL HAZARD
 116 LEWISTON ROAD, GRAY, MAINE 04039
 (207)657-5646 FAX:(207)657-5647

								DANA A. STEWART NICET IV - #064544		DRAWING TITLE: SPRINKLER LAYOUT SECOND FLOOR JOB: 130 EASTERN PROMENADE PORTLAND, MAINE		SUBMITTAL NO. OF SPRINKLERS SHOWN ON THIS SHEET: 22 NO. OF SPRINKLERS ON JOB: 83 CONTRACT NO.: C151255	
						APPROVED BY		DATE		SURVEYED BY		NO. OF SPRINKLERS SHOWN ON THIS SHEET	
										SEC 2/24/15		22	
										SEC 2/24/15		NO. OF SPRINKLERS ON JOB	
										DAS 3/1/15		83	
										AT DEAN & ALLYN, INC		CONTRACT WITH:	
										SCALE AS NOTED			
										SHEET NO. 1 OF 3			
										REVISIONS			
										DATE			



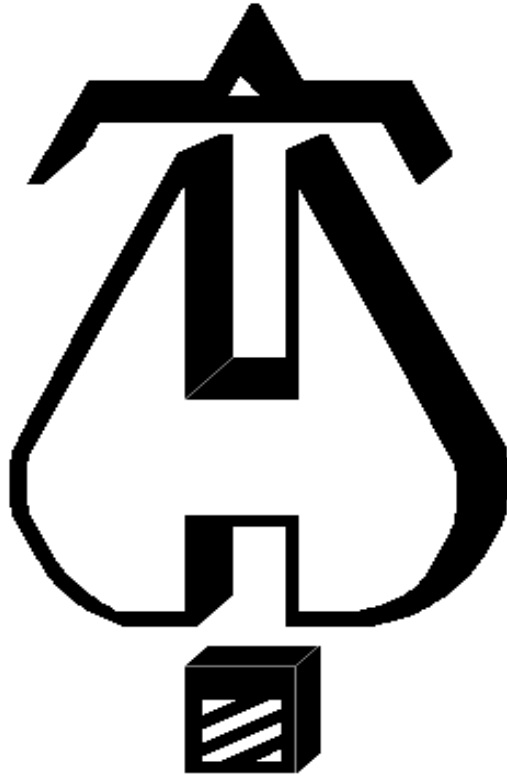
THIRD FLOOR
SCALE 1/4" = 1'-0"

HEAD LEGEND
 20 RELIABLE MODEL RFC49 CONC. PENDENT
 155° QUICK RESPONSE, RESIDENTIAL COVERAGE (18X18)
 K=4.9, 1/2" NPT, SIN RA0616

CALC: C1255 EP 3RD.WXF
 THIRD FLOOR
 HYDRAULIC DATA:
 BASIS OF DESIGN:
 DENSITY 0.05 AREA OF COVERAGE 4 HEADS
 TOTAL ORIFICE TEMP 4 7/16" 155°
 SPRINKLERS
 SYSTEM DEMAND: PRESSURE 52.025 FLOW 69.314 HOSE 0
 SAFETY MARGIN 9.96 PSI
 OCCUPANCY: RESIDENTIAL

DEAN & ALLYN, INC.
 FIRE PROTECTION • SPECIAL HAZARD
 116 LEWISTON ROAD, GRAY, MAINE 04039
 (207)657-5646 FAX:(207)657-5647

		DANA A. STEWART NICET IV - #064544		DRAWING TITLE: SPRINKLER LAYOUT THIRD FLOOR JOB: 130 EASTERN PROMENADE PORTLAND, MAINE		SUBMITTAL	
APPROVED BY: // DATE: //		SURVEYED BY: // SEC: 2/24/15 DRAWN BY: // SEC: 2/24/15 CHECKED BY: DAS 3/1/15		NO. OF SPRINKLERS SHOWN ON THIS SHEET: 19 NO. OF SPRINKLERS ON JOB: 83		CONTRACT NO.: C151255	
REVISIONS: (O) SUBMIT FOR APPROVAL 2/27/15		SCALE AS NOTED SHEET NO. 1 OF 3		CONTRACT WITH:		CONTRACT NO.: C151255	



