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

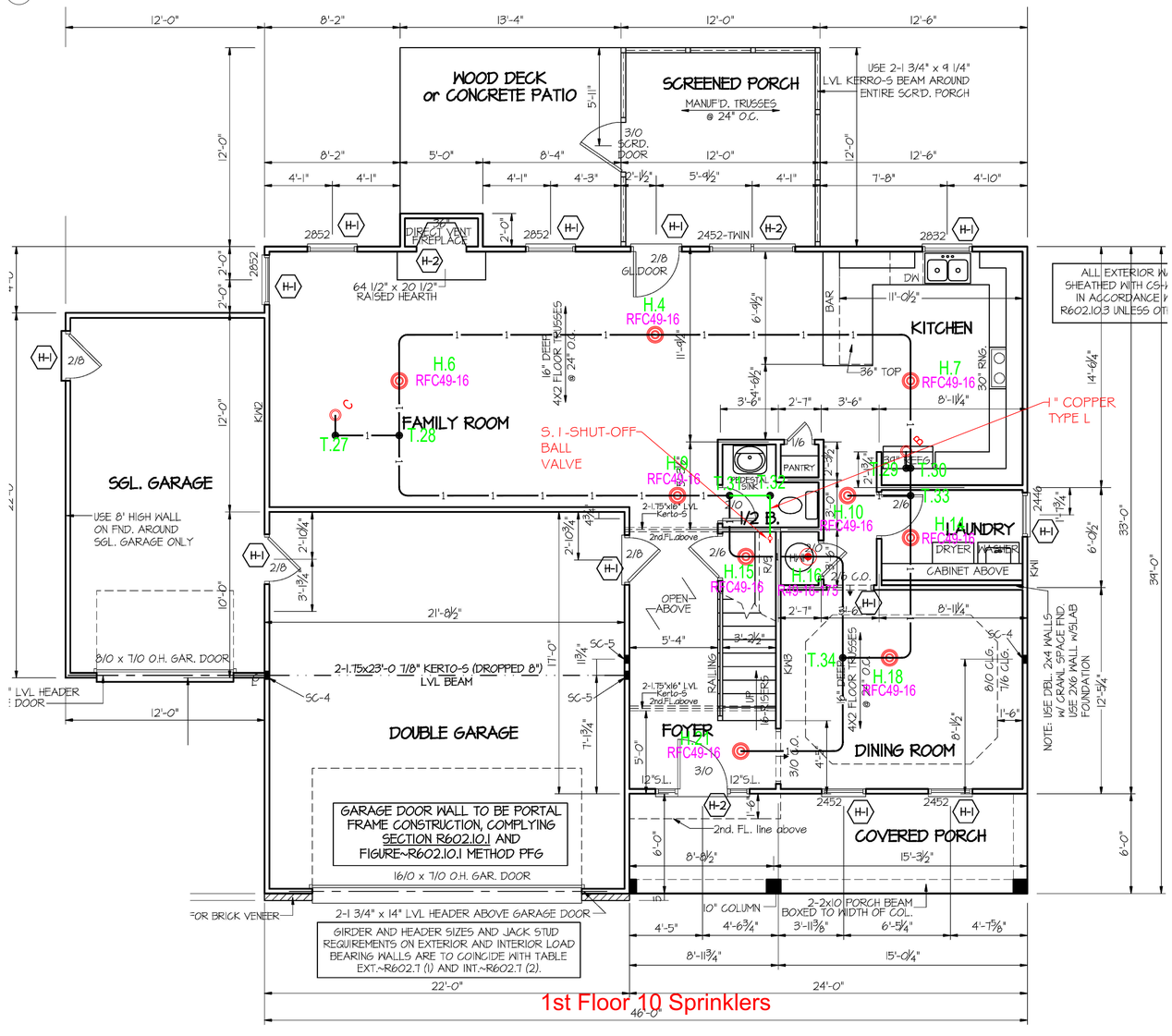
RFC49-18 — - - - 1

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

R49-16-175 — - - - 1

RELIABLE Model F1-R49-< Recess Pendent Spr 1-4 DN
K=4.9, 175F°, 7/16" Orifice, Maximum Spacing 16'x16'
Sprinkler head demand: 13 gpm @ 7.04

SPRINKLER DESCRIPTIONS



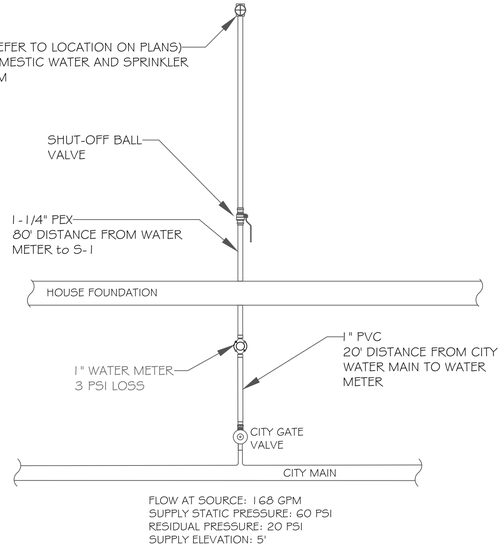
Most Demanding Single Head Information	
Information	Results
Flow Required at Head (GPM):	17
Source Pressure at Head (PSI):	12.03
Maximum Spacing (length):	18
Maximum Spacing (Width):	18
Domestic Flow Added (GPM):	0
Sprinkler Model:	RFC49
Elevation of Highest Head:	117
K-Factor	4.9
Temperature Rating:	155
Flow Required at Source (GPM)	17
Pressure Required at Source (psi)	40.49
Source Reference Point:	At Ref Pt STR
C-Factor of Sprinkler Pipe	150
C-Factor of Service Line	150
Head Reference Point:	H.13

