



AquaSAFE™ FIRE SAFETY SYSTEM

Uponor
5925 148th Street West

Apple Valley, MN 55124
800-321-4739

Job Name : JERRIER RESIDENCE - Two Head Calculation (H.22 & H.21)
Drawing : RESIDENTIAL
Location : 243 TAFT AVE PORTLAND ME 04103
Remote Area : 1
Contract : 13262F
Data File : 13262F Jerrier Residence.wx2

HYDRAULIC DESIGN INFORMATION SHEET

Name - JERRIER RESIDENCE Date - 4/9/13
Location - PORTLAND ME 04103
Building - RESIDENTIAL System No. - 1
Contractor - FORTIN SERVICES Contract No. - 13262F
Calculated By - BRENT KOTULA SET IV Drawing No. - 1
Construction: (X) Combustible () Non-Combustible Ceiling Height VARIES
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 SENJU SPRINKLER Model RC-RES
I Elevation at Highest Outlet - 118 Feet Size 7/16 K-Factor 4.9
G Note: Temperature Rating 162
N

Calculation Gpm Required 26.0233 Psi Required 64.86 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) - 80 Elev.
R Residual (Psi) - 75 Other Well
Flow (Gpm) - 300 Proof Flow Gpm
S Elevation - 96

P Location: STREET
P
L Source of Information: CONTRACTOR
Y

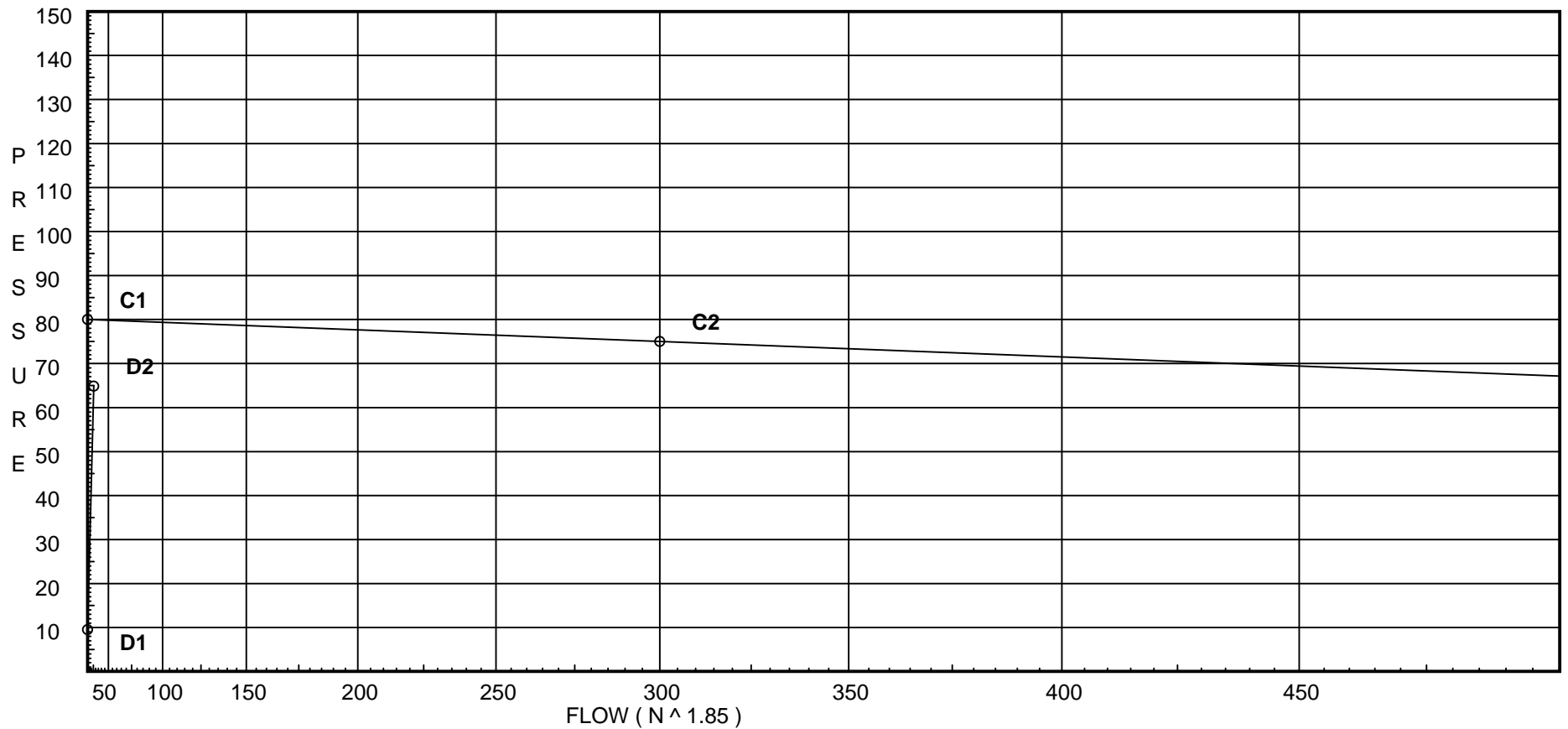
Water Supply Curve (C)