... Fire Protection by Computer Design

Dean and Allyn Inc
116 Lewiston Road
Gray ME, 04039
(207)657-5646

Job Name : 130 EASTERN PROM
Building : BASEMENT
Location : PORTLAND MAINE
System : WET
Contract : C1255
Data File : C1255 EP BSMT.WXF

Hydraulic Design Information Sheet

Name - 130 EASTERN PROM Date - 2/14/15
 Location - PORTLAND MAINE
 Building - BASEMENT System No. - WET
 Contractor - DEAN AND ALLYN INC Contract No. - C1255
 Calculated By - S. COTE Drawing No. - 1 OF 4
 Construction: (X) Combustible () Non-Combustible Ceiling Height - 6'6
 Occupancy - ORDINARY I

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 - 1040 System Type Sprinkler/Nozzle
 Density - .15 (X) Wet Make RELIABLE
 D Area Per Sprinkler - 130 () Dry Model F1FR-56
 E Elevation at Highest Outlet - 6' () Deluge Size 1/2"
 S Hose Allowance - Inside - () Preaction K-Factor 5.6
 I Rack Sprinkler Allowance - () Other Temp.Rat.155
 G Hose Allowance - Outside - 250

N Note

Calculation Flow Required - Press Required -
 Summary C-Factor Used: 120 Overhead 140 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:
 A Date of Test - 4/22/2008 Cap. -
 T Time of Test - Rated Cap.- Elev.-
 E Static Press - 62 @ Press -
 R Residual Press - 58 Elev. - Well
 Flow - 1298 Proof Flow
 S Elevation -

U Location -

P
 L Source of Information -
 Y

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:

Fittings Used Summary

Dean and Allyn Inc
130 EASTERN PROM

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Date 2/24/15

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Zaa	Ames 2000B	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

Dean and Allyn Inc
130 EASTERN PROM

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Date 2/24/15

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	6.333	5.6	15.24	na	21.86	0.15	115	7.0
2	6.333		17.0	na				
3	6.333	5.6	18.77	na	24.26	0.15	115	7.0
4	6.333	5.6	20.49	na	25.35	0.15	130	7.0
5	6.333	5.6	9.49	na	17.25	0.15	115	7.0
6	6.333	5.6	10.63	na	18.26	0.15	115	7.0
7	6.333	5.6	14.95	na	21.66	0.15	115	7.0
8	6.333	5.6	17.52	na	23.44	0.15	108	7.0
9	6.333	5.6	13.33	na	20.45	0.15	130	7.0
10	6.333	5.6	14.96	na	21.66	0.15	130	7.0
11	6.333		21.15	na				
12	6.333		22.77	na				
23	6.333		24.41	na				
22	6.333		25.52	na				
21	6.333		25.55	na				
20	6.333		26.92	na				
TR	6.333		33.24	na				
BR	6.333		38.96	na				
UG	6.333		47.26	na				
TEST	11.0		46.62	na				