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:	117
K-Factor	4.9
Temperature Rating:	155
Flow Required at Source (GPM)	26.5706
Pressure Required at Source (psi)	55.02
Source Reference Point:	At Ref Pt STR
C-Factor of Sprinkler Pipe	150
C-Factor of Service Line	150
Head Reference Point:	H.11 & H.12

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

WATER SERVICE DETAIL



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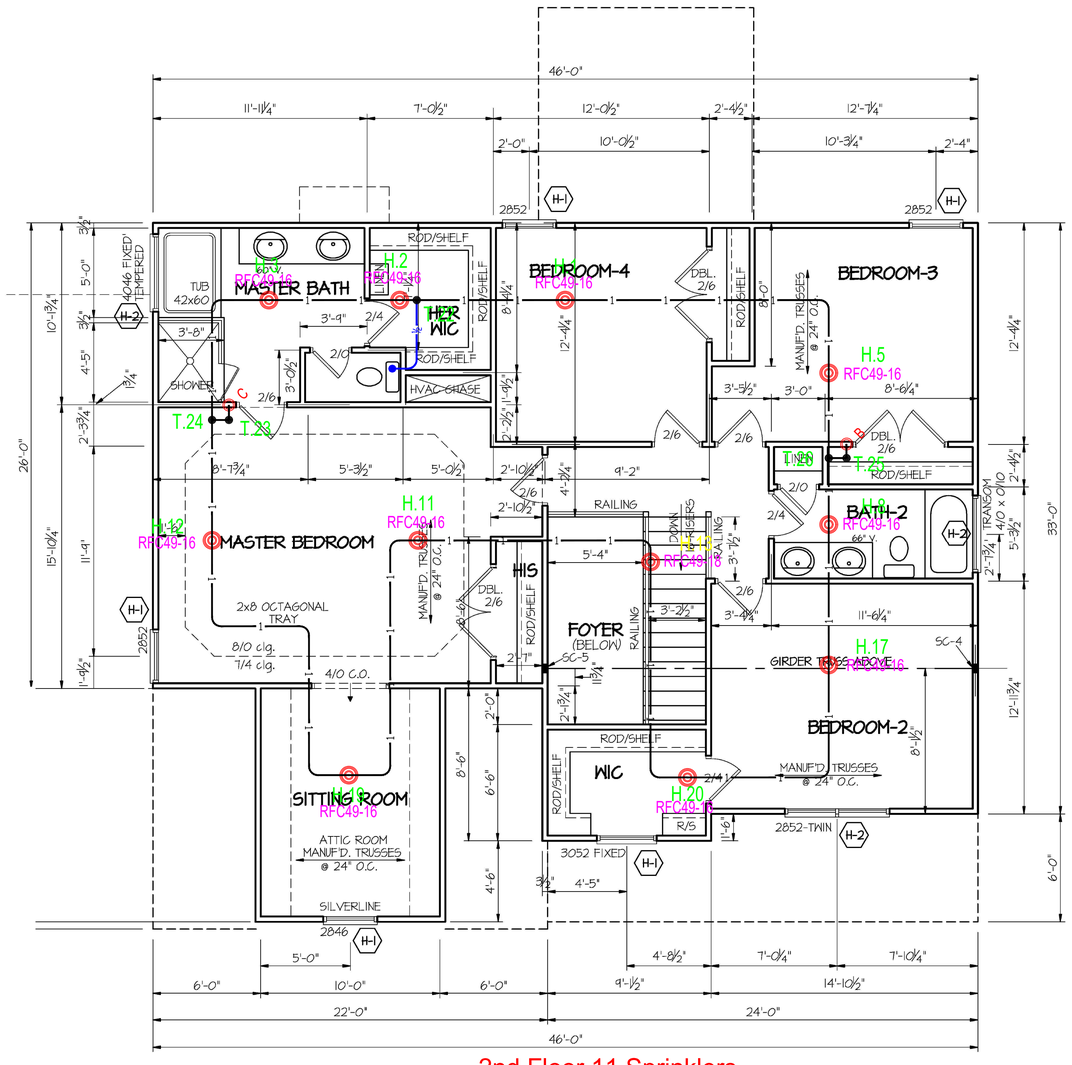
Design Services Department
1900 Southwood Drive - Nashua, NH 03063
Tel: 877-843-4262 x 351 Fax: 316-425-8466

Project:
OAKAHAVEN LOT 12
HOLLY SPRINGS, NC 27540

Dwg no.:
FP 1

Title:
1ST FLOOR PLAN

Quotation no.:	FPNM2106-008 NC
Drawn by:	N.M.
Approv. by:	
Date Submitted:	6/30/2021
Scale:	1/4" = 1'
Revision No:	Revision Date:



2nd Floor 11 Sprinklers

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

Project:
OAKAHAVEN LOT 12
HOLLY SPRINGS, NC 27540

Dwg no.:
FP 2

Title:
2ND FLOOR PLAN

Quotation no.:	FPNM2106-008 NC
Drawn by:	N.M.
Approv. by:	
Date Submitted:	6/30/2021
Scale:	1/4" = 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.

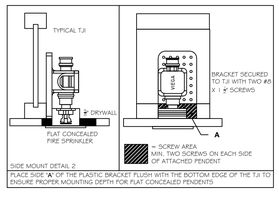
DRAWING AND DESIGN NOTES:

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:

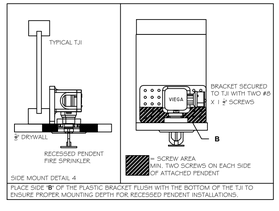
1. SERVICE ENTRANCE MATERIALS FROM WATER MAIN CONNECTION TO DISTRIBUTION MANIFOLD ARE EXCLUDED.
2. SPRINKLERS AND ASSOCIATED ESCUTCHEONS OR COVER PLATES ARE NOT SUPPLIED BY VIEGA.
3. MATERIAL LIST IS SUGGESTED ONLY. CONTRACTOR SHALL CONFIRM REQUIRED MATERIALS PRIOR TO PLACEMENT OF ORDER.

