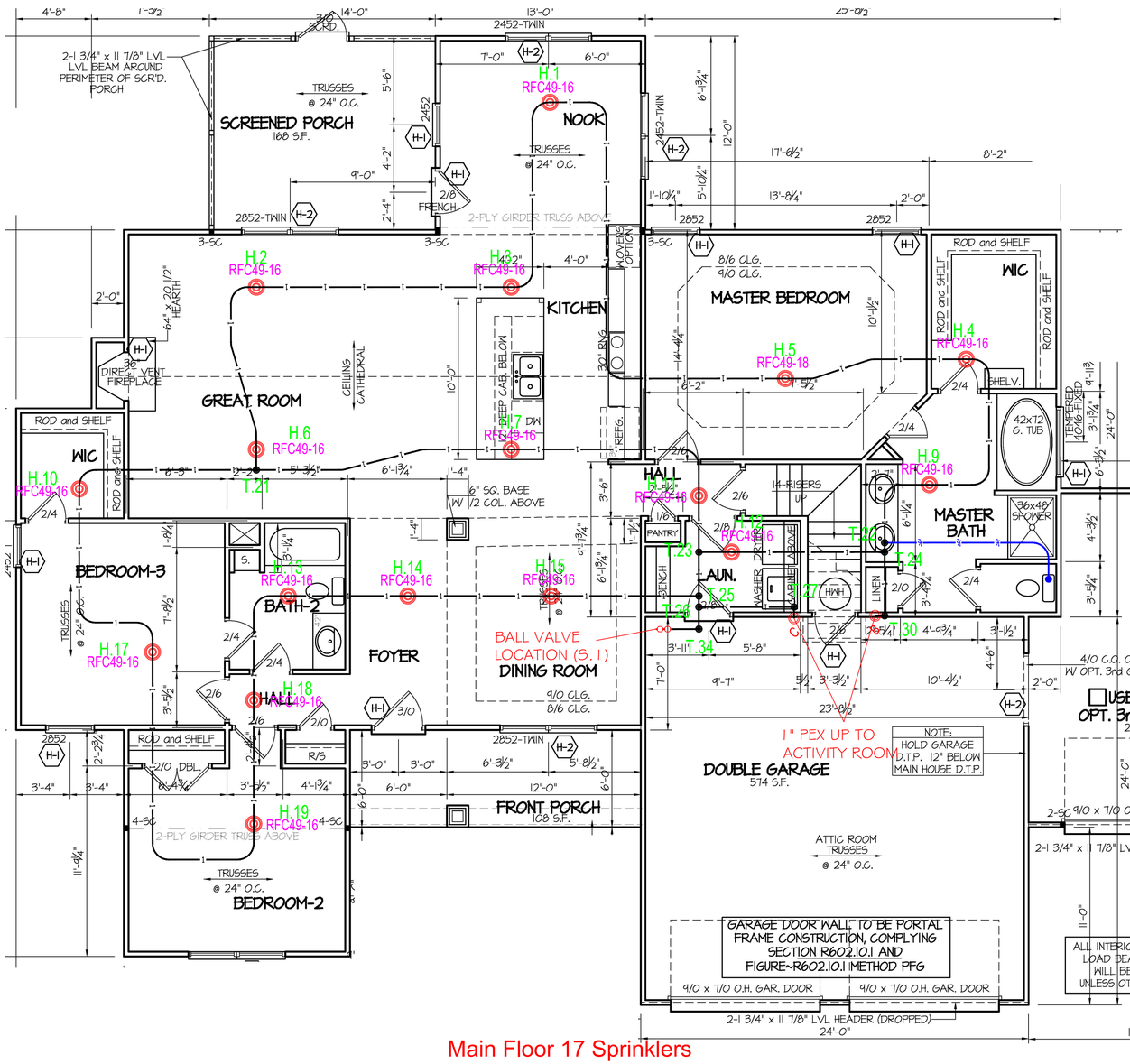
RFC49-16 — - - - 19

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

SPRINKLER DESCRIPTIONS



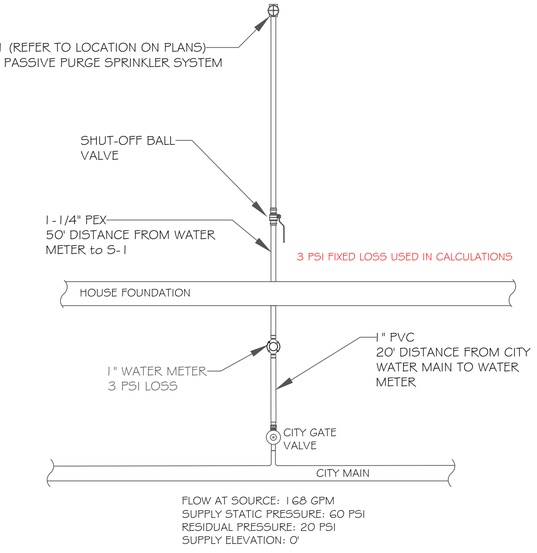
Main Floor 17 Sprinklers

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:	108
K-Factor	4.9
Temperature Rating:	155
Flow Required at Source (GPM)	17
Pressure Required at Source (psi)	33.19
Source Reference Point:	At Ref Pt STR
C-Factor of Sprinkler Pipe	150
C-Factor of Service Line	150
Head Reference Point:	H.5