The maximum velocity is 18.57 and it occurs in the pipe between nodes 20 and TR

Final Calculations - Hazen-Williams

Dean and Allyn Inc
130 EASTERN PROM

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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	*****
1	21.86	1.049		0.0	11.500	15.239				
to		120.0		0.0	0.0	0.0			K Factor = 5.60	
2	21.86	0.1534		0.0	11.500	1.764			Vel = 8.12	
2	0.0	1.049		0.0	11.500	17.003				
to		120.0		0.0	0.0	0.0				
3	21.86	0.1534		0.0	11.500	1.764			Vel = 8.12	
3	24.26	1.38		0.0	10.750	18.767			K Factor = 5.60	
to		120.0		0.0	0.0	0.0				
4	46.12	0.1606		0.0	10.750	1.726			Vel = 9.89	
4	25.35	1.38	T	6.0	11.791	20.493			K Factor = 5.60	
to		120.0		0.0	6.000	0.0				
20	71.47	0.3611		0.0	17.791	6.424			Vel = 15.33	
	0.0									
	71.47					26.917			K Factor = 13.78	
5	17.25	1.049		0.0	11.500	9.489			K Factor = 5.60	
to		120.0		0.0	0.0	0.0				
6	17.25	0.0990		0.0	11.500	1.138			Vel = 6.40	
6	18.26	1.049		0.0	11.500	10.627			K Factor = 5.60	
to		120.0		0.0	0.0	0.0				
7	35.51	0.3763		0.0	11.500	4.327			Vel = 13.18	
7	21.65	1.38		0.0	10.750	14.954			K Factor = 5.60	
to		120.0		0.0	0.0	0.0				
8	57.16	0.2389		0.0	10.750	2.568			Vel = 12.26	
8	23.44	1.38	T	6.0	11.791	17.522			K Factor = 5.60	
to		120.0		0.0	6.000	0.0				
21	80.6	0.4510		0.0	17.791	8.023			Vel = 17.29	
	0.0									
	80.60					25.545			K Factor = 15.95	
9	20.45	1.049		0.0	12.000	13.330			K Factor = 5.60	
to		120.0		0.0	0.0	0.0				
10	20.45	0.1356		0.0	12.000	1.627			Vel = 7.59	
10	21.65	1.049		0.0	12.000	14.957			K Factor = 5.60	
to		120.0		0.0	0.0	0.0				
11	42.1	0.5158		0.0	12.000	6.189			Vel = 15.63	
11	0.0	1.38		0.0	12.000	21.146				
to		120.0		0.0	0.0	0.0				
12	42.1	0.1357		0.0	12.000	1.628			Vel = 9.03	
12	0.0	1.38	T	6.0	6.041	22.774				
to		120.0		0.0	6.000	0.0				
23	42.1	0.1356		0.0	12.041	1.633			Vel = 9.03	
	0.0									
	42.10					24.407			K Factor = 8.52	
23	42.10	1.61	T	8.0	9.333	24.407				
to		120.0		0.0	8.000	0.0				
22	42.1	0.0640		0.0	17.333	1.110			Vel = 6.63	
22	0.0	2.067		0.0	1.500	25.517				
to		120.0		0.0	0.0	0.0				
21	42.1	0.0187		0.0	1.500	0.028			Vel = 4.03	

Final Calculations - Hazen-Williams

Dean and Allyn Inc
130 EASTERN PROM

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Date 2/24/15

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
21 to 20	80.60 122.7	2.067 120.0 0.1372		0.0 0.0 0.0	10.000 0.0 10.000	25.545 0.0 1.372			Vel = 11.73	
20 to TR	71.48 194.18	2.067 120.0 0.3207	2E	10.0 0.0 0.0	9.708 10.000 19.708	26.917 0.0 6.321			Vel = 18.57	
TR to BR	0.0 194.18	2.067 120.0 0.3207	E Fsp	5.0 0.0 0.0	3.500 5.000 8.500	33.238 3.000 2.726		** Fixed Loss = 3	Vel = 18.57	
BR to UG	0.0 194.18	2.067 120.0 0.3205	Zaa	0.0 0.0 0.0	2.000 0.0 2.000	38.964 7.657 0.641		** Fixed Loss = 7.657	Vel = 18.57	
UG to TEST	0.0 194.18	4.1 140.0 0.0086	2E T G	29.067 29.067 2.907	100.000 61.041 161.041	47.262 -2.021 1.382			Vel = 4.72	
	0.0 194.18					46.623			K Factor = 28.44	

