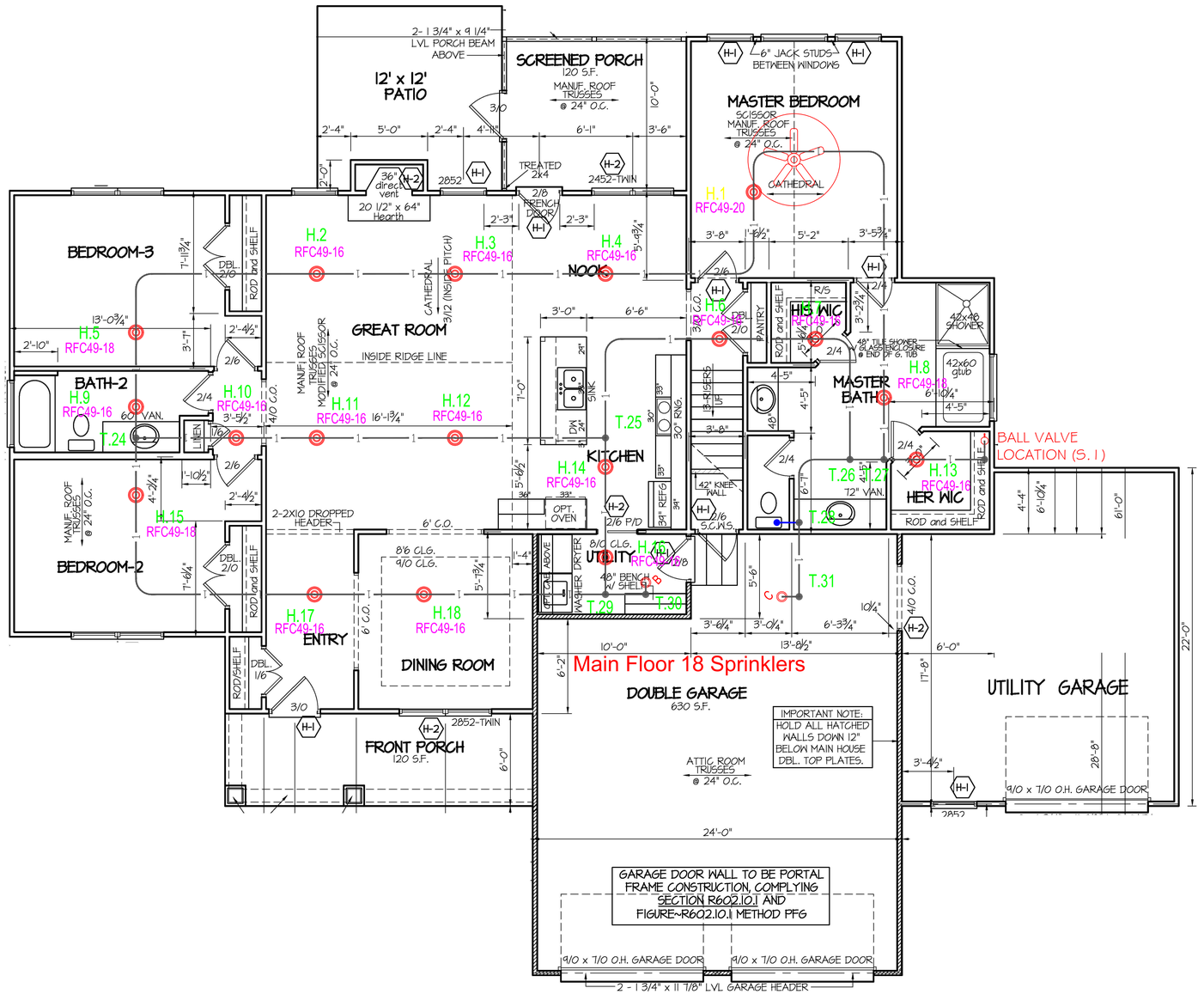
RFC49-20 - - - 1
RELIABLE Model RFC49Concealed Pendent Spr FP
K=4.9, 155F°, 7/16" Orifice, Maximum Spacing 20'x20'
Sprinkler head demand: 20 gpm @ 16.7

RFC49-16 - - - 19
RELIABLE Model RFC49Concealed Pendent Spr FP
K=4.9, 155F°, 7/16" Orifice, Maximum Spacing 16'x16'
Sprinkler head demand: 13 gpm @ 7.04

RFC49-18 - - - 3
RELIABLE Model RFC49Concealed Pendent Spr FP
K=4.9, 155F°, 7/16" Orifice, Maximum Spacing 18'x18'
Sprinkler head demand: 17 gpm @ 12.03

SPRINKLER DESCRIPTIONS

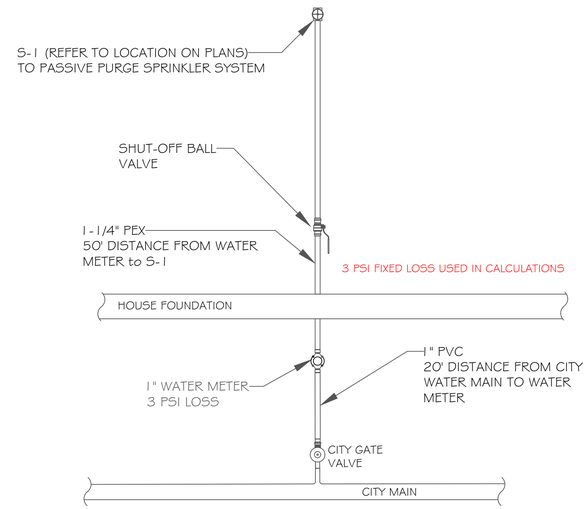


Most Demanding Single Head Information	
Information	Results
Flow Required at Head (GPM):	20
Source Pressure at Head (PSI):	16.7
Maximum Spacing (length):	20
Maximum Spacing (Width):	20
Domestic Flow Added (GPM):	0
Sprinkler Model:	RFC49
Elevation of Highest Head:	109
K-Factor	4.9
Temperature Rating:	155
Flow Required at Source (GPM)	20
Pressure Required at Source (psi)	40.79
Source Reference Point:	At Ref Pt STR
C-Factor of Sprinkler Pipe	150
C-Factor of Service Line	150
Head Reference Point:	H.1

Most Demanding Two Head Information	
Information	Results
Flow Required at Head (GPM):	13
Source Pressure at Head (PSI):	7.04
Maximum Spacing (length):	16
Maximum Spacing (Width):	16
Domestic Flow Added (GPM):	0
Sprinkler Model:	RFC49
Elevation of Highest Head:	118
K-Factor	4.9
Temperature Rating:	155
Flow Required at Source (GPM)	26.0075
Pressure Required at Source (psi)	49.37
Source Reference Point:	At Ref Pt STR
C-Factor of Sprinkler Pipe	150
C-Factor of Service Line	150
Head Reference Point:	H.23 & H.22

LEGEND

	Manifold
A	Inter Level Connection
irAB1+	Hot Water Fixture
irAB1+	Cold Water Fixture
	Type K Copper w/ ProPress Fittings
	Type L Copper w/ ProPress Fittings
	Type M Copper w/ ProPress Fittings
	ViegaPEX Ultra Black
	ViegaPEX Ultra Blue - Cold Plumbing
	ViegaPEX Ultra Red - Hot Plumbing