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)	26.229
Pressure Required at Source (psi)	50.22
Source Reference Point:	At Ref Pt STR
C-Factor of Sprinkler Pipe	150
C-Factor of Service Line	150
Head Reference Point:	H.20 & H.16

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



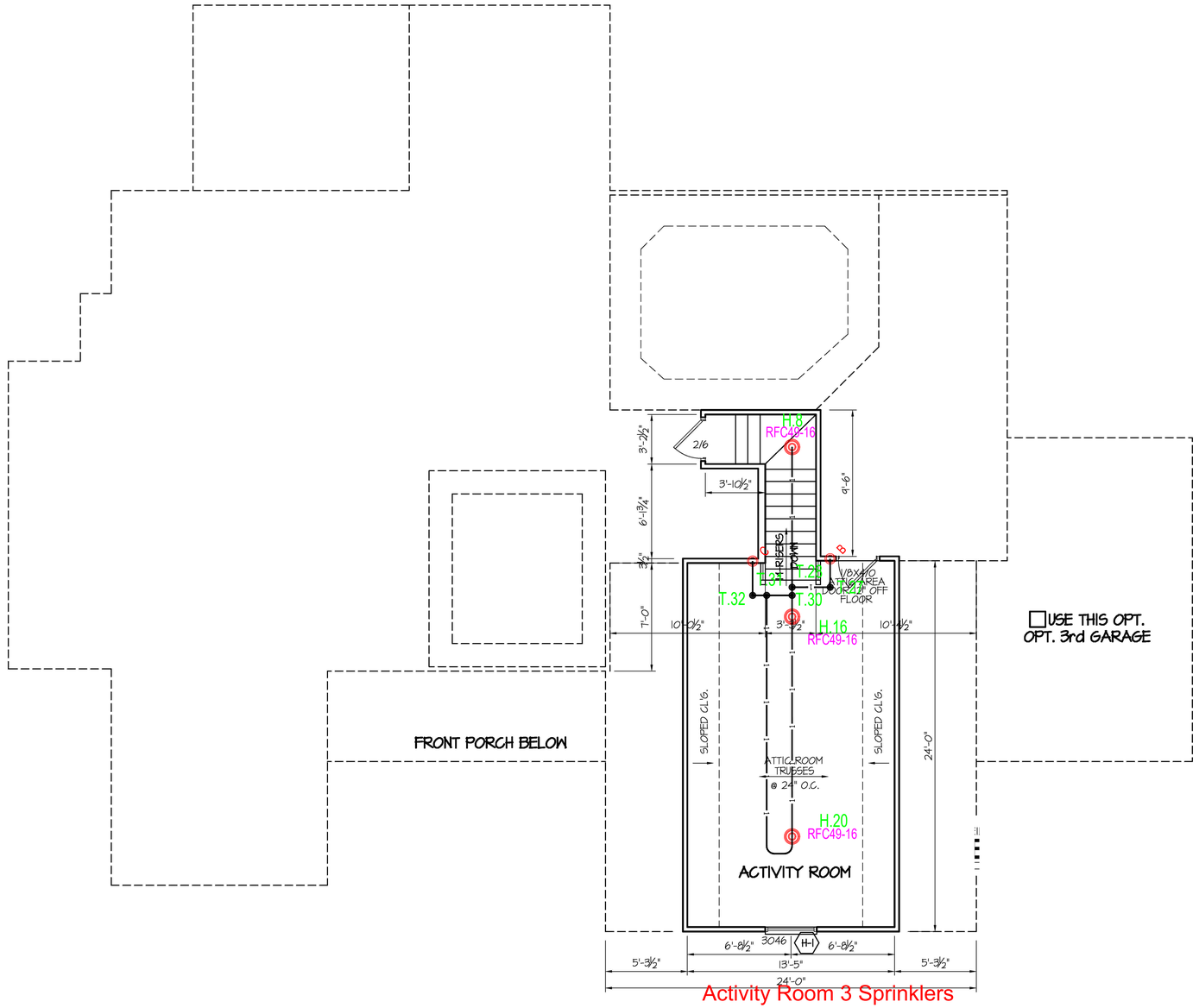
WATER SERVICE DETAIL

viega

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

Project:
218 OAKHAVEN DRIVE, LOT 4
HOLLY SPRINGS, NC 27540

Dwg no.:	FP 1
Title:	MAIN FLOOR PLAN
Quotation no.:	FPNM2103-002 NC
Drawn by:	N.M.
Approv. by:	
Date Submitted:	3/3/2021
Scale:	1/4" = 1'
Revision No:	Revision Date:



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

Project:
218 OAKHAVEN DRIVE, LOT 4
HOLLY SPRINGS, NC 27540

Dwg no.:
FP 2

Title:
ACTIVITY ROOM PLAN

Quotation no.:	FPNM2103-002 NC
Drawn by:	N.M.
Approv. by:	
Date Submitted:	3/3/2021
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.