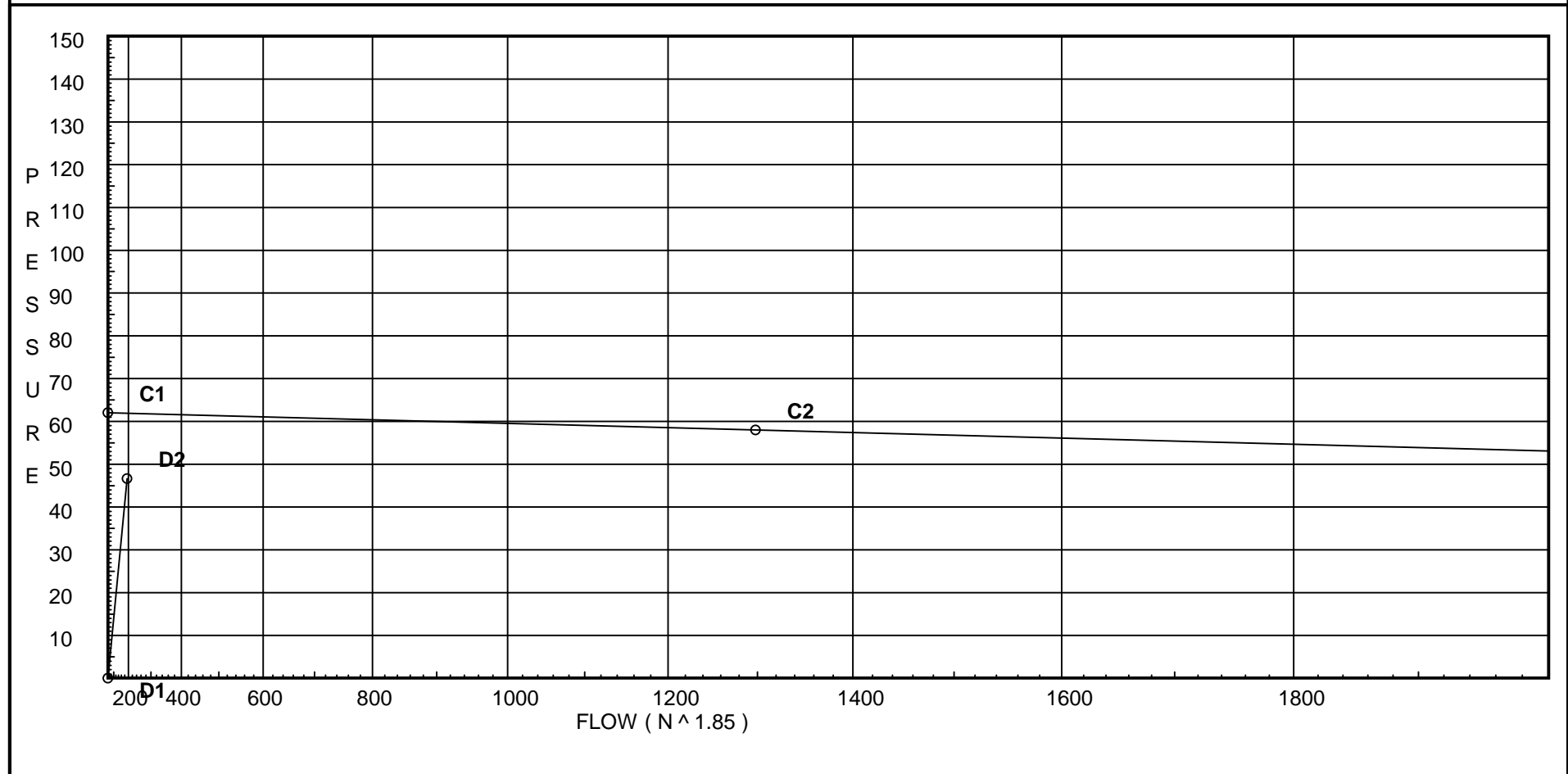
Water Supply Curve C

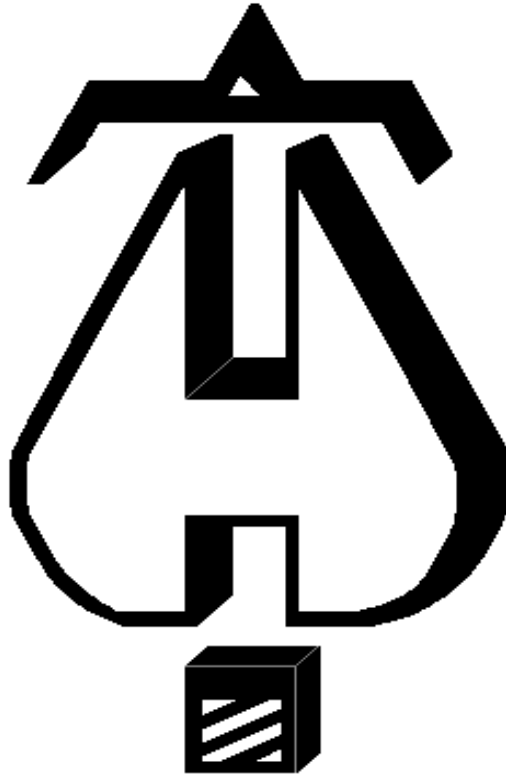
Dean and Allyn Inc
130 EASTERN PROM

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Date 2/24/15

City Water Supply:
C1 - Static Pressure : 62
C2 - Residual Pressure: 58
C2 - Residual Flow : 1298

