viega

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

SPRINKLER DESCRIPTIONS

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

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

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:	118
K-Factor	4.9
Temperature Rating:	155
Flow Required at Source (GPM)	17
Pressure Required at Source (psi)	37.41
Source Reference Point:	At Ref Pt STR
C-Factor of Sprinkler Pipe	150
C-Factor of Service Line	150
Head Reference Point:	H.8

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)	26.0933
Pressure Required at Source (psi)	48
Source Reference Point:	At Ref Pt STR
C-Factor of Sprinkler Pipe	150
C-Factor of Service Line	150
Head Reference Point:	H.9 & H.17

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

Floor Plan Labels

- 2-1 3/4" x 9 1/4" LVL AROUND SCREENED PORCH
- 16'x10' WOOD DECK CONC. PATIO 160 S.F.
- 14'x10' SCREENED PORCH 150 S.F.
- 36" VENTLESS FIREPLACE 64"x 20" FLUSH HEARTH
- GREAT ROOM
- H.3 RFC49-16
- H.4 RFC49-16
- T.20
- T.23
- DINING / OFFICE
- 8/6 CLG. 9/0 CLG.
- H.5 RFC49-16
- T.24
- T.25
- MASTER BEDROOM
- 8/6 CLG. 9/0 CLG.
- H.6 RFC49-16
- TRUSSES @ 24" O.C. ATTIC ROOM
- NOOK
- H.13 RFC49-16
- H.12 RFC49-16
- H.10 RFC49-16
- H.11 RFC49-16
- 42"x 48" SHOWER
- KITCHEN
- LEGS @ ISLAND
- DBL. 2/0 FRENCH DOORS
- MASTER BATH RFC49-18
- 42"x60" TUB
- FOYER
- OPEN RAILING
- OPEN SHELVES
- T.34
- UTIL.
- RFC49-16
- PANTRY
- SHELVES
- 2x4 WALL FULL HT. 18" LONG
- CUBBIES
- T.30 RNG.
- T.32
- T.36
- 3rd CAR GARAGE (DROP GARAGE WALLS TO 8'-11 1/2") 293 S.F.
- DOUBLE GARAGE 443 S.F.
- BALL VALVE LOCATION (S.1)
- WIC
- RFC49-16
- PORCH 18 S.F.
- BENCH SEAT
- ROD / SHELF
- SHELVES
- 2x4 WALL
- 2- 2x12 PORCH BOXED BEAM
- GARAGE DOOR WALL TO BE PORTAL FRAME CONSTRUCTION, COMPLYING SECTION R602.10.1 AND FIGURE~R602.10.1 METHOD PFG
- 2-1 3/4"x11 7/8" LVL GAR. DR. HEADER
- 16/0 x 7/0 O.H. GARAGE DOOR
- 9/0 x 7/0 O.H. GARAGE DOOR
- ATTIC STOR. ROOM TRUSSES @ 24" O.C.
- ATTIC STOR. ROOM

WATER SERVICE DETAIL

- S-1 (REFER TO LOCATION ON PLANS) TO PASSIVE PURGE SPRINKLER SYSTEM
- SHUT-OFF BALL VALVE
- 1-1/4" PEX 50' DISTANCE FROM WATER METER to S-1
- 3 PSI FIXED LOSS USED IN CALCULATIONS
- HOUSE FOUNDATION
- 1" PVC 20' DISTANCE FROM CITY WATER MAIN TO WATER METER
- 1" WATER METER - 3 PSI LOSS
- CITY GATE VALVE
- CITY MAIN

FLOW AT SOURCE: 168 GPM
SUPPLY STATIC PRESSURE: 60 PSI
RESIDUAL PRESSURE: 20 PSI
SUPPLY ELEVATION: 0'

Title Block

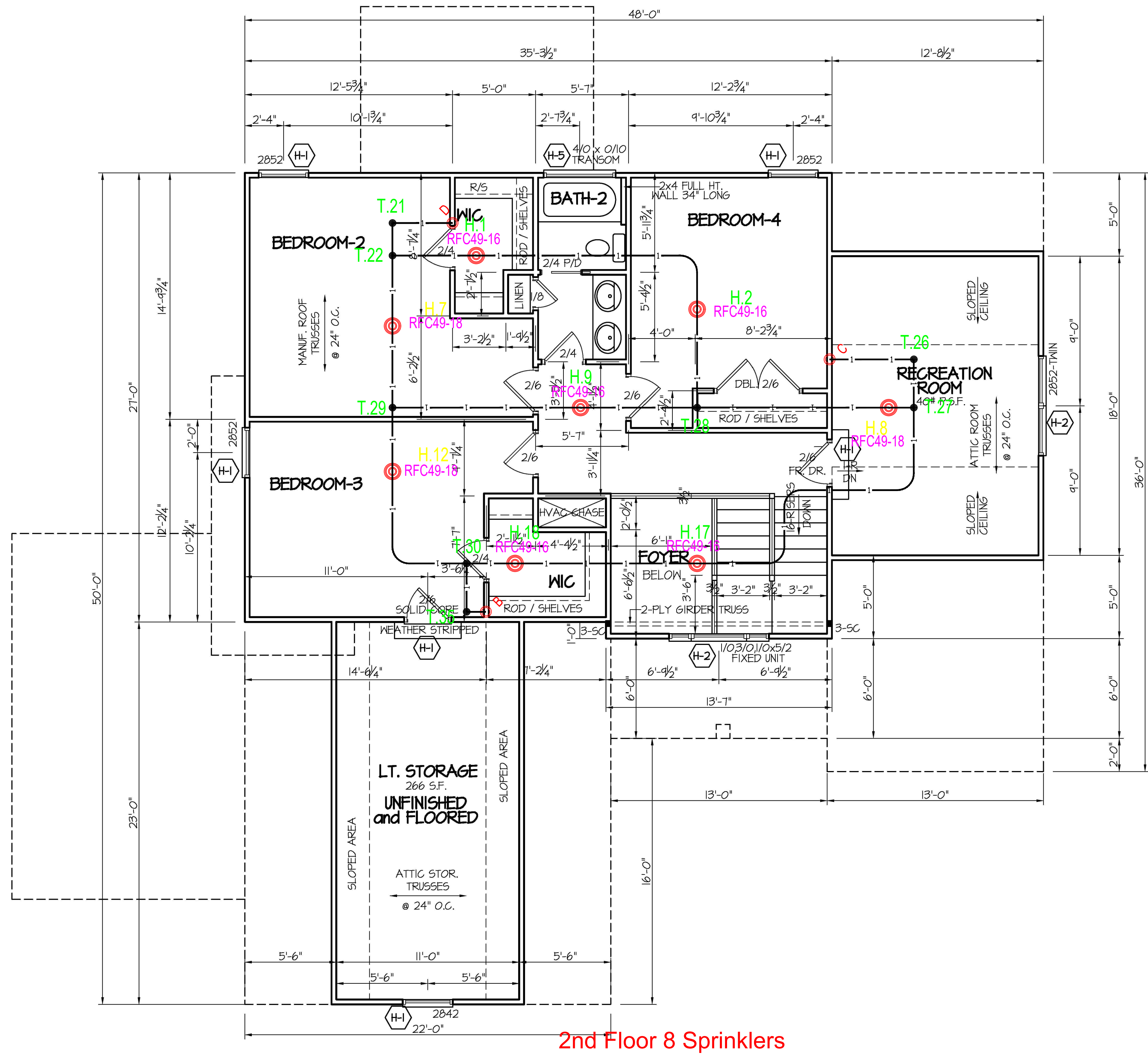|	
Project:	238 OAKHAVEN DRIVE, LOT 5 HOLLY SPRINGS, NC 27540
Dwg no.:	FP 1
Title:	FIRTS FLOOR PLAN
Quotation no.:	FPNM2103-004 NC
Drawn by:	N.M.
Approv. by:	
Date Submitted:	3/4/2021
Scale:	1/4" = 1'
Revision No:	Revision Date:

Floor Plan Labels

- 48'-0"
- 35'-3½"
- 12'-8½"
- 12'-5¾"
- 5'-0"
- 5'-7"
- 12'-2¾"
- 2'-4"
- 10'-1¾"
- 2'-7¾"
- 9'-10¾"
- 2'-4"

BEDROOM-2
- T.21
- T.22
- WIC
- RFC49-16 (F.1)
- H.2 RFC49-18
- T.29
- MANUF. ROOF TRUSSES @ 24" O.C.

BATH-2
- R/S
- ROD / SHELVES
- 2/4 F/D
- LINEN
- 4/0 x 0/10 TRANSOM
- H-5

BEDROOM-4
- 2×4 FULL HT. WALL 34" LONG
- H.2 RFC49-16
- DBL 2/6
- 2/6

BEDROOM-3
- H.12 RFC49-18
- 2/6
- 11'-0"
- 14'-6¾"

WIC
- T.30
- H.10 RFC49-16
- ROD / SHELVES
- SOLID CORE
- WEATHER STRIPPED

FOYER
- H.17 RFC49-18
- BELOW
- 2-PLY GIRDER TRUSS
- 3-SC

RECREATION ROOM
- T.26
- T.27
- 49" R.S.F.
- ATTIC ROOM TRUSSES @ 24" O.C.
- H.8 RFC49-18
- FR. DR.
- SLOPED CEILING

- H.9 RFC49-16
- HVAC CHASE
- 5'-7"
- 2/6
- T.39 ROD / SHELVES

LT. STORAGE
- 266 S.F.
- UNFINISHED and FLOORED
- ATTIC STOR. TRUSSES @ 24" O.C.
- SLOPED AREA

- I/03/01/0x5/2 FIXED UNIT
- 6'-9½"
- 6'-9½"
- 13'-7"
- 13'-0"
- 13'-0"
- 5'-6"
- 11'-0"
- 5'-6"
- 5'-6"
- 5'-6"
- 22'-0"
- 16'-0"
- 23'-0"
- 50'-0"
- 14'-6¼"
- 1'-2¼"
- 21'-0"
- 10'-2¼"
- 2'-0"
- 36'-0"
- 18'-0"
- 9'-0"
- 9'-0"
- 5'-0"
- 5'-0"
- 6'-0"
- 2'-0"
- 5'-0"

- 2852 (×several)
- 2842
- H-1, H-2, H-5

2nd Floor 8 Sprinklers

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

Project:
238 OAKHAVEN DRIVE, LOT 5
HOLLY SPRINGS, NC 27540

Dwg no.:
FP 2

Title:
SECOND FLOOR PLAN

Quotation no.:	FPNM2103-004 NC
Drawn by:	N.M.
Approv. by:	
Date Submitted:	3/4/2021
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

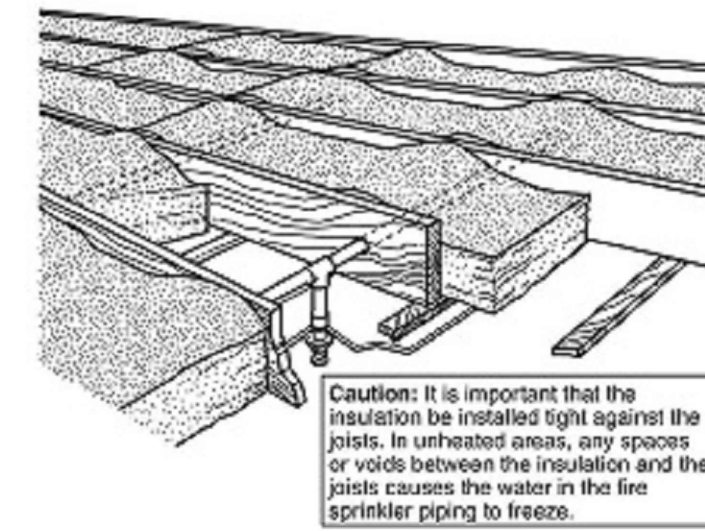## INSTALLATION DETAIL - SPRINKLER BRACKETS

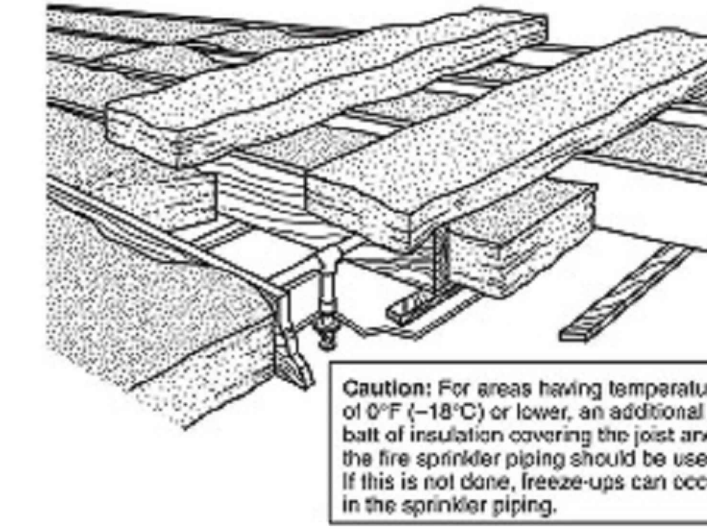FIGURE A.9.1.1(a) Insulation Recommendations — Arrangement 1.