FLOW AT SOURCE: 168 GPM
SUPPLY STATIC PRESSURE: 71 PSI
RESIDUAL PRESSURE: 20 PSI
SUPPLY ELEVATION: -2'

WATER SERVICE DETAIL

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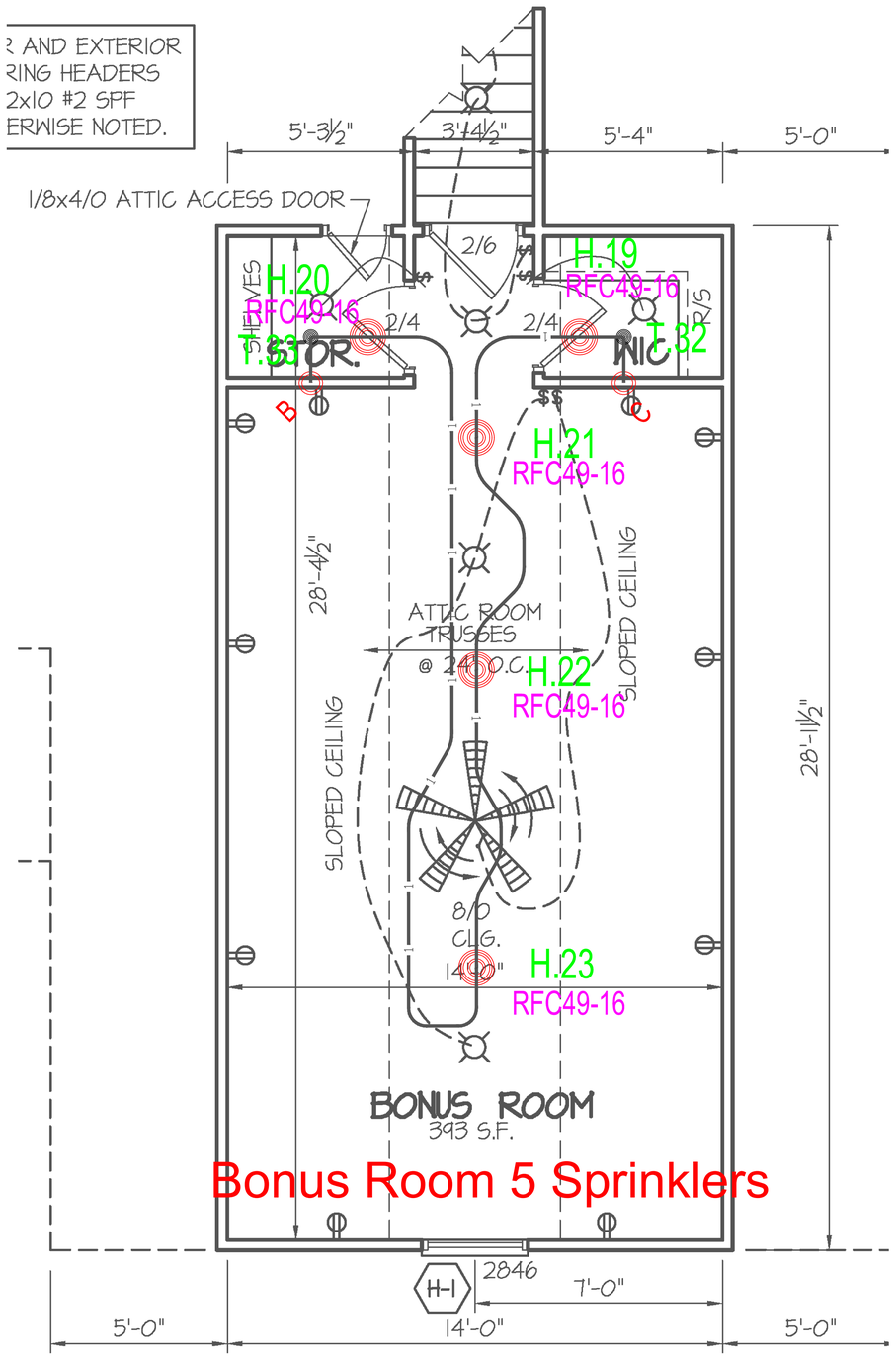
Design Services Department
1900 Southwood Drive - Nashua, NH 03063
Tel: 877-843-4262 x 351 Fax: 316-425-8466

Project:
182 OAKHAVEN DRIVE
HOLLY SPRINGS, NC 27540

Dwg no.:
FP 1 OF 3

Title:
MAIN FLOOR PLAN

Quotation no.:	FPNM2102-006 NC
Drawn by:	N.M.
Approv. by:	
Date Submitted:	02/10/2021
Scale:	1/4" = 1'
Revision No:	Revision Date:



Design Services Department
1900 Southwood Drive - Nashua, NH 03063
Tel: 877-843-4262 x 351 Fax: 316-425-8466

Project:
182 OAKHAVEN DRIVE
HOLLY SPRINGS, NC 27540

Dwg no.:
FP 2 OF 3

Title:
BONUS ROOM PLAN

Quotation no.:	FPNM2102-006 NC
Drawn by:	N.M.
Approv. by:	
Date Submitted:	02/10/2021
Scale:	1/2" = 1'
Revision No:	Revision Date:

FIRE PROTECTION INSTALLATION NOTES:

1. INSTALLATION OF THE FIRE PROTECTION SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE 2016 EDITION OF NFPA 13D OR SECTION P2904 OF THE 2018 INTERNATIONAL RESIDENTIAL CODE (IRC). NFPA 13D IS THE STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS IN ONE- AND TWO-FAMILY DWELLINGS AND MANUFACTURED HOMES.
2. INSTALLATION OF THE FIRE PROTECTION SYSTEM SHALL COMPLY WITH ALL LOCAL RESIDENTIAL FIRE PROTECTION CODES AND ALL APPLICABLE STATE REGULATIONS.
3. SPRINKLER HEADS SHALL MEET ALL GENERAL CARE AND INSTALLATION REQUIREMENTS OF THE SPRINKLER MANUFACTURER. SUBSTITUTION OF SPRINKLER HEADS IS NOT PERMITTED.
4. AFTER INSTALLATION OF THE SPRINKLERS, THE ENTIRE SYSTEM SHALL BE PRESSURE TESTED IN ACCORDANCE WITH STATE AND LOCAL CODE REQUIREMENTS.
5. SPRINKLERS SHALL BE LOCATED PER THE LAYOUT. DO NOT INSTALL SPRINKLERS IN AREAS EXPOSED TO TEMPERATURES THAT EXCEED THE MAXIMUM RECOMMENDED AMBIENT TEMPERATURE FOR THE TEMPERATURE RATING USED. MINIMUM DISTANCE OF SPRINKLER HEADS FROM HEAT SOURCES SHALL COMPLY WITH TABLE 7.5.6.3 IN THE 2016 EDITION OF NFPA 13D, INSTALLATION OF SPRINKLER SYSTEMS IN ONE - AND TWO - FAMILY DWELLINGS AND MANUFACTURED HOMES.
6. NO DEVIATIONS FROM THE PLAN SHALL BE ALLOWED WITHOUT APPROVAL FROM THE AUTHORITY HAVING JURISDICTION AND DESIGNER.
7. PIPING AND SPRINKLER FITTINGS SHALL BE SUPPORTED IN COMPLIANCE WITH LOCAL PLUMBING CODE AND THE 2016 EDITION OF NFPA 13D, INSTALLATION OF SPRINKLER SYSTEMS IN ONE - AND TWO - FAMILY DWELLINGS AND MANUFACTURED HOMES.
8. SMOKE DETECTORS SHALL BE INSTALLED IN ACCORDANCE WITH NFPA 72, NATIONAL FIRE ALARM CODE. WHEN NOT EQUIPPED WITH SMOKE DETECTORS, LOCAL WATERFLOW ALARMS SHALL BE REQUIRED.
9. WATER SOFTENERS AND WATER FILTRATION DEVICES SHALL NOT BE INSTALLED IN THE SYSTEM WITHOUT A REVIEW OF THE HYDRAULIC CALCULATIONS OF THE SYSTEM.
10. A SIGN SHALL BE AFFIXED ADJACENT TO THE MAIN SHUTOFF VALVE THAT STATES IN MINIMUM 1/4" LETTERS, "WARNING: THE WATER SYSTEM FOR THIS HOME SUPPLIES FIRE SPRINKLERS THAT REQUIRE CERTAIN FLOWS AND PRESSURES TO FIGHT A FIRE. DEVICES THAT RESTRICT THE FLOW OR DECREASE THE PRESSURE OR AUTOMATICALLY SHUT OFF THE WATER TO THE FIRE SPRINKLER SYSTEM, SUCH AS WATER SOFTENERS, FILTRATION SYSTEMS, AND AUTOMATIC SHUT-OFF VALVES, SHALL NOT BE ADDED TO THIS SYSTEM WITHOUT A REVIEW OF THE FIRE SPRINKLER SYSTEM BY A FIRE PROTECTION SPECIALIST. DO NOT REMOVE THIS SIGN."
11. ALL PIPING AND FITTINGS SHALL BE PROPERLY INSULATED AND PROTECTED SO THAT THEY ARE NOT EXPOSED TO TEMPERATURES BELOW 40° F.
12. WHEN THE MAXIMUM STATIC PRESSURE EXCEEDS 80 PSI, A PRESSURE-REDUCING VALVE SHALL BE INSTALLED. NFPA 13D RESTRICTS THE OPERATING PRESSURE OF PEX SYSTEMS TO 80 PSI. PRESSURE DROP THROUGH THE PRESSURE-REDUCING DEVICE SHALL BE INCLUDED IN THE HYDRAULIC CALCULATIONS.
13. WHEN A FIRE DEPARTMENT CONNECTION IS REQUIRED, PEX TUBING SHALL NOT BE PERMITTED. CONSULT WITH THE AUTHORITY HAVING JURISDICTION (AHJ) ABOUT THIS REQUIREMENT PRIOR TO INSTALLATION.

PLUMBING INSTALLATION NOTES:

1. INSTALLATION OF HOT AND COLD WATER DISTRIBUTION SYSTEMS SHALL BE IN ACCORDANCE WITH THE LOCAL PLUMBING CODE.
2. WATER SOFTENERS AND WATER FILTRATION DEVICES SHALL NOT BE INSTALLED WITHOUT A REVIEW OF THE HYDRAULIC CALCULATIONS OF THE SYSTEM.
3. FINAL APPROVAL OF MULTIPURPOSE AND PASSIVE PURGE FIRE SPRINKLER INSTALLATIONS SHALL BE FROM THE AUTHORITY HAVING JURISDICTION.

TESTING:

1. EVERY VIEGA NFPA 13D FIRE PROTECTION INSTALLATION SHALL BE PRESSURE TESTED IN ACCORDANCE WITH NFPA 13D, WHICH STATES THAT SYSTEMS WITHOUT FIRE DEPARTMENT CONNECTIONS SHALL BE TESTED FOR LEAKAGE AT THE NORMAL SYSTEM OPERATING WATER PRESSURE.
2. THE AUTHORITY HAVING JURISDICTION (AHJ) MAY REQUIRE A FLOW VERIFICATION TEST OF THE MOST HYDRAULICALLY REMOTE SPRINKLER HEAD(S). THIS FLOW VERIFICATION TEST IS AVAILABLE TO ENSURE THE INSTALLED FIRE PROTECTION SYSTEM OPERATES AS DESIGNED. DOCUMENTATION ON HOW TO PERFORM A FLOW VERIFICATION TEST IS AVAILABLE THROUGH VIEGA TECHNICAL SERVICES.
3. THE FLOW VERIFICATION TEST SHALL BE PERFORMED AFTER ALL PIPING, FITTINGS, SPRINKLER HEADS AND PLUMBING CONNECTIONS HAVE BEEN INSTALLED AND PRESSURE TESTING OF THE SYSTEM HAS BEEN COMPLETED. THE FLOW TEST SHOULD OCCUR WHILE IN THE "ROUGH" STAGE OF CONSTRUCTION. FLOW TEST RESULTS SHOULD BE COMPARED TO THE SYSTEM DESIGN VALUES. RESIDUAL PRESSURE (PSI) AND FLOW (GPM) MUST BE EQUAL TO OR GREATER THEN THE DESIGN VALUES TO ENSURE A PROPERLY FUNCTIONING SYSTEM.

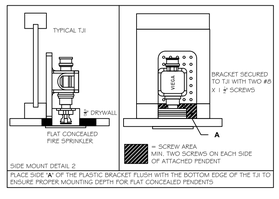
DRAWING AND DESIGN NOTES:

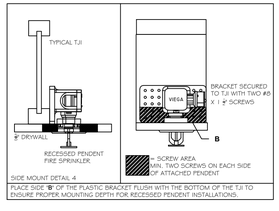
1. DESIGN SHALL ENSURE WATER SUPPLY TO THE MOST HYDRAULICALLY DEMANDING SINGLE AND DUAL SPRINKLER HEADS.
2. TUBING AND FITTINGS SHALL BE U.L. LISTED FOR RESIDENTIAL FIRE PROTECTION SYSTEMS IN ACCORDANCE WITH NFPA 13D.
3. VIEGAPEX ULTRA (BLACK IN COLOR) LISTED TO U.L. 1821 FOR RESIDENTIAL WET-PIPE FIRE PROTECTION SYSTEMS IN ACCORDANCE WITH NFPA 13D.
4. VIEGA PEX PRESS FITTINGS (POLYMER AND BRONZE) LISTED TO U.L. 1821 FOR RESIDENTIAL WET-PIPE FIRE PROTECTION SYSTEMS IN ACCORDANCE WITH NFPA 13D.
5. APPROVED SMOKE DETECTION SYSTEMS AND/OR WATER FLOW ALARMS SHALL BE INSTALLED WHERE REQUIRED BY THE AUTHORITY HAVING JURISDICTION (AHJ).