Demand:
D1 - Elevation : -2.021
D2 - System Flow : 194.176
D2 - System Pressure : 46.623
Hose (Demand) :
D3 - System Demand : 194.176
Safety Margin : 15.258





... Fire Protection by Computer Design

Dean and Allyn Inc
116 Lewiston Road
Gray ME, 04039
(207)657-5646

Job Name : 130 EASTERN PROM
Building : THIRD
Location : PORTLAND MAINE
System : WET
Contract : C1255
Data File : C1255 EP 3RD.WXF

Hydraulic Design Information Sheet

Name - 130 EASTERN PROM Date - 2/14/15
 Location - PORTLAND MAINE
 Building - THIRD System No. - WET
 Contractor - DEAN AND ALLYN INC Contract No. - C1255
 Calculated By - S. COTE Drawing No. - 4 OF 4
 Construction: (X) Combustible () Non-Combustible Ceiling Height - 9'2"
 Occupancy - RESIDENTIAL

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

S Other NFPA 13R
 T Specific Ruling

Made By Date

M	Area of Sprinkler Operation	- 4 HEADS	System Type	Sprinkler/Nozzle
	Density	- .05	(X) Wet	Make RELIABLE
D	Area Per Sprinkler	- 324	() Dry	Model F1FR-RFC49
E	Elevation at Highest Outlet	- 9'2"	() Deluge	Size 1/2"
S	Hose Allowance - Inside	-	() Preaction	K-Factor 4.9
I	Rack Sprinkler Allowance	-	() Other	Temp.Rat.155
G	Hose Allowance - Outside	-		

N Note

Calculation Flow Required - 69.314 Press Required - 52.025
 Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 4/22/2008		Cap. -
T	Time of Test -	Rated Cap.-	Elev.-
E	Static Press - 62	@ Press -	
R	Residual Press - 58	Elev. -	Well
	Flow - 1298		Proof Flow
S	Elevation -		

U Location -

P
 L Source of Information -
 Y

C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method:	%	Palletized % Rack
M	() 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

G
 E Horizontal Barriers Provided:

Fittings Used Summary

Dean and Allyn Inc
130 EASTERN PROM

Page 2
Date 2/24/15

Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Zaa	Ames 2000B	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.
30A	137.52	4.9	12.17	na	17.09	0.05	187	12.0
31A	137.52	4.9	12.86	na	17.57	0.05	176	12.0
32A	137.52	4.9	12.0	na	16.97	0.05	236	12.0
33A	137.52	4.9	13.01	na	17.67	0.05	236	12.0
30	138.812		11.95	na				
31	138.812		12.97	na				
32	138.812		11.78	na				
33	138.812		13.12	na				
34	138.812		14.83	na				
35	138.812		14.75	na				
36	138.812		16.25	na				
37	138.812		19.41	na				
24	106.729		39.24	na				
22	106.729		43.22	na				
21	106.729		43.29	na				
20	106.729		43.77	na				
TR	106.729		44.71	na				
BR	106.729		48.11	na				
UG	106.729		53.98	na				
TEST	111.729		52.02	na				