INSTALLATION NOTES



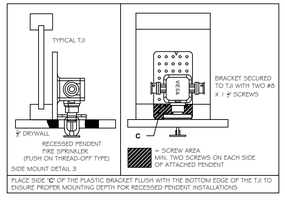
SIDE MOUNT DETAIL 2

PLACE SIDE "A" OF THE PLASTIC BRACKET FLUSH WITH THE BOTTOM EDGE OF THE TJI TO ENSURE PROPER MOUNTING DEPTH FOR FLAT CONCEALED PENDENTS



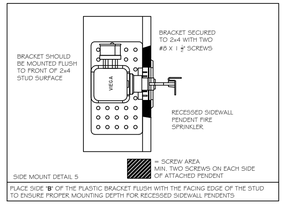
SIDE MOUNT DETAIL 4

PLACE SIDE "B" OF THE PLASTIC BRACKET FLUSH WITH THE BOTTOM OF THE TJI TO ENSURE PROPER MOUNTING DEPTH FOR RECESSED PENDENT INSTALLATIONS.



SIDE MOUNT DETAIL 3

PLACE SIDE "C" OF THE PLASTIC BRACKET FLUSH WITH THE BOTTOM EDGE OF THE TJI TO ENSURE PROPER MOUNTING DEPTH FOR RECESSED PENDENT INSTALLATIONS



SIDE MOUNT DETAIL 5

PLACE SIDE "B" OF THE PLASTIC BRACKET FLUSH WITH THE FACING EDGE OF THE STUD TO ENSURE PROPER MOUNTING DEPTH FOR RECESSED SIDEWALL PENDENTS

INSTALLATION DETAIL - SPRINKLER BRACKETS

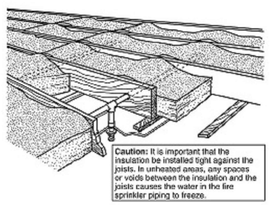


FIGURE A.9.1.1(a) Insulation Recommendations — Arrangement 1.

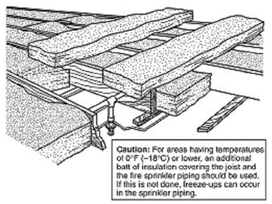


FIGURE A.9.1.1(b) Insulation Recommendations — Arrangement 2.

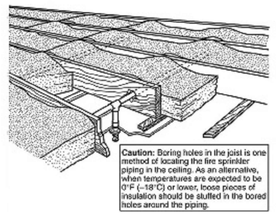


FIGURE A.9.1.1(c) Insulation Recommendations — Arrangement 3.

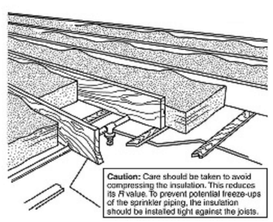


FIGURE A.9.1.1(d) Insulation Recommendations — Arrangement 4.

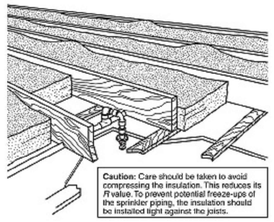


FIGURE A.9.1.1(e) Insulation Recommendations — Arrangement 5.

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:
OAKAHAVEN LOT 12
HOLLY SPRINGS, NC 27540

Dwg no.:
FP 3

Title:
NOTES & DETAILS

Quotation no.:	FPNM2106-008 NC
Drawn by:	N.M.
Approv. by:	
Date Submitted:	6/30/2021
Scale:	N/A
Revision No:	Revision Date:

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

Job Name	:	OAKAHAVEN LOT 12 - One Head Calculation (H.13)
Building	:	SINGLE FAMILY RESIDENCE
Location	:	HOLLY SPRINGS NC 27540
System	:	NFPA 13D
Contract	:	FPNM2106-008 NC
Data File	:	FPNM2106-008 NC (Oakhaven Dr - Lot 12).wx1

HYDRAULIC DESIGN INFORMATION SHEET

Name - OAKAHAVEN LOT 12 Date - 6/30/2021
Location -
Building - SINGLE FAMILY RESIDENCE System No. - NFPA 13D
Contractor - x Contract No. - FPNM2106-008 NC
Calculated By - VIEGA LLC Drawing No. - FPNM2106-008 NC
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height 9
OCCUPANCY - RESIDENTIAL

S Type of Calculation: ( )NFPA 13 Residential ( )NFPA 13R (X)NFPA 13D
Y Number of Sprinklers Flowing: (X)1 ( )2 ( )4 ( )
S ( )Other
T ( )Specific Ruling Made by Date
E
M Listed Flow at Start Point - 17 Gpm System Type
Listed Pres. at Start Point - 12.03Psi (X) Wet ( ) Dry
D MAXIMUM LISTED SPACING 18 x 18 ( ) Deluge ( ) PreAction
E Domestic Flow Added - 0 Gpm Sprinkler or Nozzle
S Additional Flow Added - Gpm Make RELIABLE Model RFC49
I Elevation at Highest Outlet - 117 Feet Size 7/16 K-Factor 4.9
G Note: Temperature Rating 155
N