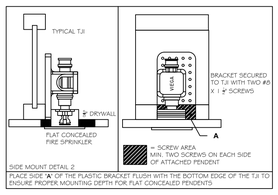
DRAWING AND DESIGN NOTES:

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:

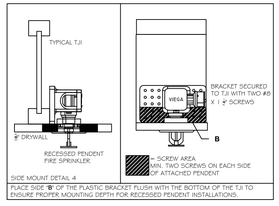
1. SERVICE ENTRANCE MATERIALS FROM WATER MAIN CONNECTION TO DISTRIBUTION MANIFOLD ARE EXCLUDED.
2. SPRINKLERS AND ASSOCIATED ESCUTCHEONS OR COVER PLATES ARE NOT SUPPLIED BY VIEGA.
3. MATERIAL LIST IS SUGGESTED ONLY. CONTRACTOR SHALL CONFIRM REQUIRED MATERIALS PRIOR TO PLACEMENT OF ORDER.

INSTALLATION NOTES



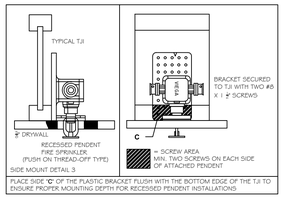
SIDE MOUNT DETAIL 2

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



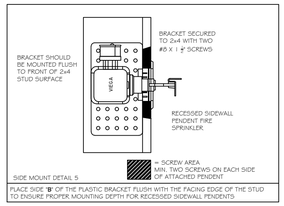
SIDE MOUNT DETAIL 4

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

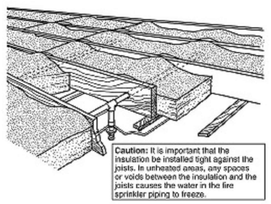


FIGURE A.9.1.1(a) Insulation Recommendations — Arrangement 1.

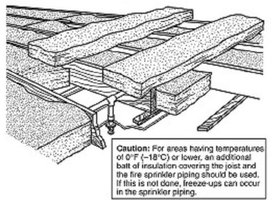


FIGURE A.9.1.1(b) Insulation Recommendations — Arrangement 2.

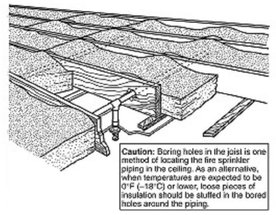


FIGURE A.9.1.1(c) Insulation Recommendations — Arrangement 3.

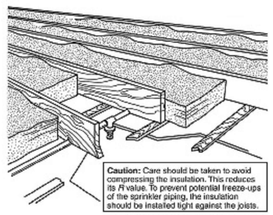


FIGURE A.9.1.1(d) Insulation Recommendations — Arrangement 4.

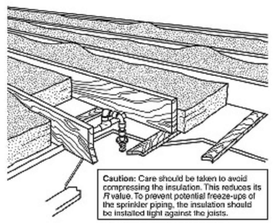


FIGURE A.9.1.1(e) Insulation Recommendations — Arrangement 5.

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°-170°	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:
218 OAKHAVEN DRIVE, LOT 4
HOLLY SPRINGS, NC 27540

Dwg no.:
FP 3

Title:
NOTES & DETAILS

Quotation no.:	FPNM2103-002 NC
Drawn by:	N.M.
Approv. by:	
Date Submitted:	3/3/2021
Scale:	N/A
Revision No:	Revision Date:

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

Job Name : 218 OAKHAVEN DRIVE, LOT 4 - One Head Calculation (H.5)
Building : SINGLE FAMILY RESIDENCE
Location : HOLLY SPRINGS NC 27540
System : NFPA 13D
Contract : FPNM2103-002 NC
Data File : FPNM2103-002 NC (218 Oakhaven Drive).wx1

HYDRAULIC DESIGN INFORMATION SHEET

Name - 218 OAKHAVEN DRIVE LOT 4 Date - 3/3/2021
Location -
Building - SINGLE FAMILY RESIDENCE System No. - NFPA 13D
Contractor - x Contract No. - FPNM2103-002 NC
Calculated By - VIEGA LLC Drawing No. - FPNM2103-002 NC
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height 10
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 - 108 Feet Size 7/16 K-Factor 4.9
G Note: Temperature Rating 155
N