The maximum velocity is 10.92 and it occurs in the pipe between nodes 36 and 37

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	*****
30A to 30	17.09 17.09	1.049 120.0 0.0974	E	2.0 0.0 0.0	1.500 2.000 3.500	12.170 -0.560 0.341			K Factor = 4.90	
	0.0 17.09						11.951		K Factor = 4.94	
31A to 31	17.57 17.57	1.049 120.0 0.1025	T	5.0 0.0 0.0	1.500 5.000 6.500	12.862 -0.560 0.666			K Factor = 4.90	
	0.0 17.57						12.968		K Factor = 4.88	
32A to 32	16.97 16.97	1.049 120.0 0.0963	E	2.0 0.0 0.0	1.500 2.000 3.500	12.000 -0.560 0.337			K Factor = 4.90	
	0.0 16.97						11.777		K Factor = 4.94	
33A to 33	17.67 17.67	1.049 120.0 0.1037	T	5.0 0.0 0.0	1.500 5.000 6.500	13.008 -0.560 0.674			K Factor = 4.90	
	0.0 17.67						13.122		K Factor = 4.88	
30 to 31	17.09 17.09	1.049 120.0 0.0972		0.0 0.0 0.0	10.458 0.0 10.458	11.951 0.0 1.017				Vel = 6.34
31 to 35	17.58 34.67	1.38 120.0 0.0947	T	6.0 0.0 0.0	12.791 6.000 18.791	12.968 0.0 1.780				Vel = 7.44
	0.0 34.67						14.748		K Factor = 9.03	
32 to 33	16.97 16.97	1.049 120.0 0.0961		0.0 0.0 0.0	14.000 0.0 14.000	11.777 0.0 1.345				Vel = 6.30
33 to 34	17.68 34.65	1.38 120.0 0.0946		0.0 0.0 0.0	18.041 0.0 18.041	13.122 0.0 1.706				Vel = 7.43
34 to 36	0.0 34.65	1.38 120.0 0.0946	T	6.0 0.0 0.0	9.000 6.000 15.000	14.828 0.0 1.419				Vel = 7.43
	0.0 34.65						16.247		K Factor = 8.60	
35 to 36	34.67 34.67	1.38 120.0 0.0947	T	6.0 0.0 0.0	9.833 6.000 15.833	14.748 0.0 1.499				Vel = 7.44
36 to 37	34.64 69.31	1.61 120.0 0.1610	E	4.0 0.0 0.0	15.625 4.000 19.625	16.247 0.0 3.160				Vel = 10.92
	0.0 69.31						19.407		K Factor = 15.73	

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	*****
37	69.31	1.61	E	4.0	32.875	19.407				
to		120.0		0.0	4.000	13.895				
24	69.31	0.1611		0.0	36.875	5.939		Vel = 10.92		
24	0.0	1.61	E	4.0	12.708	39.241				
to		120.0	T	8.0	12.000	0.0				
22	69.31	0.1610		0.0	24.708	3.979		Vel = 10.92		
22	0.0	2.067		0.0	1.500	43.220				
to		120.0		0.0	0.0	0.0				
21	69.31	0.0473		0.0	1.500	0.071		Vel = 6.63		
21	0.0	2.067		0.0	10.000	43.291				
to		120.0		0.0	0.0	0.0				
20	69.31	0.0477		0.0	10.000	0.477		Vel = 6.63		
20	0.0	2.067	2E	10.0	9.708	43.768				
to		120.0		0.0	10.000	0.0				
TR	69.31	0.0477		0.0	19.708	0.940		Vel = 6.63		
TR	0.0	2.067	E	5.0	3.500	44.708				
to		120.0	Fsp	0.0	5.000	3.000		** Fixed Loss = 3		
BR	69.31	0.0476		0.0	8.500	0.405		Vel = 6.63		
BR	0.0	2.067	Zaa	0.0	2.000	48.113				
to		120.0		0.0	0.0	5.776		** Fixed Loss = 5.776		
UG	69.31	0.0480		0.0	2.000	0.096		Vel = 6.63		
UG	0.0	4.1	2E	29.067	100.000	53.985				
to		140.0	T	29.067	61.041	-2.166				
TEST	69.31	0.0013	G	2.907	161.041	0.206		Vel = 1.68		
	0.0									
	69.31					52.025		K Factor = 9.61		

Water Supply Curve C

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City Water Supply:

C1 - Static Pressure : 62
C2 - Residual Pressure: 58
C2 - Residual Flow : 1298

Demand:

D1 - Elevation : 11.170
D2 - System Flow : 69.314
D2 - System Pressure : 52.025
Hose (Demand) : _____
D3 - System Demand : 69.314
Safety Margin : 9.957