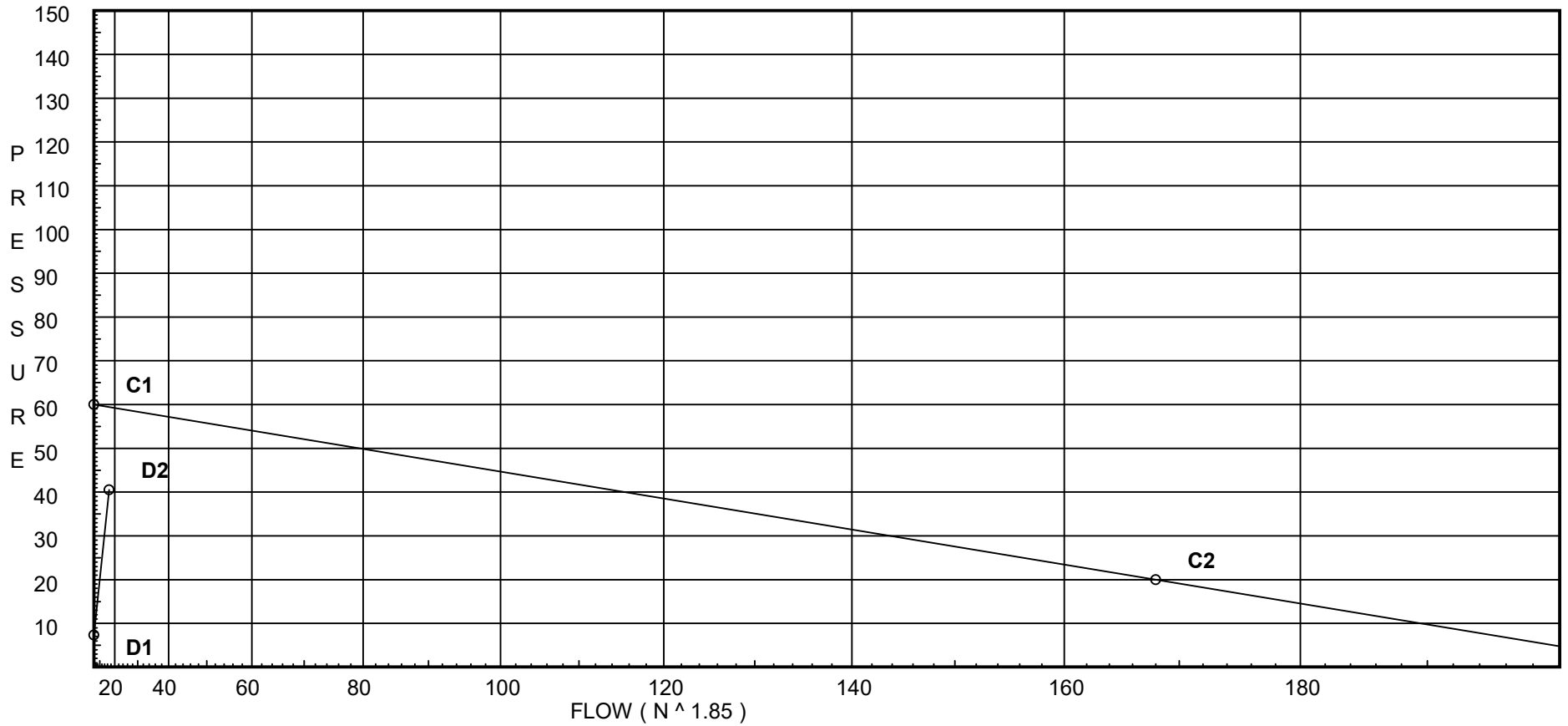
Calculation Gpm Required 17 Psi Required 40.49 At Ref Pt STR
Summary C-Factor Used: Overhead 150 Underground 150

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - x Rated Cap. Cap.
T Time of Test - x @ Psi Elev.
E Static (Psi) - 60 Elev.
R Residual (Psi) - 20 Other Well
Flow (Gpm) - 168 Proof Flow Gpm
S Elevation - 100

P Location: x
P
L Source of Information: x
Y

City Water Supply:
C1 - Static Pressure : 60
C2 - Residual Pressure: 20
C2 - Residual Flow : 168

Demand:
D1 - Elevation : 7.363
D2 - System Flow : 16.995
D2 - System Pressure : 40.490
Hose (Demand) : _____
D3 - System Demand : 16.995
Safety Margin : 18.933



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	60.0	20	168.0	59.423	17.0	40.49

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
H.13	117.0	4.9	12.03	17.0	
H.20	117.0		13.07		
H.17	117.0		13.91		
H.8	117.0		14.59		
T.26	117.0		15.0		
T.25	117.0		16.66		
T.29	108.0		21.05		
T.30	108.0		22.83		
T.33	108.0		22.98		
H.14	108.0		23.17		
H.18	108.0		23.51		
T.34	108.0		24.08		
H.16	108.0		24.43		
H.15	108.0		24.64		
T.31	108.0		25.36		
T.32	108.0		25.58		
S.1	104.0		28.56		
MTR	100.0		38.44		
STR	100.0		40.49		
H.11	117.0		12.81		
H.19	117.0		13.7		
H.12	117.0		14.61		
T.24	117.0		15.03		
T.23	117.0		16.76		
T.27	108.0		21.17		
T.28	108.0		23.04		
H.9	108.0		24.9		
H.5	117.0		15.0		
H.1	117.0		15.01		
T.22	117.0		15.02		
H.2	117.0		15.02		
H.3	117.0		15.03		
H.7	108.0		22.86		
H.4	108.0		22.94		
H.6	108.0		23.02		