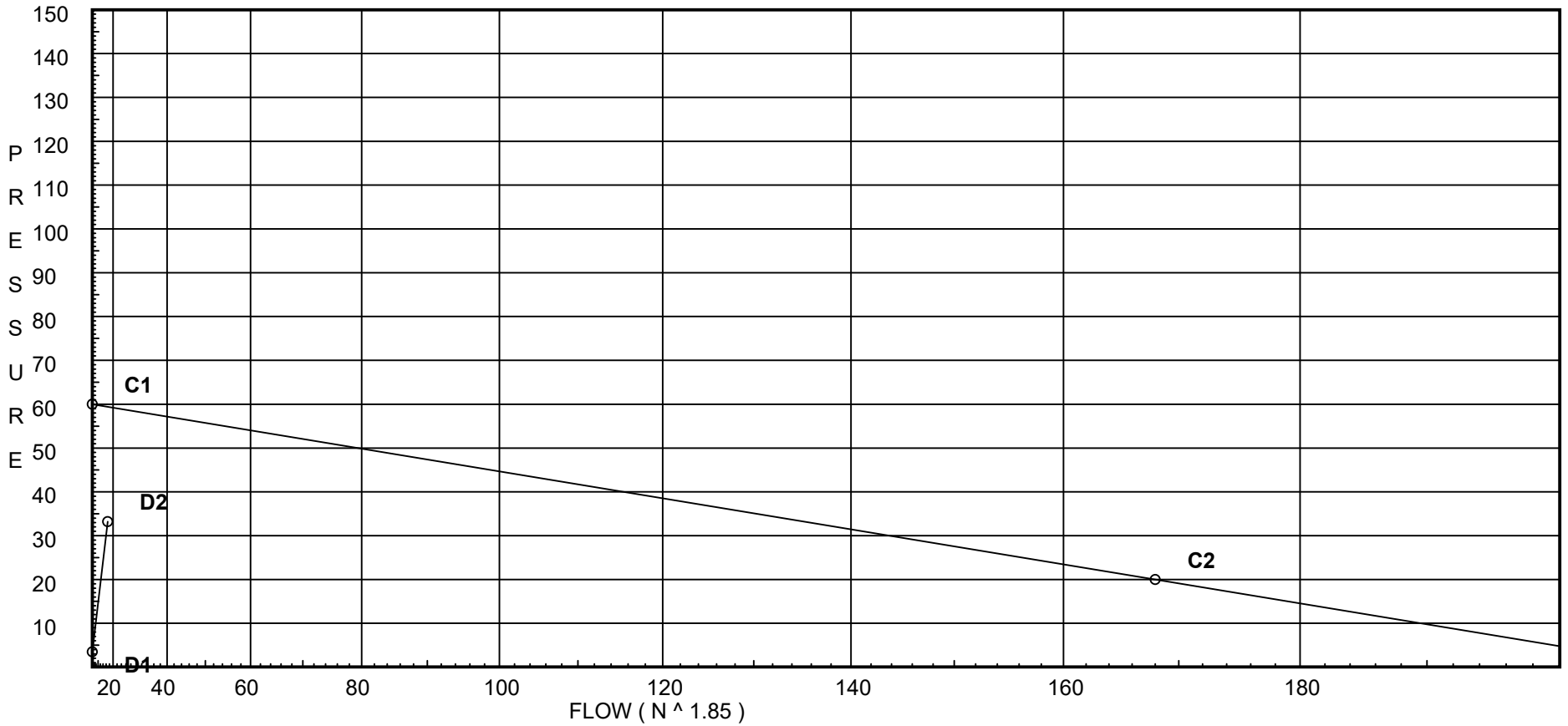
Calculation Gpm Required 17 Psi Required 33.19 At Ref Pt STR
Summary C-Factor Used: Overhead 150 Underground 150

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 : 3.465
- D2 - System Flow : 16.995
- D2 - System Pressure : 33.191
- Hose (Demand) : _____
- D3 - System Demand : 16.995
- Safety Margin : 26.232



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
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	33.191

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
H.5	108.0	4.9	12.03	17.0	
H.1	108.0		13.23		
H.3	108.0		13.81		
H.2	108.0		14.46		
H.6	108.0		14.92		
T.21	108.0		15.52		
H.7	108.0		15.75		
H.11	108.0		15.96		
T.22	108.0		16.04		
T.24	108.0		16.44		
T.25	108.0		16.9		
T.33	108.0		17.23		
S.1	104.0		23.52		
MTR	100.0		31.53		
STR	100.0		33.19		
H.4	108.0		13.15		
H.9	108.0		14.09		
T.23	108.0		14.83		
H.12	108.0		15.49		
T.29	108.0		15.11		
T.27	117.0		11.36		
T.28	117.0		11.86		
T.30	117.0		11.92		
T.31	117.0		12.03		
T.32	117.0		12.32		
T.26	108.0		16.37		
H.10	108.0		15.63		
H.17	108.0		15.77		
H.19	108.0		15.92		
H.18	108.0		15.98		
H.13	108.0		16.07		
H.14	108.0		16.15		
H.15	108.0		16.24		
H.16	117.0		11.93		
H.20	117.0		11.96		