Uponor
JERRIER RESIDENCE - Two Head Calculation (H.22 & H.21)

Page 2
Date 4/9/2013

City Water Supply:
C1 - Static Pressure : 80
C2 - Residual Pressure: 75
C2 - Residual Flow : 300

Demand:
D1 - Elevation : 9.528
D2 - System Flow : 26.0233
D2 - System Pressure : 64.857
Hose (Adj City) : _____
Hose (Demand) : _____
D3 - System Demand : 26.0233
Safety Margin : 15.088



Fittings Used Summary

Uponor
 JERRIER RESIDENCE - Two Head Calculation (H.22 & H.21)

Page 3
 Date 4/9/2013

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
Utb	Aquapex Tee - Branch	2	17	14	9	12	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Utr	Aquapex Tee - Run	1	2	2	4	2	1	0	0	0	0	0	0	0	0	0	0	0	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

Uponsor
 JERRIER RESIDENCE - Two Head Calculation (H.22 & H.21)

Page 4
 Date 4/9/2013

SUPPLY ANALYSIS

<i>Node at Source</i>	<i>Static Pressure</i>	<i>Residual Pressure</i>	<i>Flow</i>	<i>Available Pressure</i>	<i>Total Demand</i>	<i>Required Pressure</i>
STR	80.0	75	300.0	79.946	26.02	64.857

NODE ANALYSIS

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
H.22	118.0	4.9	7.04	13.0	
H.23	118.0		8.18		
H.20	118.0		9.31		
H.18	118.0		10.37		
T.42	118.0		10.77		
T.29	108.0		16.99		
H.5	108.0		19.26		
T.24	108.0		21.78		
S.1	104.0		26.31		
MTR	96.0		37.79		
STR	96.0		64.86		
H.21	118.0	4.9	7.06	13.02	
H.19	118.0		9.03		
T.43	118.0		10.14		
T.40	108.0		15.84		
T.38	108.0		16.56		
H.12	108.0		16.59		
T.30	108.0		16.73		
H.9	108.0		16.82		
T.27	108.0		16.89		
H.6	108.0		17.84		
T.25	108.0		18.15		
H.2	108.0		19.26		
H.1	108.0		20.68		
H.16	118.0		10.37		
H.15	118.0		10.56		
T.39	118.0		10.85		
H.11	118.0		11.14		
T.32	118.0		11.3		
T.33	118.0		11.39		
T.35	108.0		16.6		
H.10	108.0		16.76		
H.17	118.0		10.92		
H.13	118.0		11.08		
T.34	118.0		11.23		
H.8	118.0		11.25		
H.4	118.0		11.29		
H.3	118.0		11.33		
H.7	118.0		11.37		
T.28	118.0		11.38		
T.37	108.0		16.57		
T.36	108.0		16.58		

Flow Summary - NFPA 2007

Uponor
JERRIER RESIDENCE - Two Head Calculation (H.22 & H.21)

Page 5
Date 4/9/2013

NODE ANALYSIS (cont.)