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
H.13	9.16	0.863	Vprt	3.8	16.000	12.030		K Factor = 4.90
to		150.0		0.0	3.800	0.0		
H.20	9.16	0.0526		0.0	19.800	1.041		Vel = 5.02
H.20	0.0	0.863		0.0	16.000	13.071		
to		150.0		0.0	0.0	0.0		
H.17	9.16	0.0526		0.0	16.000	0.841		Vel = 5.02
H.17	0.0	0.863	Vprt	3.8	9.000	13.912		
to		150.0		0.0	3.800	0.0		
H.8	9.16	0.0527		0.0	12.800	0.674		Vel = 5.02
H.8	0.0	0.863	Vprt	3.8	4.000	14.586		
to		150.0		0.0	3.800	0.0		
T.26	9.16	0.0526		0.0	7.800	0.410		Vel = 5.02
T.26	-0.75	0.863	Vptb	18.4	1.000	14.996		
to		150.0	Vpel	17.7	36.100	0.0		
T.25	8.41	0.0449		0.0	37.100	1.664		Vel = 4.61
T.25	0.0	0.863		0.0	11.000	16.660		
to		150.0		0.0	0.0	3.898		
T.29	8.41	0.0449		0.0	11.000	0.494		Vel = 4.61
T.29	0.0	0.863	Vptb	18.4	3.487	21.052		
to		150.0	Vpel	17.7	36.100	0.0		
T.30	8.41	0.0449		0.0	39.587	1.776		Vel = 4.61
T.30	-2.04	0.863	Vprt	3.8	2.000	22.828		
to		150.0		0.0	3.800	0.0		
T.33	6.37	0.0269		0.0	5.800	0.156		Vel = 3.49
T.33	0.0	0.863	Vprt	3.8	3.000	22.984		
to		150.0		0.0	3.800	0.0		
H.14	6.37	0.0268		0.0	6.800	0.182		Vel = 3.49
H.14	0.0	0.863	Vprt	3.8	9.000	23.166		
to		150.0		0.0	3.800	0.0		
H.18	6.37	0.0268		0.0	12.800	0.343		Vel = 3.49
H.18	0.0	0.863	Vptb	18.4	3.000	23.509		
to		150.0		0.0	18.400	0.0		
T.34	6.37	0.0268		0.0	21.400	0.574		Vel = 3.49
T.34	0.0	0.863	Vprt	3.8	9.000	24.083		
to		150.0		0.0	3.800	0.0		
H.16	6.37	0.0269		0.0	12.800	0.344		Vel = 3.49
H.16	0.0	0.863	Vprt	3.8	4.000	24.427		
to		150.0		0.0	3.800	0.0		
H.15	6.37	0.0268		0.0	7.800	0.209		Vel = 3.49
H.15	0.0	0.863	Vptb	18.4	5.000	24.636		
to		150.0	Vprt	3.8	22.200	0.0		
T.31	6.37	0.0268		0.0	27.200	0.729		Vel = 3.49
T.31	10.63	1.025		0.0	3.000	25.365		
to		150.0		0.0	0.0	0.0		
T.32	17.0	0.0713		0.0	3.000	0.214		Vel = 6.61
T.32	0.0	1.025	E	2.7	8.000	25.579		
to		150.0	T	6.75	9.450	1.732		
S.1	17.0	0.0713		0.0	17.450	1.245		Vel = 6.61

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
S.1	0.0	1.053	2E	2.429	80.000	28.556		
to		150.0		0.0	2.429	4.732		* * Fixed Loss = 3
MTR	17.0	0.0626		0.0	82.429	5.157		Vel = 6.26
MTR	0.0	1.049	E	3.022	20.000	38.445		
to		150.0	T	7.555	12.089	0.0		
STR	17.0	0.0637	G	1.511	32.089	2.045		Vel = 6.31
	0.0							
	17.00					40.490		K Factor = 2.67
H.13	7.83	0.863	Vprt	3.8	16.000	12.030		
to		150.0		0.0	3.800	0.0		
H.11	7.83	0.0393		0.0	19.800	0.778		Vel = 4.29
H.11	0.0	0.863	Vprt	3.8	19.000	12.808		
to		150.0		0.0	3.800	0.0		
H.19	7.83	0.0393		0.0	22.800	0.897		Vel = 4.29
H.19	0.0	0.863		0.0	23.000	13.705		
to		150.0		0.0	0.0	0.0		
H.12	7.83	0.0393		0.0	23.000	0.904		Vel = 4.29
H.12	0.0	0.863	Vprt	3.8	7.000	14.609		
to		150.0		0.0	3.800	0.0		
T.24	7.83	0.0394		0.0	10.800	0.425		Vel = 4.29
T.24	0.75	0.863	Vptb	18.4	1.000	15.034		
to		150.0	Vpel	17.7	36.100	0.0		
T.23	8.58	0.0466		0.0	37.100	1.729		Vel = 4.71
T.23	0.0	0.863		0.0	11.000	16.763		
to		150.0		0.0	0.0	3.898		
T.27	8.58	0.0465		0.0	11.000	0.512		Vel = 4.71
T.27	0.0	0.863	Vptb	18.4	4.000	21.173		
to		150.0	Vpel	17.7	36.100	0.0		
T.28	8.58	0.0466		0.0	40.100	1.869		Vel = 4.71
T.28	2.05	0.863	Vprt	3.8	23.000	23.042		
to		150.0		0.0	3.800	0.0		
H.9	10.63	0.0691		0.0	26.800	1.853		Vel = 5.83
H.9	0.0	0.863	Vprt	3.8	3.000	24.895		
to		150.0		0.0	3.800	0.0		
T.31	10.63	0.0691		0.0	6.800	0.470		Vel = 5.83
	0.0							
	10.63					25.365		K Factor = 2.11
T.26	0.75	0.863	Vprt	3.8	5.000	14.996		
to		150.0		0.0	3.800	0.0		
H.5	0.75	0.0005		0.0	8.800	0.004		Vel = 0.41
H.5	0.0	0.863	Vprt	3.8	21.000	15.000		
to		150.0		0.0	3.800	0.0		
H.1	0.75	0.0005		0.0	24.800	0.013		Vel = 0.41
H.1	0.0	0.863	Vprt	3.8	9.000	15.013		
to		150.0		0.0	3.800	0.0		
T.22	0.75	0.0005		0.0	12.800	0.007		Vel = 0.41
T.22	0.0	0.863		0.0	1.000	15.020		
to		150.0		0.0	0.0	0.0		
H.2	0.75	0.0		0.0	1.000	0.0		Vel = 0.41