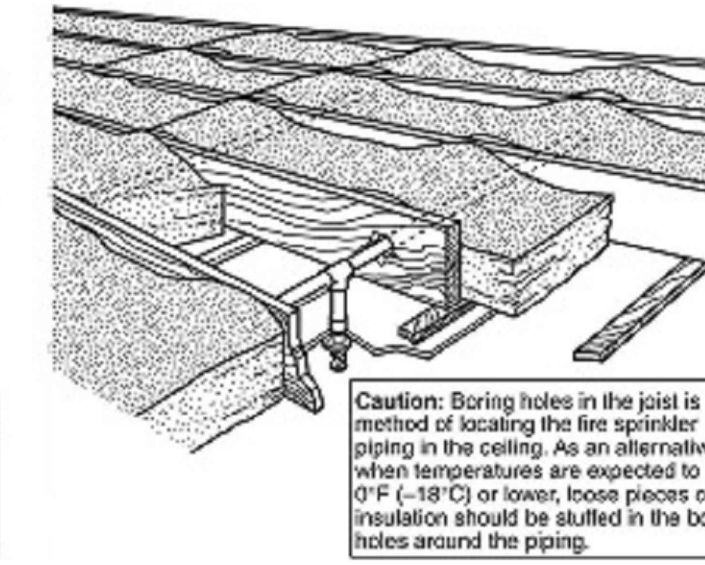FIGURE A.9.1.1(b) Insulation Recommendations — Arrangement 2.

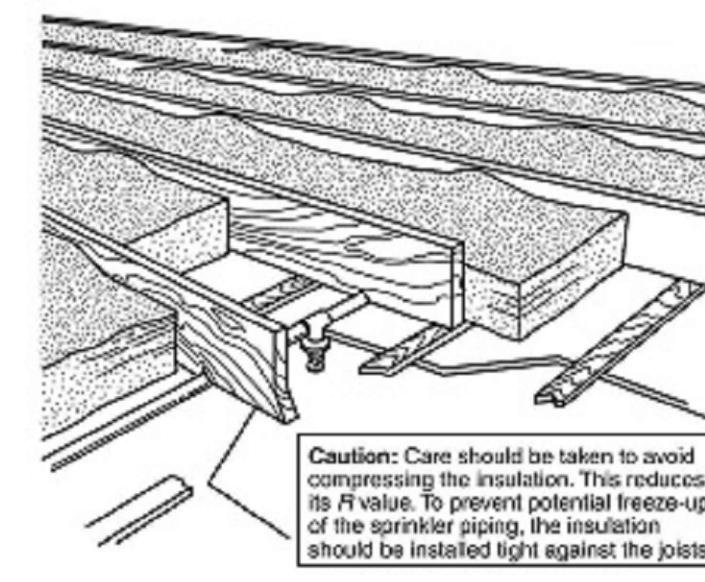FIGURE A.9.1.1(c) Insulation Recommendations — Arrangement 3.

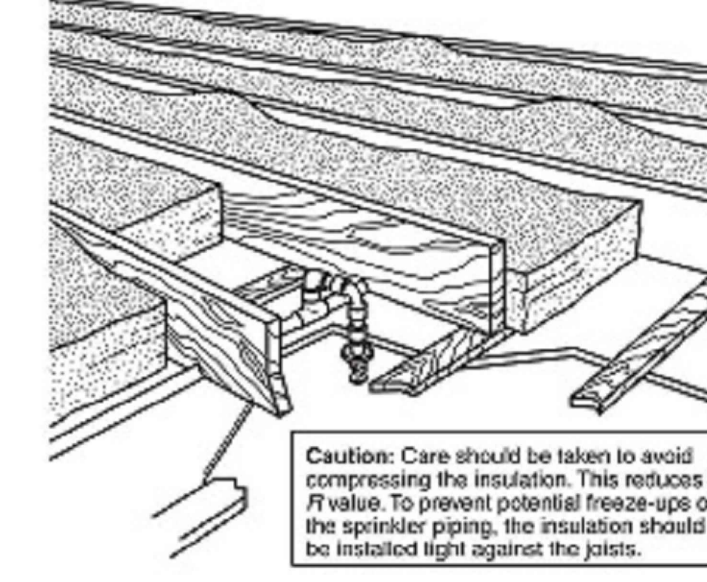FIGURE A.9.1.1(d) Insulation Recommendations — Arrangement 4.

FIGURE A.9.1.1(e) Insulation Recommendations — Arrangement 5.
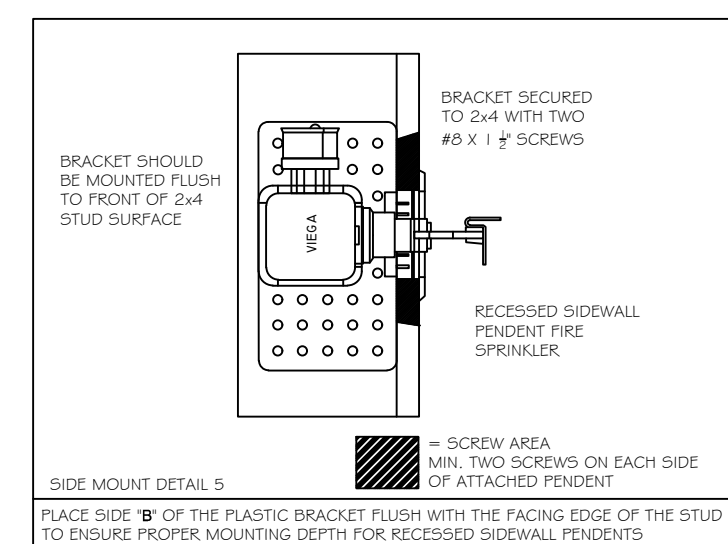
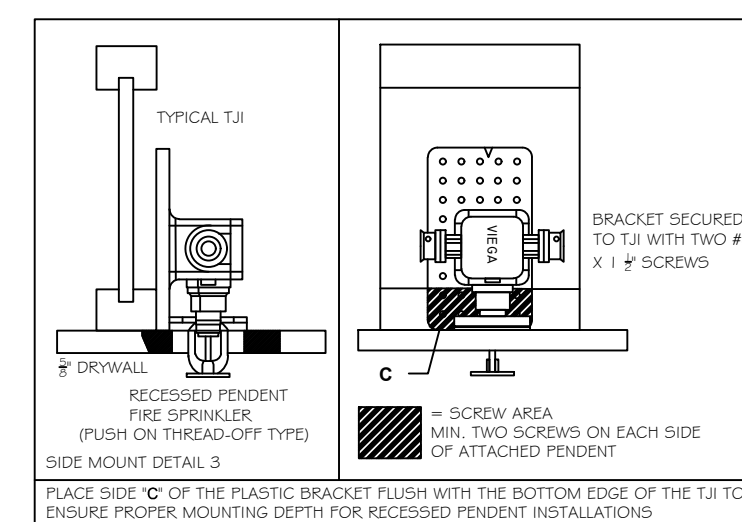## INSULATION DETAILS - ANNEX A.9.1.1 (NFPA 13D 2016)