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
H.14	108.0		16.58		

Final Calculations - Hazen-Williams

Uponor
 JERRIER RESIDENCE - Two Head Calculation (H.22 & H.21)

Page 6
 Date 4/9/2013

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
H.22 to H.23	11.55	0.862 150.0		0.0	14.000	7.040			K Factor = 4.90	
H.23 to H.20	11.55	0.0811		0.0	14.000	1.136			Vel = 6.35	
H.23 to H.20	0.0	0.862 150.0	1Utr	2.0	12.000	8.176				
H.20 to H.18	11.55	0.0811		0.0	14.000	1.136			Vel = 6.35	
H.20 to H.18	0.0	0.862 150.0	1Utr	2.0	11.000	9.312				
H.18 to T.42	11.55	0.0811		0.0	13.000	1.054			Vel = 6.35	
H.18 to T.42	0.0	0.862 150.0	1Utr	2.0	3.000	10.366				
T.42 to T.29	11.55	0.0812		0.0	5.000	0.406			Vel = 6.35	
T.42 to T.29	-4.67	0.862 150.0	2Utb	34.0	32.689	10.772				
T.29 to H.5	6.88	0.0311		0.0	60.689	1.887			Vel = 3.78	
T.29 to H.5	7.77	0.862 150.0	1Utr	2.0	16.000	16.990				
H.5 to T.24	14.65	0.1260		0.0	18.000	2.268			Vel = 8.05	
H.5 to T.24	0.0	0.862 150.0	1Utb 1Utr	17.0 2.0	4.000 16.000	19.258 0.0				
T.24 to S.1	14.65	0.1260		0.0	20.000	2.520			Vel = 8.05	
T.24 to S.1	11.37	1.054 150.0	1T	2.44	18.000	21.778				
S.1 to MTR	26.02	0.1370		0.0	20.440	2.800			Vel = 9.57	
S.1 to MTR	0.0	1.054 150.0	2E	2.44	5.000	26.310				
MTR to STR	26.02	0.1370		0.0	7.440	1.019			* Fixed loss = 7 Vel = 9.57	
MTR to STR	0.0	0.745 150.0	1E 1T	1.85 3.7	30.000 6.475	37.794 0.0				
STR	26.02	0.7420	1G	0.925	36.475	27.063			Vel = 19.15	
	0.0 26.02					64.857			K Factor = 3.23	
H.22 to H.21	1.45	0.862 150.0	1Utr	2.0	11.000	7.040				
H.21 to H.19	1.45	0.0018		0.0	13.000	0.023			Vel = 0.80	
H.21 to H.19	13.02	0.862 150.0	1Utr	2.0	14.000	7.063			K Factor = 4.90	
H.19 to T.43	14.47	0.1232		0.0	16.000	1.971			Vel = 7.96	
H.19 to T.43	0.0	0.862 150.0	1Utr	2.0	7.000	9.034				
T.43 to T.40	14.47	0.1231		0.0	9.000	1.108			Vel = 7.96	
T.43 to T.40	-7.02	0.862 150.0	1Utb	17.0	23.742	10.142				
T.40 to T.38	7.45	0.0361		0.0	37.742	1.362			Vel = 4.10	
T.40 to T.38	0.0	0.862 150.0	1Utr 1Utb	2.0 17.0	4.000 16.000	15.835 0.0				
T.38 to H.12	7.45	0.0360		0.0	20.000	0.721			Vel = 4.10	
T.38 to H.12	-2.38	0.862 150.0		0.0	2.000	16.556				
H.12	5.07	0.0180		0.0	2.000	0.036			Vel = 2.79	