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.5	6.88	0.863	Vprt	3.8	35.000	12.030		K Factor = 4.90
to		150.0		0.0	3.800	0.0		
H.1	6.88	0.0310		0.0	38.800	1.201		Vel = 3.77
H.1	0.0	0.863	Vprt	3.8	15.000	13.231		
to		150.0		0.0	3.800	0.0		
H.3	6.88	0.0310		0.0	18.800	0.582		Vel = 3.77
H.3	0.0	0.863	Vprt	3.8	17.000	13.813		
to		150.0		0.0	3.800	0.0		
H.2	6.88	0.0310		0.0	20.800	0.644		Vel = 3.77
H.2	0.0	0.863	Vprt	3.8	11.000	14.457		
to		150.0		0.0	3.800	0.0		
H.6	6.88	0.0309		0.0	14.800	0.458		Vel = 3.77
H.6	0.0	0.863	Vptb	18.4	1.000	14.915		
to		150.0		0.0	18.400	0.0		
T.21	6.88	0.0310		0.0	19.400	0.601		Vel = 3.77
T.21	-3.05	0.863	Vprt	3.8	19.000	15.516		
to		150.0		0.0	3.800	0.0		
H.7	3.83	0.0104		0.0	22.800	0.238		Vel = 2.10
H.7	0.0	0.863	Vprt	3.8	16.000	15.754		
to		150.0		0.0	3.800	0.0		
H.11	3.83	0.0105		0.0	19.800	0.207		Vel = 2.10
H.11	0.0	0.863	Vprt	3.8	4.000	15.961		
to		150.0		0.0	3.800	0.0		
T.22	3.83	0.0105		0.0	7.800	0.082		Vel = 2.10
T.22	5.86	0.863	Vprt	3.8	3.000	16.043		
to		150.0		0.0	3.800	0.0		
T.24	9.69	0.0584		0.0	6.800	0.397		Vel = 5.31
T.24	3.06	0.863	Vprt	3.8	1.000	16.440		
to		150.0		0.0	3.800	0.0		
T.25	12.75	0.0967		0.0	4.800	0.464		Vel = 6.99
T.25	4.25	0.863		0.0	2.000	16.904		
to		150.0		0.0	0.0	0.0		
T.33	17.0	0.1650		0.0	2.000	0.330		Vel = 9.32
T.33	0.0	0.863	Vpel	17.7	7.000	17.234		
to		150.0	T	2.92	20.620	1.732		
S.1	17.0	0.1649		0.0	27.620	4.554		Vel = 9.32
S.1	0.0	1.053	2E	2.429	50.000	23.520		
to		150.0		0.0	2.429	4.732		* * Fixed Loss = 3
MTR	17.0	0.0626		0.0	52.429	3.280		Vel = 6.26
MTR	0.0	1.049	2E	6.044	20.000	31.532		
to		150.0		0.0	6.044	0.0		
STR	17.0	0.0637		0.0	26.044	1.659		Vel = 6.31
	0.0							
	17.00					33.191		K Factor = 2.95
H.5	10.11	0.863	Vprt	3.8	14.000	12.030		
to		150.0		0.0	3.800	0.0		
H.4	10.11	0.0631		0.0	17.800	1.123		Vel = 5.55
H.4	0.0	0.863	Vprt	3.8	11.000	13.153		
to		150.0		0.0	3.800	0.0		
H.9	10.11	0.0631		0.0	14.800	0.934		Vel = 5.55

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.9	0.0	0.863	Vprt	3.8	8.000	14.087		
to		150.0		0.0	3.800	0.0		
T.23	10.11	0.0631		0.0	11.800	0.745		Vel = 5.55
T.23	-4.25	0.863	Vptb	18.4	10.000	14.832		
to		150.0		0.0	18.400	0.0		
H.12	5.86	0.0230		0.0	28.400	0.654		Vel = 3.21
H.12	0.0	0.863	Vptb	18.4	2.000	15.486		
to		150.0	Vprt	3.8	22.200	0.0		
T.22	5.86	0.0230		0.0	24.200	0.557		Vel = 3.21
	0.0							
	5.86					16.043		K Factor = 1.46
T.23	4.25	0.863	Vpel	17.7	4.000	14.832		
to		150.0		0.0	17.700	0.0		
T.29	4.25	0.0127		0.0	21.700	0.275		Vel = 2.33
T.29	0.0	0.863		0.0	12.000	15.107		
to		150.0		0.0	0.0	-3.898		
T.27	4.25	0.0127		0.0	12.000	0.153		Vel = 2.33
T.27	0.0	0.863	Vptb	18.4	3.000	11.362		
to		150.0	Vpel	17.7	36.100	0.0		
T.28	4.25	0.0127		0.0	39.100	0.496		Vel = 2.33
T.28	0.0	0.863	Vprt	3.8	1.000	11.858		
to		150.0		0.0	3.800	0.0		
T.30	4.25	0.0125		0.0	4.800	0.060		Vel = 2.33
T.30	-1.50	0.863	Vptb	18.4	2.000	11.918		
to		150.0		0.0	18.400	0.0		
T.31	2.75	0.0057		0.0	20.400	0.116		Vel = 1.51
T.31	1.50	0.863	Vpel	17.7	1.000	12.034		
to		150.0	Vprt	3.8	21.500	0.0		
T.32	4.25	0.0127		0.0	22.500	0.286		Vel = 2.33
T.32	0.0	0.863		0.0	12.000	12.320		
to		150.0		0.0	0.0	3.898		
T.26	4.25	0.0127		0.0	12.000	0.152		Vel = 2.33
T.26	0.0	0.863	Vpel	17.7	6.000	16.370		
to		150.0	Vptb	18.4	36.100	0.0		
T.25	4.25	0.0127		0.0	42.100	0.534		Vel = 2.33
	0.0							
	4.25					16.904		K Factor = 1.03
T.21	3.05	0.863	Vprt	3.8	13.000	15.516		
to		150.0		0.0	3.800	0.0		
H.10	3.05	0.0068		0.0	16.800	0.115		Vel = 1.67
H.10	0.0	0.863	Vprt	3.8	16.000	15.631		
to		150.0		0.0	3.800	0.0		
H.17	3.05	0.0069		0.0	19.800	0.137		Vel = 1.67
H.17	0.0	0.863	Vprt	3.8	19.000	15.768		
to		150.0		0.0	3.800	0.0		
H.19	3.05	0.0069		0.0	22.800	0.157		Vel = 1.67
H.19	0.0	0.863		0.0	8.000	15.925		
to		150.0		0.0	0.0	0.0		
H.18	3.05	0.0069		0.0	8.000	0.055		Vel = 1.67