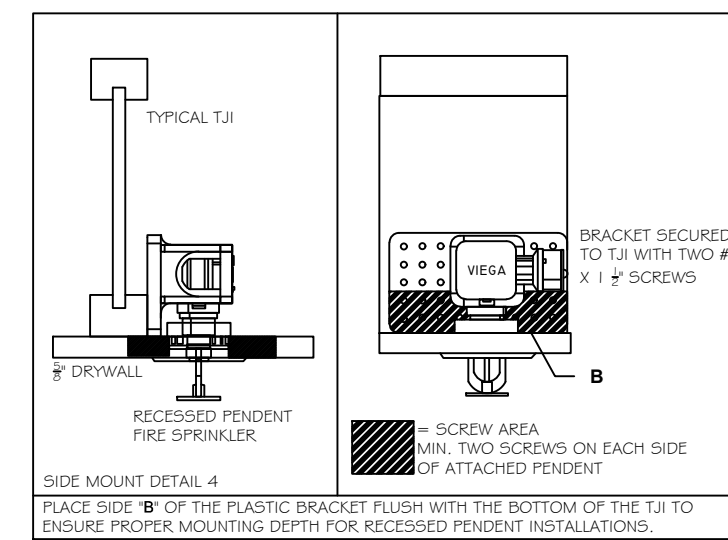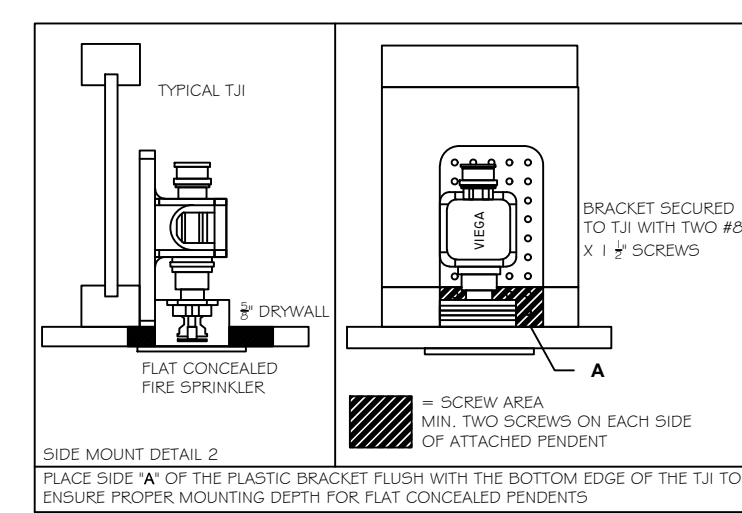### WATER METER PRESSURE LOSSES (PSI) - TABLE 10.4.4(A) NFPA 13D (2016)

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)

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

Project:

238 OAKHAVEN DRIVE, LOT 5
HOLLY SPRINGS, NC 27540

Dwg no.:

FP 3

Title:

NOTES & DETAILS

Quotation no.: FPNM2103-004 NC

Drawn by: N.M.

Approv. by:

Date Submitted: 3/4/2021

Scale: N/A

Revision No: Revision Date:

viega

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

Job Name	:	238 OAKHAVEN DRIVE, LOT 5 - One Head Calculation (H.8)
Building	:	SINGLE FAMILY RESIDENCE
Location	:	HOLLY SPRINGS NC 27540
System	:	NFPA 13D
Contract	:	FPNM2103-004 NC
Data File	:	FPNM2103-004 NC (238 Oakhaven Dr, Lot 5).wx1

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HYDRAULIC DESIGN INFORMATION SHEET


Name - 238 OAKHAVEN DRIVE  LOT 5                    Date - 3/4/2021
Location -
Building - SINGLE FAMILY RESIDENCE            System No. - NFPA 13D
Contractor - x                               Contract No. - FPNM2103-004 NC
Calculated By - VIEGA LLC                     Drawing No. - FPNM2103-004 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 - 118  Feet  Size 7/16      K-Factor 4.9
G    Note:                                Temperature Rating 155
N