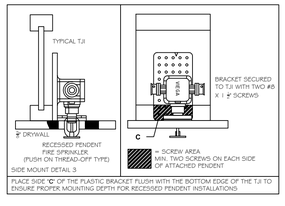
MATERIALS LIST NOTES:

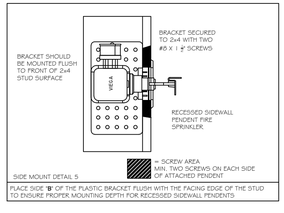
1. SERVICE ENTRANCE MATERIALS FROM WATER MAIN CONNECTION TO DISTRIBUTION MANIFOLD ARE EXCLUDED.
2. SPRINKLERS AND ASSOCIATED ESCUTCHEONS OR COVER PLATES ARE NOT SUPPLIED BY VIEGA.
3. MATERIAL LIST IS SUGGESTED ONLY. CONTRACTOR SHALL CONFIRM REQUIRED MATERIALS PRIOR TO PLACEMENT OF ORDER.

INSTALLATION NOTES









INSTALLATION DETAIL - SPRINKLER BRACKETS

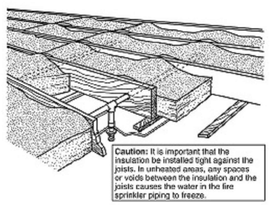


FIGURE A.9.1.1(a) Insulation Recommendations — Arrangement 1.

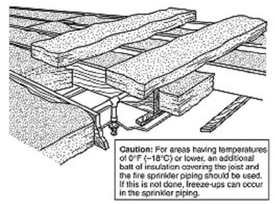


FIGURE A.9.1.1(b) Insulation Recommendations — Arrangement 2.

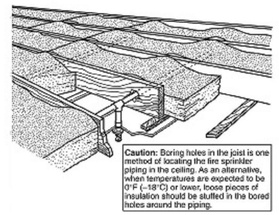


FIGURE A.9.1.1(c) Insulation Recommendations — Arrangement 3.

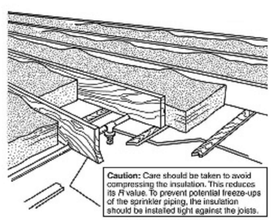


FIGURE A.9.1.1(d) Insulation Recommendations — Arrangement 4.

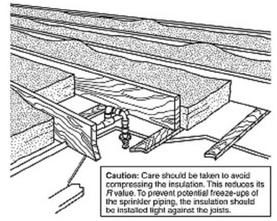


FIGURE A.9.1.1(e) Insulation Recommendations — Arrangement 5.

INSULATION DETAILS - ANNEX A.9.1.1 (NFPA 13D 2016)

WATER METER PRESSURE LOSSES (PSI) - TABLE 10.4.4(A) NFPA 13D (2016)						
Meter Size (in.)	Flow (gpm)					
	18 or less	23	26	31	39	52
5/8"	9	14	18	26	38	*
3/4"	7	11	14	22	35	*
1"	2	3	3	4	6	10
1-1/2"	1	1	2	2	4	7
2"	1	1	1	1	2	3

TABLE 10.4.4(a) (NFPA 13D 2016)

DISTANCES FROM HEAT SOURCES - TABLE 7.5.6.3 NFPA 13D (2016)		
Heat Source	Ordinary Temp. 135°-175°	Intermediate Temp. 175°-225°
Side of Fireplace	36"	12"
Front of Fireplace	60"	36"
Coal or Wood Burning Stove	42"	12"
Kitchen Range	18"	9"
Wall Oven	18"	9"
Hot Air Flues	18"	9"
Uninsulated Heat Ducts	18"	9"
Uninsulated Hot Water Pipes	12"	6"
Side of Hot Air Diffusers	24"	12"
Front of Hot Air Diffusers	36"	18"
Hot Water Heater or Furnace	6"	3"
Light Fixture 0 W - 250 W	6"	3"
Light Fixture 250 W - 499 W	12"	6"

TABLE 7.5.6.3 (NFPA 13D 2016)

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Design Services Department
1900 Southwood Drive - Nashua, NH 03063
Tel: 877-843-4262 x 351 Fax: 316-425-8466

Project:
182 OAKHAVEN DRIVE
HOLLY SPRINGS, NC 27540

Dwg no.:
FP 3 OF 3

Title:
NOTES & DETAILS

Quotation no.:	FPNM2102-006 NC
Drawn by:	N.M.
Approv. by:	
Date Submitted:	02/10/2021
Scale:	N/A
Revision No:	Revision Date:

Viega LLC
Technical Services Department
1900 Southwood Drive
Nashua, NH 03063
603-882-7171

Job Name : 182 OAKHAVEN DRIVE - One Head Calculation (H.1)
Building : SINGLE FAMILY RESIDENCE
Location : HOLLY SPRINGS NC 27540
System : NFPA 13D
Contract : FPNM2102-006 NC
Data File : FPNM2102-006 NC (182 Oakhaven Drive).wx1

HYDRAULIC DESIGN INFORMATION SHEET

Name - 182 OAKHAVEN DRIVE Date - 02/10/2021
Location -
Building - SINGLE FAMILY RESIDENCE System No. - NFPA 13D
Contractor - CUMBERLAND HOMES INC. Contract No. - FPNM2102-006 NC
Calculated By - VIEGA LLC Drawing No. - FPNM2102-006 NC
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height 9
OCCUPANCY - RESIDENTIAL

SYSTEM DESIGN

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

Listed Flow at Start Point - 20 Gpm System Type
Listed Pres. at Start Point - 16.7 Psi (X) Wet ( ) Dry
MAXIMUM LISTED SPACING 20 x 20 ( ) Deluge ( ) PreAction
Domestic Flow Added - 0 Gpm Sprinkler or Nozzle
Additional Flow Added - Gpm Make RELIABLE Model RFC49
Elevation at Highest Outlet - 109 Feet Size 7/16 K-Factor 4.9
Note: Temperature Rating 155

Calculation Summary: Gpm Required 20 Psi Required 40.79 At Ref Pt STR
C-Factor Used: Overhead 150 Underground 150