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*******	Notes	******
H.2	0.0	0.863	Vprt	3.8	8.000	15.020				
to		150.0		0.0	3.800	0.0				
H.3	0.75	0.0005		0.0	11.800	0.006		Vel = 0.41		
H.3	0.0	0.863	Vprt	3.8	11.000	15.026				
to		150.0		0.0	3.800	0.0				
T.24	0.75	0.0005		0.0	14.800	0.008		Vel = 0.41		
	0.0									
	0.75					15.034		K Factor = 0.19		
T.30	2.04	0.863	Vprt	3.8	6.000	22.828				
to		150.0		0.0	3.800	0.0				
H.7	2.04	0.0033		0.0	9.800	0.032		Vel = 1.12		
H.7	0.0	0.863	Vprt	3.8	20.000	22.860				
to		150.0		0.0	3.800	0.0				
H.4	2.04	0.0033		0.0	23.800	0.078		Vel = 1.12		
H.4	0.0	0.863	Vprt	3.8	20.000	22.938				
to		150.0		0.0	3.800	0.0				
H.6	2.04	0.0033		0.0	23.800	0.078		Vel = 1.12		
H.6	0.0	0.863	Vprt	3.8	4.000	23.016				
to		150.0		0.0	3.800	0.0				
T.28	2.04	0.0033		0.0	7.800	0.026		Vel = 1.12		
	0.0									
	2.04					23.042		K Factor = 0.42		

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

Job Name	:	OAKAHAVEN LOT 12 - Two Head Calculation (H.11 & H.12)
Building	:	SINGLE FAMILY RESIDENCE
Location	:	HOLLY SPRINGS NC 27540
System	:	NFPA 13D
Contract	:	FPNM2106-008 NC
Data File	:	FPNM2106-008 NC (Oakhaven Dr - Lot 12).wx2

HYDRAULIC DESIGN INFORMATION SHEET

Name - OAKAHAVEN LOT 12 Date - 6/30/2021
Location -
Building - SINGLE FAMILY RESIDENCE System No. - NFPA 13D
Contractor - x Contract No. - FPNM2106-008 NC
Calculated By - VIEGA LLC Drawing No. - FPNM2106-008 NC
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height 9
OCCUPANCY - RESIDENTIAL

S Type of Calculation: ( )NFPA 13 Residential ( )NFPA 13R (X)NFPA 13D
Y Number of Sprinklers Flowing: ( )1 (X)2 ( )4 ( )
S ( )Other
T ( )Specific Ruling Made by Date
E
M Listed Flow at Start Point - 13 Gpm System Type
Listed Pres. at Start Point - 7.04 Psi (X) Wet ( ) Dry
D MAXIMUM LISTED SPACING 16 x 16 ( ) Deluge ( ) PreAction
E Domestic Flow Added - 0 Gpm Sprinkler or Nozzle
S Additional Flow Added - Gpm Make RELIABLE Model RFC49
I Elevation at Highest Outlet - 117 Feet Size 7/16 K-Factor 4.9
G Note: Temperature Rating 155
N

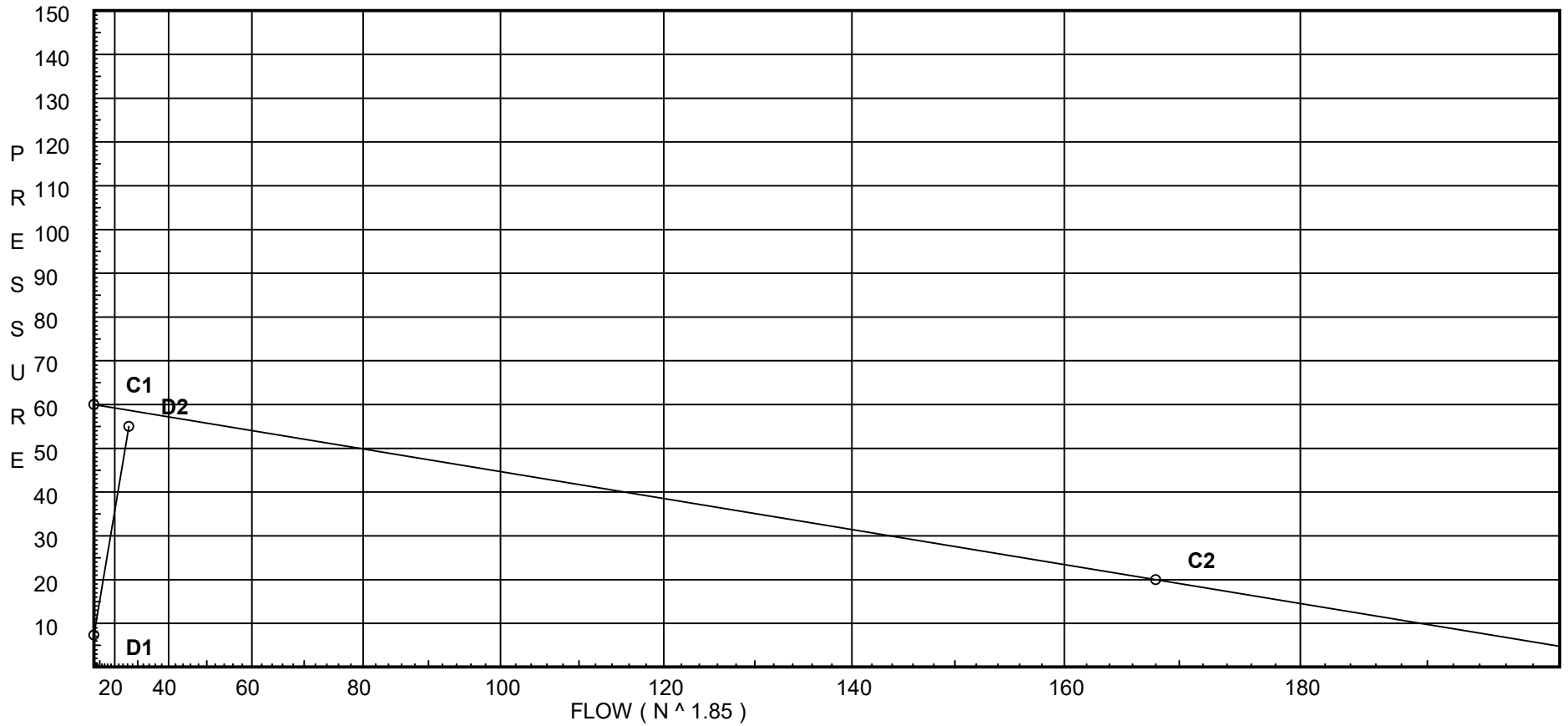
Calculation Gpm Required 26.5706 Psi Required 55.02 At Ref Pt STR
Summary C-Factor Used: Overhead 150 Underground 150