Calculation   Gpm Required 17      Psi Required 37.41    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
```

Water Supply Curve C

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

Demand:
- D1 - Elevation   : 7.796
- D2 - System Flow   : 16.995
- D2 - System Pressure   : 37.406
- Hose (Demand)   : _____
- D3 - System Demand   : 16.995
- Safety Margin   : 22.017

PRESSURE vs FLOW (N ^ 1.85)

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	37.406

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
H.8	118.0	4.9	12.03	17.0	
T.27	118.0		13.06		
T.26	118.0		13.53		
T.25	108.0		18.52		
T.24	108.0		18.93		
H.6	108.0		19.06		
H.15	108.0		19.32		
T.34	108.0		19.43		
H.19	108.0		19.5		
H.11	108.0		19.79		
H.10	108.0		19.98		
H.14	108.0		20.25		
T.31	108.0		20.43		
T.32	108.0		20.73		
T.36	108.0		21.06		
S.1	104.0		27.35		
MTR	100.0		35.36		
STR	100.0		37.41		
T.28	118.0		12.72		
H.2	118.0		12.94		
H.1	118.0		13.13		
T.22	118.0		13.37		
T.21	118.0		13.73		
T.20	108.0		18.3		
T.23	108.0		18.95		
H.3	108.0		19.27		
H.13	108.0		19.63		
H.16	108.0		19.82		
H.9	118.0		12.84		
T.29	118.0		13.34		
H.12	118.0		13.4		
T.30	118.0		13.52		
T.35	118.0		14.2		
T.33	108.0		20.02		
H.17	118.0		13.34		
H.18	118.0		13.45		
H.7	118.0		13.35		
H.5	108.0		18.93		
H.4	108.0		18.95		

Final Calculations - Hazen-Williams

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.8 to T.27	8.96 8.96	0.863 150.0 0.0505	Vptb	18.4 0.0 0.0	2.000 18.400 20.400	12.030 0.0 1.030		K Factor = 4.90 Vel = 4.91		
T.27 to T.26	-3.66 5.3	0.863 150.0 0.0191	Vprt Vpel	3.8 17.7 0.0	3.000 21.500 24.500	13.060 0.0 0.467		Vel = 2.91		
T.26 to T.25	0.0 5.3	0.863 150.0 0.0190	Vpel	17.7 0.0 0.0	17.000 17.700 34.700	13.527 4.331 0.661		Vel = 2.91		
T.25 to T.24	0.0 5.3	0.863 150.0 0.0191	Vptb	18.4 0.0 0.0	3.000 18.400 21.400	18.519 0.0 0.408		Vel = 2.91		
T.24 to H.6	-0.93 4.37	0.863 150.0 0.0134	Vprt	3.8 0.0 0.0	6.000 3.800 9.800	18.927 0.0 0.131		Vel = 2.40		
H.6 to H.15	0.0 4.37	0.863 150.0 0.0134	Vprt	3.8 0.0 0.0	16.000 3.800 19.800	19.058 0.0 0.266		Vel = 2.40		
H.15 to T.34	0.0 4.37	0.863 150.0 0.0133	Vprt	3.8 0.0 0.0	4.000 3.800 7.800	19.324 0.0 0.104		Vel = 2.40		
T.34 to H.19	0.0 4.37	0.863 150.0 0.0134		0.0 0.0 0.0	5.000 0.0 5.000	19.428 0.0 0.067		Vel = 2.40		
H.19 to H.11	0.0 4.37	0.863 150.0 0.0134	Vprt	3.8 0.0 0.0	18.000 3.800 21.800	19.495 0.0 0.292		Vel = 2.40		
H.11 to H.10	0.0 4.37	0.863 150.0 0.0134	Vprt	3.8 0.0 0.0	11.000 3.800 14.800	19.787 0.0 0.198		Vel = 2.40		
H.10 to H.14	0.0 4.37	0.863 150.0 0.0134	Vprt	3.8 0.0 0.0	16.000 3.800 19.800	19.985 0.0 0.265		Vel = 2.40		
H.14 to T.31	0.0 4.37	0.863 150.0 0.0134	Vprt	3.8 0.0 0.0	10.000 3.800 13.800	20.250 0.0 0.185		Vel = 2.40		
T.31 to T.32	5.67 10.04	0.863 150.0 0.0621	Vprt	3.8 0.0 0.0	1.000 3.800 4.800	20.435 0.0 0.298		Vel = 5.51		
T.32 to T.36	6.96 17.0	0.863 150.0 0.1650		0.0 0.0 0.0	2.000 0.0 2.000	20.733 0.0 0.330		Vel = 9.32		
T.36 to S.1	0.0 17.0	0.863 150.0 0.1649	Vpel T	17.7 2.92 0.0	7.000 20.620 27.620	21.063 1.732 4.554		Vel = 9.32		
S.1 to MTR	0.0 17.0	1.053 150.0 0.0626	2E	2.429 0.0 0.0	50.000 2.429 52.429	27.349 4.732 3.280		* * Fixed Loss = 3 Vel = 6.26		

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*******	Notes ******
MTR to STR	0.0 17.0	1.049 150.0 0.0637	E T G	3.022 7.555 1.511	20.000 12.089 32.089	35.361 0.0 2.045			Vel = 6.31
	0.0 17.00					37.406			K Factor = 2.78
H.8 to T.28	8.03 8.03	0.863 150.0 0.0412	Vprt	3.8 0.0 0.0	13.000 3.800 16.800	12.030 0.0 0.692			Vel = 4.40
T.28 to H.2	-4.60 3.43	0.863 150.0 0.0085	Vptb	18.4 0.0 0.0	7.000 18.400 25.400	12.722 0.0 0.217			Vel = 1.88