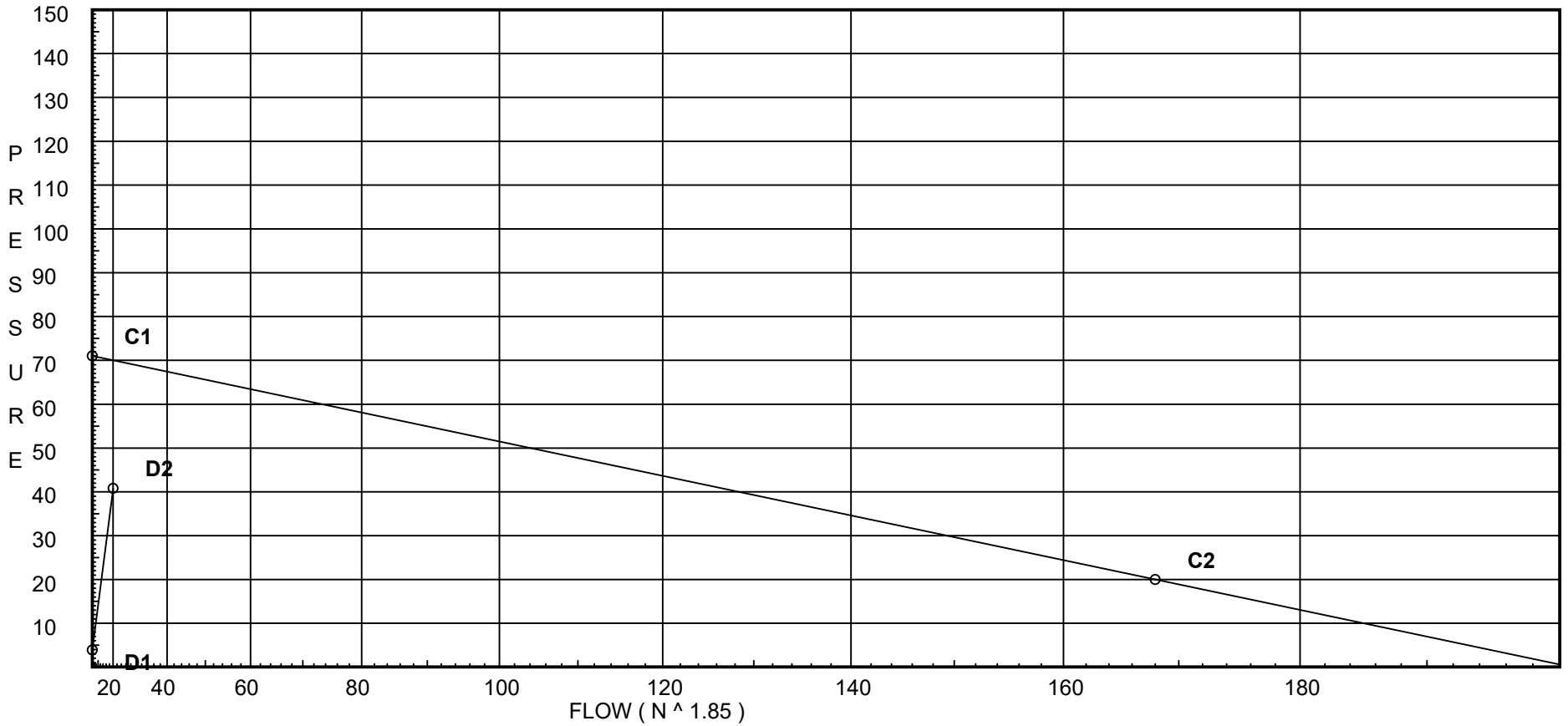
Water Flow Test:		Pump Data:	Tank or Reservoir:
Date of Test	- x	Rated Cap.	Cap.
Time of Test	- x	@ Psi	Elev.
Static (Psi)	- 71	Elev.	
Residual (Psi)	- 20	Other	Well
Flow (Gpm)	- 168		Proof Flow Gpm
Elevation	- 100		

Location: x

Source of Information: x

City Water Supply:
- C1 - Static Pressure : 71
- C2 - Residual Pressure: 20
- C2 - Residual Flow : 168

Demand:
- D1 - Elevation : 3.898
- D2 - System Flow : 20.024
- D2 - System Pressure : 40.786
- Hose (Demand) : _____
- D3 - System Demand : 20.024
- Safety Margin : 29.217



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G	Generic Gate Valve	1	1	1	1	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
T	90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Vpel *	PEX Press 90 Elbow - Poly	12.6	18.9	17.7	18.6	29.4	36.4	0	0	0											
Vprt *	PEX Press Tee - Run-Poly	3.9	3.6	3.8	6.4	7.9	10.2	0	0	0											
Vptb *	PEX Press Tee - Branch-Poly	14	19.1	18.4	18.7	28.3	37.5	0	0	0											

Units Summary

Diameter Units	Inches
Length Units	Feet
Flow Units	US Gallons per Minute
Pressure Units	Pounds per Square Inch

SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
STR	71.0	20	168.0	70.003	20.02	40.786

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes	
H.1	109.0	4.9	16.7	20.02	0.05	400
H.8	109.0		19.32			
T.27	109.0		21.42			
H.13	109.0		22.72			
S.1	98.0		31.44			
MTR	100.0		38.02			
STR	100.0		40.79			
H.4	109.0		17.41			
H.3	109.0		17.81			
H.2	109.0		18.31			
H.5	109.0		19.06			
H.9	109.0		19.37			
T.24	109.0		19.58			
H.10	109.0		19.83			
H.11	109.0		19.92			
H.12	109.0		20.04			
T.25	109.0		20.29			
H.6	109.0		20.58			
H.7	109.0		20.75			
T.26	109.0		21.22			
H.15	109.0		19.67			
H.17	109.0		19.95			
H.18	109.0		20.04			
T.29	109.0		20.23			
H.16	109.0		20.26			
H.14	109.0		20.28			
T.30	109.0		20.25			
T.33	118.0		16.6			
H.20	118.0		16.64			
H.23	118.0		16.78			
H.22	118.0		16.83			
H.21	118.0		16.89			
H.19	118.0		16.95			
T.32	118.0		16.97			
T.31	109.0		21.12			
T.28	109.0		21.15			

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
H.1	109	4.90	12.55	1	Vprt	3.8	24.000	150	16.700	
to							3.800		0.0	
H.8	109		12.55	0.863			27.800	0.0941	2.617	Vel = 6.88
H.8	109		0.0	1	Vptb	18.4	4.000	150	19.317	
to							18.400		0.0	
T.27	109		12.55	0.863			22.400	0.0941	2.108	Vel = 6.88
T.27	109		7.47	1	Vprt	3.8	2.000	150	21.425	
to							3.800		0.0	
H.13	109		20.02	0.863			5.800	0.2233	1.295	Vel = 10.98
H.13	109		0.0	1	Vprt	3.8	11.000	150	22.720	
to					T	2.92	6.720		4.764	
S.1	98		20.02	0.863			17.720	0.2233	3.957	Vel = 10.98
S.1	98		0.0	1.25	2E	2.429	50.000	150	31.441	
to							2.429		2.134	* * Fixed Loss = 3
MTR	100		20.02	1.053			52.429	0.0847	4.442	Vel = 7.38
MTR	100		0.0	1	E	3.022	20.000	150	38.017	
to					T	7.555	12.089		0.0	
STR	100		20.02	1.049	G	1.511	32.089	0.0863	2.769	Vel = 7.43
			0.0							
STR			20.02						40.786	K Factor = 3.13
H.1	109		7.47	1	Vprt	3.8	16.000	150	16.700	
to							3.800		0.0	
H.4	109		7.47	0.863			19.800	0.0361	0.714	Vel = 4.10
H.4	109		0.0	1			11.000	150	17.414	
to									0.0	
H.3	109		7.47	0.863			11.000	0.0360	0.396	Vel = 4.10
H.3	109		0.0	1	Vprt	3.8	10.000	150	17.810	
to							3.800		0.0	
H.2	109		7.47	0.863			13.800	0.0360	0.497	Vel = 4.10
H.2	109		0.0	1	Vprt	3.8	17.000	150	18.307	
to							3.800		0.0	
H.5	109		7.47	0.863			20.800	0.0361	0.750	Vel = 4.10
H.5	109		0.0	1	Vprt	3.8	5.000	150	19.057	
to							3.800		0.0	
H.9	109		7.47	0.863			8.800	0.0360	0.317	Vel = 4.10
H.9	109		0.0	1	Vprt	3.8	2.000	150	19.374	
to							3.800		0.0	
T.24	109		7.47	0.863			5.800	0.0360	0.209	Vel = 4.10
T.24	109		-4.03	1	Vptb	18.4	7.000	150	19.583	
to					Vprt	3.8	22.200		0.0	
H.10	109		3.44	0.863			29.200	0.0086	0.250	Vel = 1.89
H.10	109		0.0	1	Vprt	3.8	6.000	150	19.833	
to							3.800		0.0	
H.11	109		3.44	0.863			9.800	0.0086	0.084	Vel = 1.89
H.11	109		0.0	1	Vprt	3.8	10.000	150	19.917	
to							3.800		0.0	
H.12	109		3.44	0.863			13.800	0.0086	0.119	Vel = 1.89
H.12	109		0.0	1	Vptb	18.4	11.000	150	20.036	
to							18.400		0.0	
T.25	109		3.44	0.863			29.400	0.0086	0.252	Vel = 1.89