Final Calculations - Hazen-Williams

Uponor
 JERRIER RESIDENCE - Two Head Calculation (H.22 & H.21)

Page 7
 Date 4/9/2013

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
H.12 to T.30	0.0 5.07	0.862 150.0 0.0176	1Utr	2.0 0.0 0.0	6.000 2.000 8.000	16.592 0.0 0.141			Vel = 2.79	
T.30 to H.9	0.0 5.07	0.862 150.0 0.0176	1Utr	2.0 0.0 0.0	3.000 2.000 5.000	16.733 0.0 0.088			Vel = 2.79	
H.9 to T.27	0.0 5.07	0.862 150.0 0.0177	1Utr	2.0 0.0 0.0	2.000 2.000 4.000	16.821 0.0 0.071			Vel = 2.79	
T.27 to H.6	6.30 11.37	0.862 150.0 0.0788	1Utr	2.0 0.0 0.0	10.000 2.000 12.000	16.892 0.0 0.946			Vel = 6.25	
H.6 to T.25	0.0 11.37	0.862 150.0 0.0788	1Utr	2.0 0.0 0.0	2.000 2.000 4.000	17.838 0.0 0.315			Vel = 6.25	
T.25 to H.2	0.0 11.37	0.862 150.0 0.0788	1Utr	2.0 0.0 0.0	12.000 2.000 14.000	18.153 0.0 1.103			Vel = 6.25	
H.2 to H.1	0.0 11.37	0.862 150.0 0.0788	1Utr	2.0 0.0 0.0	16.000 2.000 18.000	19.256 0.0 1.419			Vel = 6.25	
H.1 to T.24	0.0 11.37	0.862 150.0 0.0788	1Utr	2.0 0.0 0.0	12.000 2.000 14.000	20.675 0.0 1.103			Vel = 6.25	
	0.0 11.37					21.778			K Factor = 2.44	
T.43 to H.16	7.02 7.02	0.862 150.0 0.0323	1Utr	2.0 0.0 0.0	5.000 2.000 7.000	10.142 0.0 0.226			Vel = 3.86	
H.16 to H.15	0.0 7.02	0.862 150.0 0.0323	1Utr	2.0 0.0 0.0	4.000 2.000 6.000	10.368 0.0 0.194			Vel = 3.86	
H.15 to T.39	0.0 7.02	0.862 150.0 0.0323	1Utr	2.0 0.0 0.0	7.000 2.000 9.000	10.562 0.0 0.291			Vel = 3.86	
T.39 to H.11	0.0 7.02	0.862 150.0 0.0323	1Utr	2.0 0.0 0.0	7.000 2.000 9.000	10.853 0.0 0.291			Vel = 3.86	
H.11 to T.32	0.0 7.02	0.862 150.0 0.0322	1Utr	2.0 0.0 0.0	3.000 2.000 5.000	11.144 0.0 0.161			Vel = 3.86	
T.32 to T.33	-4.67 2.35	0.862 150.0 0.0043	1Utb	17.0 0.0 0.0	5.000 14.000 19.000	11.305 0.0 0.081			Vel = 1.29	
T.33 to T.35	3.04 5.39	0.862 150.0 0.0198	2Utb	34.0 0.0 0.0	16.543 28.000 44.543	11.386 4.331 0.883			Vel = 2.96	
T.35 to H.10	2.39 7.78	0.862 150.0 0.0390	1Utr	2.0 0.0 0.0	2.000 2.000 4.000	16.600 0.0 0.156			Vel = 4.28	

Final Calculations - Hazen-Williams

Uponor
 JERRIER RESIDENCE - Two Head Calculation (H.22 & H.21)