H.2 to H.1	0.0 3.43	0.863 150.0 0.0086	Vprt	3.8 0.0 0.0	18.000 3.800 21.800	12.939 0.0 0.187			Vel = 1.88
H.1 to T.22	0.0 3.43	0.863 150.0 0.0085	Vptb Vprt	18.4 3.8 0.0	6.000 22.200 28.200	13.126 0.0 0.241			Vel = 1.88
T.22 to T.21	1.31 4.74	0.863 150.0 0.0155	Vprt Vpel	3.8 17.7 0.0	2.000 21.500 23.500	13.367 0.0 0.365			Vel = 2.60
T.21 to T.20	0.0 4.74	0.863 150.0 0.0155		0.0 0.0 0.0	15.000 0.0 15.000	13.732 4.331 0.233			Vel = 2.60
T.20 to T.23	0.0 4.74	0.863 150.0 0.0155	Vptb Vpel	18.4 17.7 0.0	6.000 36.100 42.100	18.296 0.0 0.654			Vel = 2.60
T.23 to H.3	0.92 5.66	0.863 150.0 0.0216	Vprt	3.8 0.0 0.0	11.000 3.800 14.800	18.950 0.0 0.320			Vel = 3.10
H.3 to H.13	0.0 5.66	0.863 150.0 0.0215	Vprt	3.8 0.0 0.0	13.000 3.800 16.800	19.270 0.0 0.362			Vel = 3.10
H.13 to H.16	0.0 5.66	0.863 150.0 0.0216	Vprt	3.8 0.0 0.0	5.000 3.800 8.800	19.632 0.0 0.190			Vel = 3.10
H.16 to T.31	0.0 5.66	0.863 150.0 0.0216	Vptb	18.4 0.0 0.0	10.000 18.400 28.400	19.822 0.0 0.613			Vel = 3.10
	0.0 5.66					20.435			K Factor = 1.25
T.28 to H.9	4.60 4.6	0.863 150.0 0.0148		0.0 0.0 0.0	8.000 0.0 8.000	12.722 0.0 0.118			Vel = 2.52
H.9 to T.29	0.0 4.6	0.863 150.0 0.0147	Vptb Vprt	18.4 3.8 0.0	12.000 22.200 34.200	12.840 0.0 0.502			Vel = 2.52
T.29 to H.12	-1.31 3.29	0.863 150.0 0.0078	Vprt	3.8 0.0 0.0	4.000 3.800 7.800	13.342 0.0 0.061			Vel = 1.80

Viega LLC
238 OAKHAVEN DRIVE, LOT 5 - One Head Calculation (H.8)

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.12 to T.30	0.0 3.29	0.863 150.0 0.0079	Vprt	3.8 0.0 0.0	11.000 3.800 14.800	13.403 0.0 0.117			Vel = 1.80	
T.30 to T.35	3.67 6.96	0.863 150.0 0.0316	Vptb	18.4 0.0 0.0	3.000 18.400 21.400	13.520 0.0 0.676			Vel = 3.82	
T.35 to T.33	0.0 6.96	0.863 150.0 0.0316	2Vpel	35.4 0.0 0.0	12.000 35.400 47.400	14.196 4.331 1.498			Vel = 3.82	
T.33 to T.32	0.0 6.96	0.863 150.0 0.0316	Vptb	18.4 0.0 0.0	4.000 18.400 22.400	20.025 0.0 0.708			Vel = 3.82	
	0.0 6.96					20.733			K Factor = 1.53	
T.27 to H.17	3.67 3.67	0.863 150.0 0.0097	Vprt	3.8 0.0 0.0	25.000 3.800 28.800	13.060 0.0 0.278			Vel = 2.01	
H.17 to H.18	0.0 3.67	0.863 150.0 0.0097		0.0 0.0 0.0	12.000 0.0 12.000	13.338 0.0 0.116			Vel = 2.01	
H.18 to T.30	0.0 3.67	0.863 150.0 0.0097	Vprt	3.8 0.0 0.0	3.000 3.800 6.800	13.454 0.0 0.066			Vel = 2.01	
	0.0 3.67					13.520			K Factor = 1.00	
T.29 to H.7	1.31 1.31	0.863 150.0 0.0014	Vprt	3.8 0.0 0.0	5.000 3.800 8.800	13.342 0.0 0.012			Vel = 0.72	
H.7 to T.22	0.0 1.31	0.863 150.0 0.0015	Vprt	3.8 0.0 0.0	5.000 3.800 8.800	13.354 0.0 0.013			Vel = 0.72	
	0.0 1.31					13.367			K Factor = 0.36	
T.24 to H.5	0.92 0.92	0.863 150.0 0.0007	Vprt	3.8 0.0 0.0	7.000 3.800 10.800	18.927 0.0 0.008			Vel = 0.50	
H.5 to H.4	0.0 0.92	0.863 150.0 0.0008	Vprt	3.8 0.0 0.0	12.000 3.800 15.800	18.935 0.0 0.012			Vel = 0.50	
H.4 to T.23	0.0 0.92	0.863 150.0 0.0008		0.0 0.0 0.0	4.000 0.0 4.000	18.947 0.0 0.003			Vel = 0.50	
	0.0 0.92					18.950			K Factor = 0.21	

viega

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

Job Name   : 238 OAKHAVEN DRIVE, LOT 5 - Two Head Calculation (H.9 & H.17)
Building   : SINGLE FAMILY RESIDENCE
Location   : HOLLY SPRINGS NC 27540
System   : NFPA 13D
Contract   : FPNM2103-004 NC
Data File   : FPNM2103-004 NC (238 Oakhaven Dr, Lot 5).wx2

HYDRAULIC DESIGN INFORMATION SHEET

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Name - 238 OAKHAVEN DRIVE  LOT 5                    Date - 3/4/2021
Location -
Building - SINGLE FAMILY RESIDENCE              System No. - NFPA 13D
Contractor - x                                  Contract No. - FPNM2103-004 NC
Calculated By - VIEGA LLC                       Drawing No. - FPNM2103-004 NC
Construction:  (X) Combustible   ( ) Non-Combustible    Ceiling Height 9