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
T.25	109		1.33	1	Vprt	3.8	15.000	150	20.288	
to							3.800		0.0	
H.6	109		4.77	0.863			18.800	0.0157	0.295	Vel = 2.62
H.6	109		0.0	1	Vprt	3.8	7.000	150	20.583	
to							3.800		0.0	
H.7	109		4.77	0.863			10.800	0.0157	0.170	Vel = 2.62
H.7	109		0.0	1	Vptb	18.4	11.000	150	20.753	
to							18.400		0.0	
T.26	109		4.77	0.863			29.400	0.0157	0.463	Vel = 2.62
T.26	109		2.70	1	Vprt	3.8	2.000	150	21.216	
to							3.800		0.0	
T.27	109		7.47	0.863			5.800	0.0360	0.209	Vel = 4.10
			0.0							
T.27			7.47						21.425	K Factor = 1.61
T.24	109		4.03	1	Vprt	3.8	4.000	150	19.583	
to							3.800		0.0	
H.15	109		4.03	0.863			7.800	0.0115	0.090	Vel = 2.21
H.15	109		0.0	1	Vprt	3.8	20.000	150	19.673	
to							3.800		0.0	
H.17	109		4.03	0.863			23.800	0.0115	0.274	Vel = 2.21
H.17	109		0.0	1			8.000	150	19.947	
to									0.0	
H.18	109		4.03	0.863			8.000	0.0115	0.092	Vel = 2.21
H.18	109		0.0	1	Vprt	3.8	13.000	150	20.039	
to							3.800		0.0	
T.29	109		4.03	0.863			16.800	0.0115	0.193	Vel = 2.21
T.29	109		-2.69	1	Vptb	18.4	3.000	150	20.232	
to							18.400		0.0	
H.16	109		1.34	0.863			21.400	0.0015	0.032	Vel = 0.73
H.16	109		0.0	1	Vprt	3.8	6.000	150	20.264	
to							3.800		0.0	
H.14	109		1.34	0.863			9.800	0.0015	0.015	Vel = 0.73
H.14	109		0.0	1	Vprt	3.8	2.000	150	20.279	
to							3.800		0.0	
T.25	109		1.34	0.863			5.800	0.0016	0.009	Vel = 0.73
			0.0							
T.25			1.34						20.288	K Factor = 0.30
T.29	109		2.70	1			3.000	150	20.232	
to									0.0	
T.30	109		2.7	0.863			3.000	0.0057	0.017	Vel = 1.48
T.30	109		0.0	1	2Vpel	35.4	11.000	150	20.249	
to							35.400		-3.898	
T.33	118		2.7	0.863			46.400	0.0055	0.254	Vel = 1.48
T.33	118		0.0	1	Vprt	3.8	2.000	150	16.605	
to							3.800		0.0	
H.20	118		2.7	0.863			5.800	0.0055	0.032	Vel = 1.48
H.20	118		0.0	1	Vprt	3.8	23.000	150	16.637	
to							3.800		0.0	
H.23	118		2.7	0.863			26.800	0.0055	0.147	Vel = 1.48

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*******	Notes	******
H.23	118		0.0	1			9.000	150	16.784			
to									0.0			
H.22	118		2.7	0.863			9.000	0.0054	0.049	Vel = 1.48		
H.22	118		0.0	1	Vprt	3.8	7.000	150	16.833			
to							3.800		0.0			
H.21	118		2.7	0.863			10.800	0.0055	0.059	Vel = 1.48		
H.21	118		0.0	1	Vprt	3.8	6.000	150	16.892			
to							3.800		0.0			
H.19	118		2.7	0.863			9.800	0.0055	0.054	Vel = 1.48		
H.19	118		0.0	1	Vprt	3.8	1.000	150	16.946			
to							3.800		0.0			
T.32	118		2.7	0.863			4.800	0.0054	0.026	Vel = 1.48		
T.32	118		0.0	1	2Vpel	35.4	11.000	150	16.972			
to							35.400		3.898			
T.31	109		2.7	0.863			46.400	0.0055	0.254	Vel = 1.48		
T.31	109		0.0	1			5.000	150	21.124			
to									0.0			
T.28	109		2.7	0.863			5.000	0.0054	0.027	Vel = 1.48		
T.28	109		0.0	1	Vprt	3.8	8.000	150	21.151			
to							3.800		0.0			
T.26	109		2.7	0.863			11.800	0.0055	0.065	Vel = 1.48		
			0.0									
T.26			2.70						21.216	K Factor = 0.59		

Viega LLC
Technical Services Department
1900 Southwood Drive
Nashua, NH 03063
603-882-7171

Job Name : 182 OAKHAVEN DRIVE - Two Head Calculation (H.23 & H.22)
Building : SINGLE FAMILY RESIDENCE
Location : HOLLY SPRINGS NC 27540
System : NFPA 13D
Contract : FPNM2102-006 NC
Data File : FPNM2102-006 NC (182 Oakhaven Drive).wx2

HYDRAULIC DESIGN INFORMATION SHEET

Name - 182 OAKHAVEN DRIVE Date - 02/10/2021
Location -
Building - SINGLE FAMILY RESIDENCE System No. - NFPA 13D
Contractor - CUMBERLAND HOMES INC. Contract No. - FPNM2102-006 NC
Calculated By - VIEGA LLC Drawing No. - FPNM2102-006 NC
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height 9
OCCUPANCY - RESIDENTIAL

SYSTEM DESIGN

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

Listed Flow at Start Point - 13 Gpm System Type
Listed Pres. at Start Point - 7.04 Psi (X) Wet ( ) Dry
MAXIMUM LISTED SPACING 16 x 16 ( ) Deluge ( ) PreAction
Domestic Flow Added - 0 Gpm Sprinkler or Nozzle
Additional Flow Added - Gpm Make RELIABLE Model RFC49
Elevation at Highest Outlet - 118 Feet Size 7/16 K-Factor 4.9
Note: Temperature Rating 155

Calculation Summary: Gpm Required 26.0075 Psi Required 49.37 At Ref Pt STR
C-Factor Used: Overhead 150 Underground 150