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.18	0.0	0.863	Vprt	3.8	9.000	15.980		
to		150.0		0.0	3.800	0.0		
H.13	3.05	0.0069		0.0	12.800	0.088		Vel = 1.67
H.13	0.0	0.863	Vprt	3.8	8.000	16.068		
to		150.0		0.0	3.800	0.0		
H.14	3.05	0.0069		0.0	11.800	0.081		Vel = 1.67
H.14	0.0	0.863	Vprt	3.8	10.000	16.149		
to		150.0		0.0	3.800	0.0		
H.15	3.05	0.0069		0.0	13.800	0.095		Vel = 1.67
H.15	0.0	0.863	Vptb	18.4	10.000	16.244		
to		150.0		0.0	18.400	0.0		
T.24	3.05	0.0069		0.0	28.400	0.196		Vel = 1.67
	0.0							
	3.05					16.440		K Factor = 0.75
T.30	1.50	0.863	Vprt	3.8	2.000	11.918		
to		150.0		0.0	3.800	0.0		
H.16	1.5	0.0019		0.0	5.800	0.011		Vel = 0.82
H.16	0.0	0.863		0.0	16.000	11.929		
to		150.0		0.0	0.0	0.0		
H.20	1.5	0.0019		0.0	16.000	0.030		Vel = 0.82
H.20	0.0	0.863	Vptb	18.4	19.000	11.959		
to		150.0	Vprt	3.8	22.200	0.0		
T.31	1.5	0.0018		0.0	41.200	0.075		Vel = 0.82
	0.0							
	1.50					12.034		K Factor = 0.43

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

Job Name	:	218 OAKHAVEN DRIVE, LOT 4 - Two Head Calculation (H.20 & H.16)
Building	:	SINGLE FAMILY RESIDENCE
Location	:	HOLLY SPRINGS NC 27540
System	:	NFPA 13D
Contract	:	FPNM2103-002 NC
Data File	:	FPNM2103-002 NC (218 Oakhaven Drive).wx2

HYDRAULIC DESIGN INFORMATION SHEET

Name - 218 OAKHAVEN DRIVE LOT 4 Date - 3/3/2021
Location -
Building - SINGLE FAMILY RESIDENCE System No. - NFPA 13D
Contractor - x Contract No. - FPNM2103-002 NC
Calculated By - VIEGA LLC Drawing No. - FPNM2103-002 NC
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height 10
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

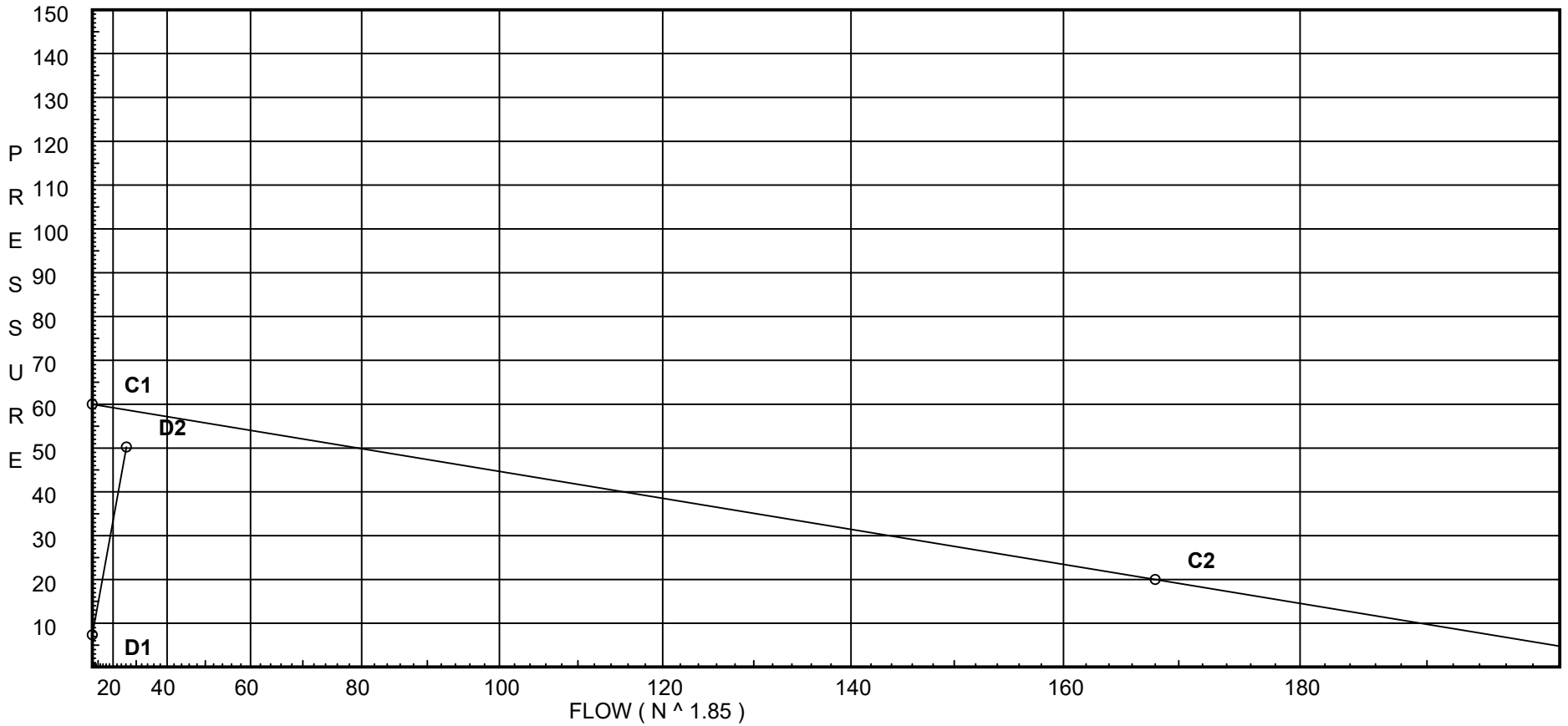
Calculation Gpm Required 26.229 Psi Required 50.22 At Ref Pt STR
Summary C-Factor Used: Overhead 150 Underground 150