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - x Rated Cap. Cap.
T Time of Test - x @ Psi Elev.
E Static (Psi) - 60 Elev.
R Residual (Psi) - 20 Other Well
Flow (Gpm) - 168 Proof Flow Gpm
S Elevation - 100

P Location: x
P
L Source of Information: x
Y

City Water Supply:
- C1 - Static Pressure : 60
- C2 - Residual Pressure: 20
- C2 - Residual Flow : 168

Demand:
- D1 - Elevation : 7.363
- D2 - System Flow : 26.571
- D2 - System Pressure : 55.018
- Hose (Demand) : _____
- D3 - System Demand : 26.571
- Safety Margin : 3.663



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	60.0	20	168.0	58.681	26.57	55.018

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
H.11	117.0	4.9	7.04	13.0	
H.13	117.0		7.96		
H.20	117.0		8.88		
H.17	117.0		9.62		
H.8	117.0		10.22		
T.26	117.0		10.58		
T.25	117.0		14.19		
T.29	108.0		19.16		
T.30	108.0		23.01		
T.33	108.0		23.37		
H.14	108.0		23.78		
H.18	108.0		24.56		
T.34	108.0		25.86		
H.16	108.0		26.63		
H.15	108.0		27.11		
T.31	108.0		28.76		
T.32	108.0		29.25		
S.1	104.0		33.83		
MTR	100.0		50.34		
STR	100.0		55.02		
H.19	117.0		7.35		
H.12	117.0	4.9	7.67	13.57	
T.24	117.0		9.65		
T.23	117.0		13.8		
T.27	108.0		18.93		
T.28	108.0		23.42		
H.9	108.0		27.68		
H.3	117.0		9.84		
H.2	117.0		9.98		
T.22	117.0		10.0		
H.1	117.0		10.16		
H.5	117.0		10.47		
H.7	108.0		23.08		
H.4	108.0		23.22		
H.6	108.0		23.37		

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
H.11	8.57	0.863	Vprt	3.8	16.000	7.040		K Factor = 4.90
to		150.0		0.0	3.800	0.0		
H.13	8.57	0.0464		0.0	19.800	0.919		Vel = 4.70
H.13	0.0	0.863	Vprt	3.8	16.000	7.959		
to		150.0		0.0	3.800	0.0		
H.20	8.57	0.0464		0.0	19.800	0.919		Vel = 4.70
H.20	0.0	0.863		0.0	16.000	8.878		
to		150.0		0.0	0.0	0.0		
H.17	8.57	0.0464		0.0	16.000	0.743		Vel = 4.70
H.17	0.0	0.863	Vprt	3.8	9.000	9.621		
to		150.0		0.0	3.800	0.0		
H.8	8.57	0.0464		0.0	12.800	0.594		Vel = 4.70
H.8	0.0	0.863	Vprt	3.8	4.000	10.215		
to		150.0		0.0	3.800	0.0		
T.26	8.57	0.0464		0.0	7.800	0.362		Vel = 4.70
T.26	4.22	0.863	Vptb	18.4	1.000	10.577		
to		150.0	Vpel	17.7	36.100	0.0		
T.25	12.79	0.0974		0.0	37.100	3.613		Vel = 7.02
T.25	0.0	0.863		0.0	11.000	14.190		
to		150.0		0.0	0.0	3.898		
T.29	12.79	0.0974		0.0	11.000	1.071		Vel = 7.02
T.29	0.0	0.863	Vptb	18.4	3.487	19.159		
to		150.0	Vpel	17.7	36.100	0.0		
T.30	12.79	0.0974		0.0	39.587	3.855		Vel = 7.02
T.30	-2.88	0.863	Vprt	3.8	2.000	23.014		
to		150.0		0.0	3.800	0.0		
T.33	9.91	0.0607		0.0	5.800	0.352		Vel = 5.44
T.33	0.0	0.863	Vprt	3.8	3.000	23.366		
to		150.0		0.0	3.800	0.0		
H.14	9.91	0.0607		0.0	6.800	0.413		Vel = 5.44
H.14	0.0	0.863	Vprt	3.8	9.000	23.779		
to		150.0		0.0	3.800	0.0		
H.18	9.91	0.0608		0.0	12.800	0.778		Vel = 5.44
H.18	0.0	0.863	Vptb	18.4	3.000	24.557		
to		150.0		0.0	18.400	0.0		
T.34	9.91	0.0607		0.0	21.400	1.299		Vel = 5.44
T.34	0.0	0.863	Vprt	3.8	9.000	25.856		
to		150.0		0.0	3.800	0.0		
H.16	9.91	0.0608		0.0	12.800	0.778		Vel = 5.44
H.16	0.0	0.863	Vprt	3.8	4.000	26.634		
to		150.0		0.0	3.800	0.0		
H.15	9.91	0.0606		0.0	7.800	0.473		Vel = 5.44
H.15	0.0	0.863	Vptb	18.4	5.000	27.107		
to		150.0	Vprt	3.8	22.200	0.0		
T.31	9.91	0.0607		0.0	27.200	1.652		Vel = 5.44
T.31	16.66	1.025		0.0	3.000	28.759		
to		150.0		0.0	0.0	0.0		
T.32	26.57	0.1630		0.0	3.000	0.489		Vel = 10.33