WATER SUPPLY

Water Flow Test:	Pump Data:	Tank or Reservoir:
Date of Test - x	Rated Cap.	Cap.
Time of Test - x	@ Psi	Elev.
Static (Psi) - 71	Elev.	
Residual (Psi) - 20	Other	Well
Flow (Gpm) - 168		Proof Flow Gpm
Elevation - 100		

PLAN

Location: x

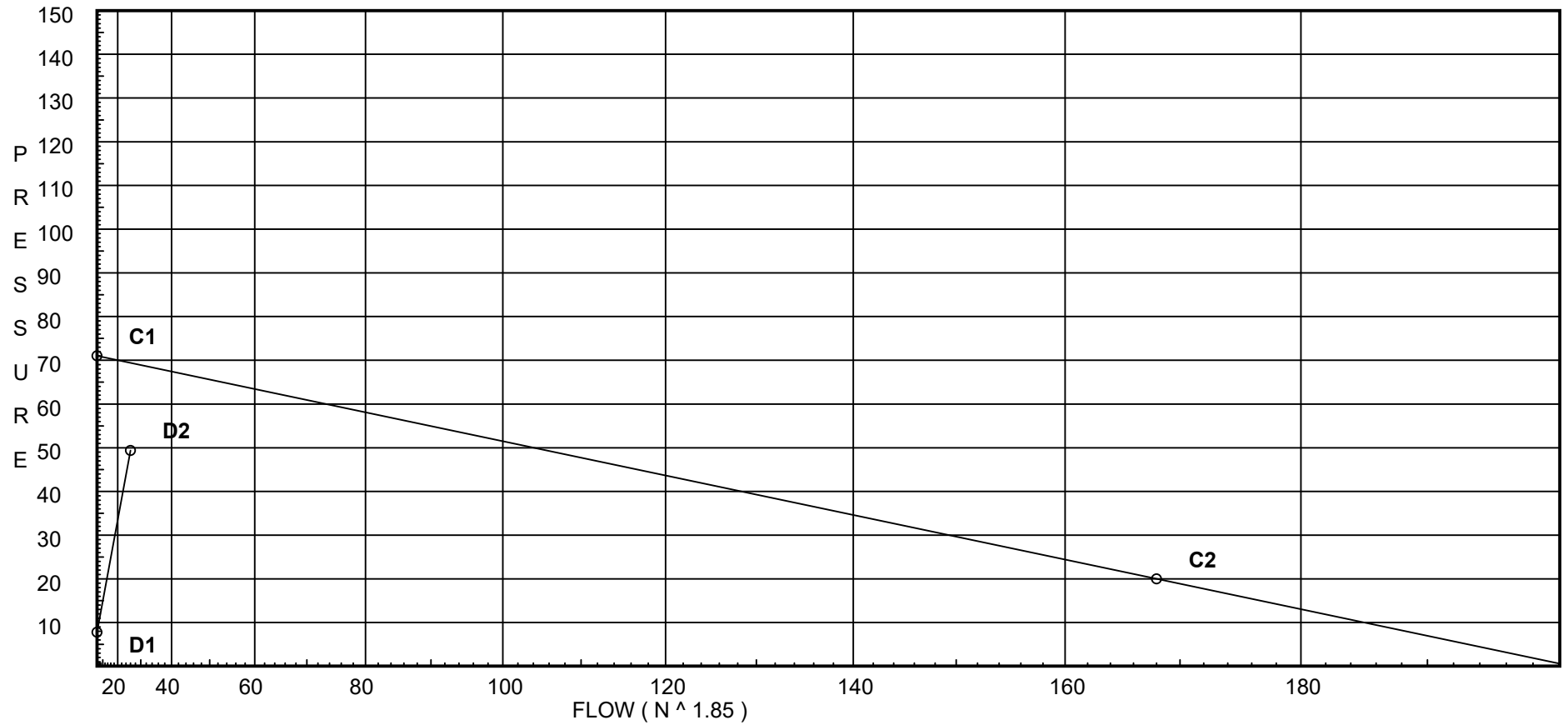
Source of Information: x

City Water Supply:

C1 - Static Pressure	**: 71**
C2 - Residual Pressure	**: 20**
C2 - Residual Flow	**: 168**

Demand:

D1 - Elevation	**: 7.796**
D2 - System Flow	**: 26.008**
D2 - System Pressure	**: 49.365**
Hose (Demand)	**: _____**
D3 - System Demand	**: 26.008**
Safety Margin	**: 20.018**



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G	Generic Gate Valve	1	1	1	1	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
T	90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Vpel *	PEX Press 90 Elbow - Poly	12.6	18.9	17.7	18.6	29.4	36.4	0	0	0											
Vprt *	PEX Press Tee - Run-Poly	3.9	3.6	3.8	6.4	7.9	10.2	0	0	0											
Vptb *	PEX Press Tee - Branch-Poly	14	19.1	18.4	18.7	28.3	37.5	0	0	0											

Units Summary

Diameter Units	Inches
Length Units	Feet
Flow Units	US Gallons per Minute
Pressure Units	Pounds per Square Inch

SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
STR	71.0	20	168.0	69.383	26.01	49.365

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes	
H.23	118.0	4.9	7.04	13.0	0.05	256
H.20	118.0		9.42			
T.33	118.0		9.94			
T.30	109.0		17.96			
T.29	109.0		18.23			
H.16	109.0		18.87			
H.14	109.0		19.16			
T.25	109.0		19.33			
H.6	109.0		19.84			
H.7	109.0		20.13			
T.26	109.0		20.93			
T.27	109.0		22.25			
H.13	109.0		24.35			
S.1	98.0		35.53			
MTR	100.0		44.87			
STR	100.0		49.36			
H.22	118.0	4.9	7.05	13.01	0.05	256
H.21	118.0		8.26			
H.19	118.0		9.37			
T.32	118.0		9.91			
T.31	109.0		19.04			
T.28	109.0		19.6			
H.18	109.0		18.56			
H.17	109.0		18.72			
H.15	109.0		19.19			
T.24	109.0		19.34			
H.9	109.0		19.47			
H.5	109.0		19.67			
H.2	109.0		20.13			
H.3	109.0		20.44			
H.4	109.0		20.69			
H.1	109.0		21.13			
H.8	109.0		21.75			
H.12	109.0		19.34			
H.11	109.0		19.34			
H.10	109.0		19.34			