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 : 26.229
- D2 - System Pressure : 50.217
- Hose (Demand) : _____
- D3 - System Demand : 26.229
- Safety Margin : 8.495



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
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	58.712	26.23	50.217

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
H.20	117.0	4.9	7.04	13.0	
T.31	117.0		8.83		
T.32	117.0		11.5		
T.26	108.0		16.83		
T.25	108.0		21.83		
T.33	108.0		22.57		
S.1	104.0		34.46		
MTR	100.0		46.51		
STR	100.0		50.22		
H.16	117.0	4.9	7.29	13.23	
T.30	117.0		8.35		
T.28	117.0		8.76		
T.27	117.0		12.14		
T.29	108.0		17.08		
T.23	108.0		18.95		
H.12	108.0		20.07		
T.22	108.0		21.02		
T.24	108.0		21.42		
H.9	108.0		19.1		
H.4	108.0		19.28		
H.5	108.0		19.5		
H.1	108.0		19.97		
H.3	108.0		20.2		
H.2	108.0		20.46		
H.6	108.0		20.64		
T.21	108.0		20.88		
H.10	108.0		20.94		
H.17	108.0		21.02		
H.19	108.0		21.12		
H.18	108.0		21.15		
H.13	108.0		21.2		
H.14	108.0		21.25		
H.15	108.0		21.3		
H.7	108.0		20.94		
H.11	108.0		21.0		

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.20	8.27	0.863	Vptb	18.4	19.000	7.040		K Factor = 4.90
to		150.0	Vprt	3.8	22.200	0.0		
T.31	8.27	0.0435		0.0	41.200	1.792		Vel = 4.54
T.31	5.97	0.863	Vpel	17.7	1.000	8.832		
to		150.0	Vprt	3.8	21.500	0.0		
T.32	14.24	0.1188		0.0	22.500	2.673		Vel = 7.81
T.32	0.0	0.863		0.0	12.000	11.505		
to		150.0		0.0	0.0	3.898		
T.26	14.24	0.1188		0.0	12.000	1.426		Vel = 7.81
T.26	0.0	0.863	Vpel	17.7	6.000	16.829		
to		150.0	Vptb	18.4	36.100	0.0		
T.25	14.24	0.1188		0.0	42.100	5.002		Vel = 7.81
T.25	11.99	0.863		0.0	2.000	21.831		
to		150.0		0.0	0.0	0.0		
T.33	26.23	0.3680		0.0	2.000	0.736		Vel = 14.39
T.33	0.0	0.863	Vpel	17.7	7.000	22.567		
to		150.0	T	2.92	20.620	1.732		
S.1	26.23	0.3679		0.0	27.620	10.162		Vel = 14.39
S.1	0.0	1.053	2E	2.429	50.000	34.461		
to		150.0		0.0	2.429	4.732		* * Fixed Loss = 3
MTR	26.23	0.1396		0.0	52.429	7.320		Vel = 9.66
MTR	0.0	1.049	2E	6.044	20.000	46.513		
to		150.0		0.0	6.044	0.0		
STR	26.23	0.1422		0.0	26.044	3.704		Vel = 9.74
	0.0							
	26.23					50.217		K Factor = 3.70
H.20	4.73	0.863		0.0	16.000	7.040		
to		150.0		0.0	0.0	0.0		
H.16	4.73	0.0155		0.0	16.000	0.248		Vel = 2.59
H.16	13.23	0.863	Vprt	3.8	2.000	7.288		K Factor = 4.90
to		150.0		0.0	3.800	0.0		
T.30	17.96	0.1826		0.0	5.800	1.059		Vel = 9.85
T.30	-11.99	0.863	Vptb	18.4	2.000	8.347		
to		150.0		0.0	18.400	0.0		
T.31	5.97	0.0238		0.0	20.400	0.485		Vel = 3.27
	0.0							
	5.97					8.832		K Factor = 2.01
T.30	11.99	0.863	Vprt	3.8	1.000	8.347		
to		150.0		0.0	3.800	0.0		
T.28	11.99	0.0865		0.0	4.800	0.415		Vel = 6.58
T.28	0.0	0.863	Vptb	18.4	3.000	8.762		
to		150.0	Vpel	17.7	36.100	0.0		
T.27	11.99	0.0864		0.0	39.100	3.380		Vel = 6.58
T.27	0.0	0.863		0.0	12.000	12.142		
to		150.0		0.0	0.0	3.898		
T.29	11.99	0.0865		0.0	12.000	1.038		Vel = 6.58
T.29	0.0	0.863	Vpel	17.7	4.000	17.078		
to		150.0		0.0	17.700	0.0		
T.23	11.99	0.0865		0.0	21.700	1.876		Vel = 6.58