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
T.32	0.0	1.025	E	2.7	8.000	29.248		
to		150.0	T	6.75	9.450	1.732		
S.1	26.57	0.1631		0.0	17.450	2.846		Vel = 10.33
S.1	0.0	1.053	2E	2.429	80.000	33.826		
to		150.0		0.0	2.429	4.732		* * Fixed Loss = 3
MTR	26.57	0.1430		0.0	82.429	11.786		Vel = 9.79
MTR	0.0	1.049	E	3.022	20.000	50.344		
to		150.0	T	7.555	12.089	0.0		
STR	26.57	0.1457	G	1.511	32.089	4.674		Vel = 9.86
	0.0							
	26.57					55.018		K Factor = 3.58
H.11	4.43	0.863	Vprt	3.8	19.000	7.040		
to		150.0		0.0	3.800	0.0		
H.19	4.43	0.0137		0.0	22.800	0.313		Vel = 2.43
H.19	0.0	0.863		0.0	23.000	7.353		
to		150.0		0.0	0.0	0.0		
H.12	4.43	0.0137		0.0	23.000	0.316		Vel = 2.43
H.12	13.57	0.863	Vprt	3.8	7.000	7.669		K Factor = 4.90
to		150.0		0.0	3.800	0.0		
T.24	18.0	0.1834		0.0	10.800	1.981		Vel = 9.87
T.24	-4.22	0.863	Vptb	18.4	1.000	9.650		
to		150.0	Vpel	17.7	36.100	0.0		
T.23	13.78	0.1119		0.0	37.100	4.151		Vel = 7.56
T.23	0.0	0.863		0.0	11.000	13.801		
to		150.0		0.0	0.0	3.898		
T.27	13.78	0.1119		0.0	11.000	1.231		Vel = 7.56
T.27	0.0	0.863	Vptb	18.4	4.000	18.930		
to		150.0	Vpel	17.7	36.100	0.0		
T.28	13.78	0.1119		0.0	40.100	4.487		Vel = 7.56
T.28	2.88	0.863	Vprt	3.8	23.000	23.417		
to		150.0		0.0	3.800	0.0		
H.9	16.66	0.1590		0.0	26.800	4.261		Vel = 9.14
H.9	0.0	0.863	Vprt	3.8	3.000	27.678		
to		150.0		0.0	3.800	0.0		
T.31	16.66	0.1590		0.0	6.800	1.081		Vel = 9.14
	0.0							
	16.66					28.759		K Factor = 3.11
T.24	4.22	0.863	Vprt	3.8	11.000	9.650		
to		150.0		0.0	3.800	0.0		
H.3	4.22	0.0125		0.0	14.800	0.185		Vel = 2.31
H.3	0.0	0.863	Vprt	3.8	8.000	9.835		
to		150.0		0.0	3.800	0.0		
H.2	4.22	0.0125		0.0	11.800	0.148		Vel = 2.31
H.2	0.0	0.863		0.0	1.000	9.983		
to		150.0		0.0	0.0	0.0		
T.22	4.22	0.0130		0.0	1.000	0.013		Vel = 2.31
T.22	0.0	0.863	Vprt	3.8	9.000	9.996		
to		150.0		0.0	3.800	0.0		
H.1	4.22	0.0125		0.0	12.800	0.160		Vel = 2.31

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
H.1	0.0	0.863	Vprt	3.8	21.000	10.156		
to		150.0		0.0	3.800	0.0		
H.5	4.22	0.0125		0.0	24.800	0.311		Vel = 2.31
H.5	0.0	0.863	Vprt	3.8	5.000	10.467		
to		150.0		0.0	3.800	0.0		
T.26	4.22	0.0125		0.0	8.800	0.110		Vel = 2.31
	0.0							
	4.22					10.577		K Factor = 1.30
T.30	2.88	0.863	Vprt	3.8	6.000	23.014		
to		150.0		0.0	3.800	0.0		
H.7	2.88	0.0062		0.0	9.800	0.061		Vel = 1.58
H.7	0.0	0.863	Vprt	3.8	20.000	23.075		
to		150.0		0.0	3.800	0.0		
H.4	2.88	0.0062		0.0	23.800	0.147		Vel = 1.58
H.4	0.0	0.863	Vprt	3.8	20.000	23.222		
to		150.0		0.0	3.800	0.0		
H.6	2.88	0.0062		0.0	23.800	0.147		Vel = 1.58
H.6	0.0	0.863	Vprt	3.8	4.000	23.369		
to		150.0		0.0	3.800	0.0		
T.28	2.88	0.0062		0.0	7.800	0.048		Vel = 1.58
	0.0							
	2.88					23.417		K Factor = 0.60