Node1 / to / Node2	Elev1 / Elev2	K / Fact	Qa / Qt	Nom / Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact / Pf/Ft	Pt Pe Pf	******* Notes ******
H.23	118	4.90	12.17	1	Vprt	3.8	23.000	150	7.040	
to							3.800		0.0	
H.20	118		12.17	0.863			26.800	0.0889	2.382	Vel = 6.68
H.20	118		0.0	1	Vprt	3.8	2.000	150	9.422	
to							3.800		0.0	
T.33	118		12.17	0.863			5.800	0.0888	0.515	Vel = 6.68
T.33	118		0.0	1	2Vpel	35.4	11.000	150	9.937	
to							35.400		3.898	
T.30	109		12.17	0.863			46.400	0.0889	4.123	Vel = 6.68
T.30	109		0.0	1			3.000	150	17.958	
to									0.0	
T.29	109		12.17	0.863			3.000	0.0890	0.267	Vel = 6.68
T.29	109		-5.41	1	Vptb	18.4	3.000	150	18.225	
to							18.400		0.0	
H.16	109		6.76	0.863			21.400	0.0300	0.641	Vel = 3.71
H.16	109		0.0	1	Vprt	3.8	6.000	150	18.866	
to							3.800		0.0	
H.14	109		6.76	0.863			9.800	0.0299	0.293	Vel = 3.71
H.14	109		0.0	1	Vprt	3.8	2.000	150	19.159	
to							3.800		0.0	
T.25	109		6.76	0.863			5.800	0.0300	0.174	Vel = 3.71
T.25	109		-0.36	1	Vprt	3.8	15.000	150	19.333	
to							3.800		0.0	
H.6	109		6.4	0.863			18.800	0.0271	0.509	Vel = 3.51
H.6	109		0.0	1	Vprt	3.8	7.000	150	19.842	
to							3.800		0.0	
H.7	109		6.4	0.863			10.800	0.0270	0.292	Vel = 3.51
H.7	109		0.0	1	Vptb	18.4	11.000	150	20.134	
to							18.400		0.0	
T.26	109		6.4	0.863			29.400	0.0271	0.796	Vel = 3.51
T.26	109		13.84	1	Vprt	3.8	2.000	150	20.930	
to							3.800		0.0	
T.27	109		20.24	0.863			5.800	0.2278	1.321	Vel = 11.10
T.27	109		5.77	1	Vprt	3.8	2.000	150	22.251	
to							3.800		0.0	
H.13	109		26.01	0.863			5.800	0.3622	2.101	Vel = 14.27
H.13	109		0.0	1	Vprt	3.8	11.000	150	24.352	
to					T	2.92	6.720		4.764	
S.1	98		26.01	0.863			17.720	0.3622	6.418	Vel = 14.27
S.1	98		0.0	1.25	2E	2.429	50.000	150	35.534	
to							2.429		2.134	* * Fixed Loss = 3
MTR	100		26.01	1.053			52.429	0.1374	7.205	Vel = 9.58
MTR	100		0.0	1	E	3.022	20.000	150	44.873	
to					T	7.555	12.089		0.0	
STR	100		26.01	1.049	G	1.511	32.089	0.1400	4.492	Vel = 9.66
			0.0							
STR			26.01						49.365	K Factor = 3.70
H.23	118		0.83	1			9.000	150	7.040	
to									0.0	
H.22	118		0.83	0.863			9.000	0.0007	0.006	Vel = 0.46

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
H.22	118	4.90	13.01	1	Vprt	3.8	7.000	150	7.046	
to							3.800		0.0	
H.21	118		13.84	0.863			10.800	0.1127	1.217	Vel = 7.59
H.21	118		0.0	1	Vprt	3.8	6.000	150	8.263	
to							3.800		0.0	
H.19	118		13.84	0.863			9.800	0.1128	1.105	Vel = 7.59
H.19	118		0.0	1	Vprt	3.8	1.000	150	9.368	
to							3.800		0.0	
T.32	118		13.84	0.863			4.800	0.1127	0.541	Vel = 7.59
T.32	118		0.0	1	2Vpel	35.4	11.000	150	9.909	
to							35.400		3.898	
T.31	109		13.84	0.863			46.400	0.1127	5.230	Vel = 7.59
T.31	109		0.0	1			5.000	150	19.037	
to									0.0	
T.28	109		13.84	0.863			5.000	0.1126	0.563	Vel = 7.59
T.28	109		0.0	1	Vprt	3.8	8.000	150	19.600	
to							3.800		0.0	
T.26	109		13.84	0.863			11.800	0.1127	1.330	Vel = 7.59
			0.0							
T.26			13.84						20.930	K Factor = 3.03
T.29	109		5.41	1	Vprt	3.8	13.000	150	18.225	
to							3.800		0.0	
H.18	109		5.41	0.863			16.800	0.0198	0.333	Vel = 2.97
H.18	109		0.0	1			8.000	150	18.558	
to									0.0	
H.17	109		5.41	0.863			8.000	0.0199	0.159	Vel = 2.97
H.17	109		0.0	1	Vprt	3.8	20.000	150	18.717	
to							3.800		0.0	
H.15	109		5.41	0.863			23.800	0.0198	0.472	Vel = 2.97
H.15	109		0.0	1	Vprt	3.8	4.000	150	19.189	
to							3.800		0.0	
T.24	109		5.41	0.863			7.800	0.0199	0.155	Vel = 2.97
T.24	109		0.36	1	Vprt	3.8	2.000	150	19.344	
to							3.800		0.0	
H.9	109		5.77	0.863			5.800	0.0222	0.129	Vel = 3.16
H.9	109		0.0	1	Vprt	3.8	5.000	150	19.473	
to							3.800		0.0	
H.5	109		5.77	0.863			8.800	0.0224	0.197	Vel = 3.16
H.5	109		0.0	1	Vprt	3.8	17.000	150	19.670	
to							3.800		0.0	
H.2	109		5.77	0.863			20.800	0.0223	0.464	Vel = 3.16
H.2	109		0.0	1	Vprt	3.8	10.000	150	20.134	
to							3.800		0.0	
H.3	109		5.77	0.863			13.800	0.0223	0.308	Vel = 3.16
H.3	109		0.0	1			11.000	150	20.442	
to									0.0	
H.4	109		5.77	0.863			11.000	0.0224	0.246	Vel = 3.16
H.4	109		0.0	1	Vprt	3.8	16.000	150	20.688	
to							3.800		0.0	
H.1	109		5.77	0.863			19.800	0.0223	0.442	Vel = 3.16

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*******	Notes	******
H.1	109		0.0	1	Vprt	3.8	24.000	150	21.130			
to							3.800		0.0			
H.8	109		5.77	0.863			27.800	0.0223	0.621	Vel = 3.16		
H.8	109		0.0	1	Vptb	18.4	4.000	150	21.751			
to							18.400		0.0			
T.27	109		5.77	0.863			22.400	0.0223	0.500	Vel = 3.16		
			0.0									
T.27			5.77						22.251	K Factor = 1.22		
T.25	109		0.36	1	Vptb	18.4	11.000	150	19.333			
to							18.400		0.0			
H.12	109		0.36	0.863			29.400	0.0001	0.004	Vel = 0.20		
H.12	109		0.0	1	Vprt	3.8	10.000	150	19.337			
to							3.800		0.0			
H.11	109		0.36	0.863			13.800	0.0001	0.001	Vel = 0.20		
H.11	109		0.0	1	Vprt	3.8	6.000	150	19.338			
to							3.800		0.0			
H.10	109		0.36	0.863			9.800	0.0002	0.002	Vel = 0.20		
H.10	109		0.0	1	Vptb	18.4	7.000	150	19.340			
to					Vprt	3.8	22.200		0.0			
T.24	109		0.36	0.863			29.200	0.0001	0.004	Vel = 0.20		
			0.0									
T.24			0.36						19.344	K Factor = 0.08		