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.23	-4.17	0.863	Vptb	18.4	10.000	18.954		
to		150.0		0.0	18.400	0.0		
H.12	7.82	0.0393		0.0	28.400	1.115		Vel = 4.29
H.12	0.0	0.863	Vptb	18.4	2.000	20.069		
to		150.0	Vprt	3.8	22.200	0.0		
T.22	7.82	0.0392		0.0	24.200	0.949		Vel = 4.29
T.22	1.89	0.863	Vprt	3.8	3.000	21.018		
to		150.0		0.0	3.800	0.0		
T.24	9.71	0.0585		0.0	6.800	0.398		Vel = 5.33
T.24	2.28	0.863	Vprt	3.8	1.000	21.416		
to		150.0		0.0	3.800	0.0		
T.25	11.99	0.0865		0.0	4.800	0.415		Vel = 6.58
	0.0							
	11.99					21.831		K Factor = 2.57
T.23	4.17	0.863	Vprt	3.8	8.000	18.954		
to		150.0		0.0	3.800	0.0		
H.9	4.17	0.0123		0.0	11.800	0.145		Vel = 2.29
H.9	0.0	0.863	Vprt	3.8	11.000	19.099		
to		150.0		0.0	3.800	0.0		
H.4	4.17	0.0122		0.0	14.800	0.181		Vel = 2.29
H.4	0.0	0.863	Vprt	3.8	14.000	19.280		
to		150.0		0.0	3.800	0.0		
H.5	4.17	0.0122		0.0	17.800	0.218		Vel = 2.29
H.5	0.0	0.863	Vprt	3.8	35.000	19.498		
to		150.0		0.0	3.800	0.0		
H.1	4.17	0.0122		0.0	38.800	0.475		Vel = 2.29
H.1	0.0	0.863	Vprt	3.8	15.000	19.973		
to		150.0		0.0	3.800	0.0		
H.3	4.17	0.0122		0.0	18.800	0.230		Vel = 2.29
H.3	0.0	0.863	Vprt	3.8	17.000	20.203		
to		150.0		0.0	3.800	0.0		
H.2	4.17	0.0123		0.0	20.800	0.255		Vel = 2.29
H.2	0.0	0.863	Vprt	3.8	11.000	20.458		
to		150.0		0.0	3.800	0.0		
H.6	4.17	0.0122		0.0	14.800	0.181		Vel = 2.29
H.6	0.0	0.863	Vptb	18.4	1.000	20.639		
to		150.0		0.0	18.400	0.0		
T.21	4.17	0.0122		0.0	19.400	0.237		Vel = 2.29
T.21	-1.89	0.863	Vprt	3.8	13.000	20.876		
to		150.0		0.0	3.800	0.0		
H.10	2.28	0.0040		0.0	16.800	0.068		Vel = 1.25
H.10	0.0	0.863	Vprt	3.8	16.000	20.944		
to		150.0		0.0	3.800	0.0		
H.17	2.28	0.0040		0.0	19.800	0.080		Vel = 1.25
H.17	0.0	0.863	Vprt	3.8	19.000	21.024		
to		150.0		0.0	3.800	0.0		
H.19	2.28	0.0040		0.0	22.800	0.091		Vel = 1.25
H.19	0.0	0.863		0.0	8.000	21.115		
to		150.0		0.0	0.0	0.0		
H.18	2.28	0.0041		0.0	8.000	0.033		Vel = 1.25

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.18	0.0	0.863	Vprt	3.8	9.000	21.148		
to		150.0		0.0	3.800	0.0		
H.13	2.28	0.0040		0.0	12.800	0.051		Vel = 1.25
H.13	0.0	0.863	Vprt	3.8	8.000	21.199		
to		150.0		0.0	3.800	0.0		
H.14	2.28	0.0040		0.0	11.800	0.047		Vel = 1.25
H.14	0.0	0.863	Vprt	3.8	10.000	21.246		
to		150.0		0.0	3.800	0.0		
H.15	2.28	0.0041		0.0	13.800	0.056		Vel = 1.25
H.15	0.0	0.863	Vptb	18.4	10.000	21.302		
to		150.0		0.0	18.400	0.0		
T.24	2.28	0.0040		0.0	28.400	0.114		Vel = 1.25
	0.0							
	2.28					21.416		K Factor = 0.49
T.21	1.88	0.863	Vprt	3.8	19.000	20.876		
to		150.0		0.0	3.800	0.0		
H.7	1.88	0.0029		0.0	22.800	0.065		Vel = 1.03
H.7	0.0	0.863	Vprt	3.8	16.000	20.941		
to		150.0		0.0	3.800	0.0		
H.11	1.88	0.0028		0.0	19.800	0.055		Vel = 1.03
H.11	0.0	0.863	Vprt	3.8	4.000	20.996		
to		150.0		0.0	3.800	0.0		
T.22	1.88	0.0028		0.0	7.800	0.022		Vel = 1.03
	0.0							
	1.88					21.018		K Factor = 0.41