OCCUPANCY - RESIDENTIAL
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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 - 118  Feet  Size 7/16       K-Factor 4.9
G    Note:                               Temperature Rating 155
N
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Calculation   Gpm Required 26.0933   Psi Required 48      At Ref Pt STR
Summary       C-Factor Used:         Overhead 150         Underground 150
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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
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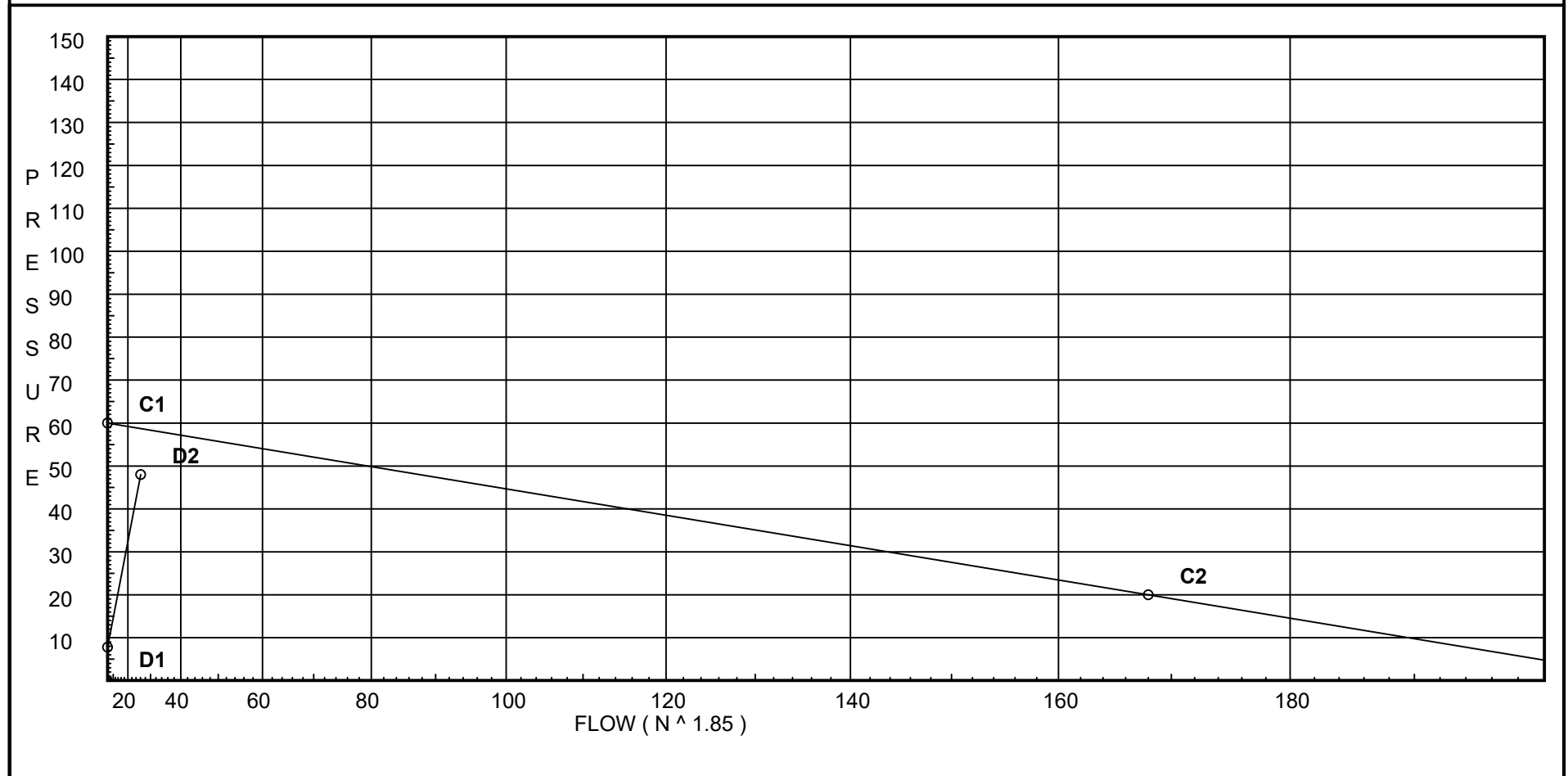
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P    Location: x
P
L    Source of Information: x
Y
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Water Supply Curve C

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

Demand:
    D1 - Elevation   : 7.796
    D2 - System Flow   : 26.093
    D2 - System Pressure   : 47.997
    Hose (Demand)   : _____
    D3 - System Demand   : 26.093
    Safety Margin   : 10.727

PRESSURE (y-axis): 10 to 150

FLOW (N ^ 1.85) (x-axis): 20 to 180

Points labeled: C1, D2, D1, C2

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

Flow Summary - NFPA 2007

SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
STR	60.0	20	168.0	58.724	26.09	47.997

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
H.9	118.0	4.9	7.04	13.0	
T.29	118.0		7.88		
H.7	118.0		7.96		
T.22	118.0		8.04		
T.21	118.0		8.85		
T.20	108.0		13.7		
T.23	108.0		15.14		
H.3	108.0		15.83		
H.13	108.0		16.61		
H.16	108.0		17.01		
T.31	108.0		18.33		
T.32	108.0		18.97		
T.36	108.0		19.7		
S.1	104.0		31.5		
MTR	100.0		43.48		
STR	100.0		48.0		
T.28	118.0		7.29		
H.2	118.0		7.54		
H.1	118.0		7.76		
H.8	118.0		7.42		
T.27	118.0		7.57		
T.26	118.0		8.54		
T.25	108.0		14.25		
T.24	108.0		15.1		
H.6	108.0		15.38		
H.15	108.0		15.95		
T.34	108.0		16.17		
H.19	108.0		16.32		
H.11	108.0		16.94		
H.10	108.0		17.37		
H.14	108.0		17.93		
H.17	118.0	4.9	7.14	13.09	
H.18	118.0		7.68		
T.30	118.0		7.99		
T.35	118.0		9.55		
T.33	108.0		17.34		
H.12	118.0		7.92		
H.5	108.0		15.12		
H.4	108.0		15.14		

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 to T.29	6.07 6.07	0.863 150.0 0.0245	Vptb Vprt	18.4 3.8 0.0	12.000 22.200 34.200	7.040 0.0 0.839		K Factor = 4.90 Vel = 3.33
T.29 to H.7	-2.51 3.56	0.863 150.0 0.0091	Vprt	3.8 0.0 0.0	5.000 3.800 8.800	7.879 0.0 0.080		 Vel = 1.95
H.7 to T.22	0.0 3.56	0.863 150.0 0.0092	Vprt	3.8 0.0 0.0	5.000 3.800 8.800	7.959 0.0 0.081		 Vel = 1.95
T.22 to T.21	3.72 7.28	0.863 150.0 0.0344	Vprt Vpel	3.8 17.7 0.0	2.000 21.500 23.500	8.040 0.0 0.808		 Vel = 3.99
T.21 to T.20	0.0 7.28	0.863 150.0 0.0344		0.0 0.0 0.0	15.000 0.0 15.000	8.848 4.331 0.516		 Vel = 3.99
T.20 to T.23	0.0 7.28	0.863 150.0 0.0344	Vptb Vpel	18.4 17.7 0.0	6.000 36.100 42.100	13.695 0.0 1.449		 Vel = 3.99
T.23 to H.3	1.28 8.56	0.863 150.0 0.0463	Vprt	3.8 0.0 0.0	11.000 3.800 14.800	15.144 0.0 0.685		 Vel = 4.70
H.3 to H.13	0.0 8.56	0.863 150.0 0.0463	Vprt	3.8 0.0 0.0	13.000 3.800 16.800	15.829 0.0 0.778		 Vel = 4.70
H.13 to H.16	0.0 8.56	0.863 150.0 0.0462	Vprt	3.8 0.0 0.0	5.000 3.800 8.800	16.607 0.0 0.407		 Vel = 4.70
H.16 to T.31	0.0 8.56	0.863 150.0 0.0463	Vptb	18.4 0.0 0.0	10.000 18.400 28.400	17.014 0.0 1.315		 Vel = 4.70
T.31 to T.32	6.60 15.16	0.863 150.0 0.1333	Vprt	3.8 0.0 0.0	1.000 3.800 4.800	18.329 0.0 0.640		 Vel = 8.32
T.32 to T.36	10.93 26.09	0.863 150.0 0.3645		0.0 0.0 0.0	2.000 0.0 2.000	18.969 0.0 0.729		 Vel = 14.31
T.36 to S.1	0.0 26.09	0.863 150.0 0.3644	Vpel T	17.7 2.92 0.0	7.000 20.620 27.620	19.698 1.732 10.065		 Vel = 14.31