Page 8
 Date 4/9/2013

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
H.10 to T.29	0.0 7.78	0.862 150.0 0.0390	1Utr	2.0 0.0 0.0	4.000 2.000 6.000	16.756 0.0 0.234			Vel = 4.28	
	0.0 7.78					16.990			K Factor = 1.89	
T.42 to H.17	4.67	0.862 150.0 0.0152	1Utr	2.0 0.0 0.0	8.000 2.000 10.000	10.772 0.0 0.152			Vel = 2.57	
H.17 to H.13	0.0 4.67	0.862 150.0 0.0152	1Utr	2.0 0.0 0.0	8.000 2.000 10.000	10.924 0.0 0.152			Vel = 2.57	
H.13 to T.34	0.0 4.67	0.862 150.0 0.0152	1Utr	2.0 0.0 0.0	8.000 2.000 10.000	11.076 0.0 0.152			Vel = 2.57	
T.34 to T.33	-1.63 3.04	0.862 150.0 0.0069	1Utb 1Utr	17.0 2.0 0.0	7.000 16.000 23.000	11.228 0.0 0.158			Vel = 1.67	
	0.0 3.04					11.386			K Factor = 0.90	
T.34 to H.8	1.64	0.862 150.0 0.0022	1Utr	2.0 0.0 0.0	8.000 2.000 10.000	11.228 0.0 0.022			Vel = 0.90	
H.8 to H.4	0.0 1.64	0.862 150.0 0.0022	1Utr	2.0 0.0 0.0	15.000 2.000 17.000	11.250 0.0 0.037			Vel = 0.90	
H.4 to H.3	0.0 1.64	0.862 150.0 0.0022	1Utr	2.0 0.0 0.0	17.000 2.000 19.000	11.287 0.0 0.042			Vel = 0.90	
H.3 to H.7	0.0 1.64	0.862 150.0 0.0022	1Utr	2.0 0.0 0.0	15.000 2.000 17.000	11.329 0.0 0.037			Vel = 0.90	
H.7 to T.28	0.0 1.64	0.862 150.0 0.0021	1Utr	2.0 0.0 0.0	5.000 2.000 7.000	11.366 0.0 0.015			Vel = 0.90	
T.28 to T.27	4.66 6.3	0.862 150.0 0.0265	2Utb	34.0 0.0 0.0	16.576 28.000 44.576	11.381 4.331 1.180			Vel = 3.46	
	0.0 6.30					16.892			K Factor = 1.53	
T.32 to T.28	4.67	0.862 150.0 0.0152	1Utr	2.0 0.0 0.0	3.000 2.000 5.000	11.305 0.0 0.076			Vel = 2.57	
	0.0 4.67					11.381			K Factor = 1.38	
T.38 to T.37	2.39	0.862 150.0 0.0045	1Utr	2.0 0.0 0.0	2.000 2.000 4.000	16.556 0.0 0.018			Vel = 1.31	
T.37 to T.36	-0.13 2.26	0.862 150.0 0.0040		0.0 0.0 0.0	1.000 0.0 1.000	16.574 0.0 0.004			Vel = 1.24	

Final Calculations - Hazen-Williams

Uponor
 JERRIER RESIDENCE - Two Head Calculation (H.22 & H.21)

Page 9
 Date 4/9/2013

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.36 to T.35	0.13 2.39	0.862 150.0 0.0044	1Utr 2.0 0.0 0.0	3.000 2.000 5.000	16.578 0.0 0.022			Vel = 1.31	
	0.0 2.39				16.600			K Factor = 0.59	
T.37 to H.14	0.12	0.671 150.0 0.0001	1Utb 17.0 0.0 0.0	15.000 17.000 32.000	16.574 0.0 0.002			Vel = 0.11	
H.14 to T.36	0.0 0.12	0.671 150.0 0.0001	1Utb 17.0 1Utr 2.0 0.0	14.000 19.000 33.000	16.576 0.0 0.002			Vel = 0.11	
	0.0 0.12				16.578			K Factor = 0.03	