S.1 to MTR	0.0 26.09	1.053 150.0 0.1383	2E	2.429 0.0 0.0	50.000 2.429 52.429	31.495 4.732 7.250		* * Fixed Loss = 3 Vel = 9.61
MTR to STR	0.0 26.09	1.049 150.0 0.1409	E T G	3.022 7.555 1.511	20.000 12.089 32.089	43.477 0.0 4.520		 Vel = 9.69
	0.0 26.09					47.997		K Factor = 3.77
H.9 to T.28	6.93 6.93	0.863 150.0 0.0314		0.0 0.0 0.0	8.000 0.0 8.000	7.040 0.0 0.251		 Vel = 3.80

Final Calculations - Hazen-Williams

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.28 to H.2	-3.21 3.72	0.863 150.0 0.0099	Vptb	18.4 0.0 0.0	7.000 18.400 25.400	7.291 0.0 0.252			Vel = 2.04
H.2 to H.1	0.0 3.72	0.863 150.0 0.0100	Vprt	3.8 0.0 0.0	18.000 3.800 21.800	7.543 0.0 0.217			Vel = 2.04
H.1 to T.22	0.0 3.72	0.863 150.0 0.0099	Vptb Vprt	18.4 3.8 0.0	6.000 22.200 28.200	7.760 0.0 0.280			Vel = 2.04
	0.0 3.72					8.040			K Factor = 1.31
T.28 to H.8	3.21 3.21	0.863 150.0 0.0076	Vprt	3.8 0.0 0.0	13.000 3.800 16.800	7.291 0.0 0.127			Vel = 1.76
H.8 to T.27	0.0 3.21	0.863 150.0 0.0075	Vptb	18.4 0.0 0.0	2.000 18.400 20.400	7.418 0.0 0.154			Vel = 1.76
T.27 to T.26	4.66 7.87	0.863 150.0 0.0397	Vprt Vpel	3.8 17.7 0.0	3.000 21.500 24.500	7.572 0.0 0.973			Vel = 4.32
T.26 to T.25	0.0 7.87	0.863 150.0 0.0397	Vpel	17.7 0.0 0.0	17.000 17.700 34.700	8.545 4.331 1.377			Vel = 4.32
T.25 to T.24	0.0 7.87	0.863 150.0 0.0397	Vptb	18.4 0.0 0.0	3.000 18.400 21.400	14.253 0.0 0.849			Vel = 4.32
T.24 to H.6	-1.27 6.6	0.863 150.0 0.0287	Vprt	3.8 0.0 0.0	6.000 3.800 9.800	15.102 0.0 0.281			Vel = 3.62
H.6 to H.15	0.0 6.6	0.863 150.0 0.0286	Vprt	3.8 0.0 0.0	16.000 3.800 19.800	15.383 0.0 0.567			Vel = 3.62
H.15 to T.34	0.0 6.6	0.863 150.0 0.0287	Vprt	3.8 0.0 0.0	4.000 3.800 7.800	15.950 0.0 0.224			Vel = 3.62
T.34 to H.19	0.0 6.6	0.863 150.0 0.0286		0.0 0.0 0.0	5.000 0.0 5.000	16.174 0.0 0.143			Vel = 3.62
H.19 to H.11	0.0 6.6	0.863 150.0 0.0287	Vprt	3.8 0.0 0.0	18.000 3.800 21.800	16.317 0.0 0.625			Vel = 3.62
H.11 to H.10	0.0 6.6	0.863 150.0 0.0286	Vprt	3.8 0.0 0.0	11.000 3.800 14.800	16.942 0.0 0.424			Vel = 3.62
H.10 to H.14	0.0 6.6	0.863 150.0 0.0287	Vprt	3.8 0.0 0.0	16.000 3.800 19.800	17.366 0.0 0.568			Vel = 3.62
H.14 to T.31	0.0 6.6	0.863 150.0 0.0286	Vprt	3.8 0.0 0.0	10.000 3.800 13.800	17.934 0.0 0.395			Vel = 3.62

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*******	Notes ******
	0.0 6.60					18.329			K Factor = 1.54
T.27 to H.17	-4.66 -4.66	0.863 150.0 -0.0150	Vprt	3.8 0.0 0.0	25.000 3.800 28.800	7.572 0.0 -0.433			Vel = 2.56
H.17 to H.18	13.09 8.43	0.863 150.0 0.0451		0.0 0.0 0.0	12.000 0.0 12.000	7.139 0.0 0.541		K Factor = 4.90	Vel = 4.62
H.18 to T.30	0.0 8.43	0.863 150.0 0.0450	Vprt	3.8 0.0 0.0	3.000 3.800 6.800	7.680 0.0 0.306			Vel = 4.62
T.30 to T.35	2.51 10.94	0.863 150.0 0.0729	Vptb	18.4 0.0 0.0	3.000 18.400 21.400	7.986 0.0 1.561			Vel = 6.00
T.35 to T.33	0.0 10.94	0.863 150.0 0.0730	2Vpel	35.4 0.0 0.0	12.000 35.400 47.400	9.547 4.331 3.458			Vel = 6.00
T.33 to T.32	0.0 10.94	0.863 150.0 0.0729	Vptb	18.4 0.0 0.0	4.000 18.400 22.400	17.336 0.0 1.633			Vel = 6.00
	0.0 10.94					18.969			K Factor = 2.51
T.29 to H.12	2.50 2.5	0.863 150.0 0.0047	Vprt	3.8 0.0 0.0	4.000 3.800 7.800	7.879 0.0 0.037			Vel = 1.37
H.12 to T.30	0.0 2.5	0.863 150.0 0.0047	Vprt	3.8 0.0 0.0	11.000 3.800 14.800	7.916 0.0 0.070			Vel = 1.37
	0.0 2.50					7.986			K Factor = 0.88
T.24 to H.5	1.27 1.27	0.863 150.0 0.0014	Vprt	3.8 0.0 0.0	7.000 3.800 10.800	15.102 0.0 0.015			Vel = 0.70
H.5 to H.4	0.0 1.27	0.863 150.0 0.0013	Vprt	3.8 0.0 0.0	12.000 3.800 15.800	15.117 0.0 0.021			Vel = 0.70
H.4 to T.23	0.0 1.27	0.863 150.0 0.0015		0.0 0.0 0.0	4.000 0.0 4.000	15.138 0.0 0.006			Vel = 0.70
	0.0 1.27					15.144			K Factor = 0.33