



AquaSAFE™ FIRE SAFETY SYSTEM

Uponor
5925 148th Street West

Apple Valley, MN 55124
800-321-4739

Job Name : JERRIER RESIDENCE - One Head Calculation (H.22)
Drawing : RESIDENTIAL
Location : 243 TAFT AVE PORTLAND ME 04103
Remote Area : 1
Contract : 13262F
Data File : 13262F Jerrier Residence.wx1

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: (X)1 ()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 13 Psi Required 35.22 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) - 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

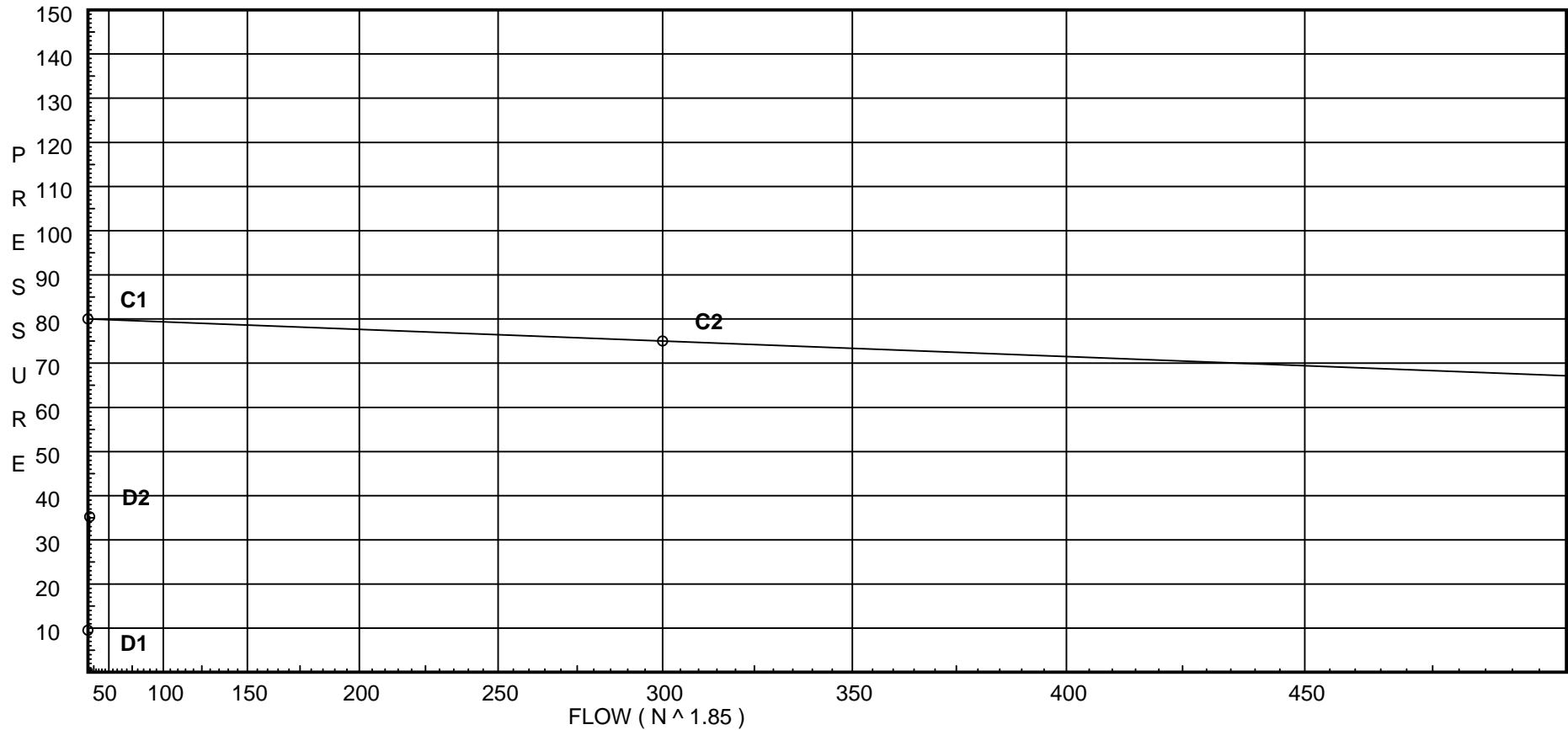
Water Supply Curve (C)

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

Demand:
D1 - Elevation : 9.528
D2 - System Flow : 13.0012
D2 - System Pressure : 35.224
Hose (Adj City) : _____
Hose (Demand) : _____
D3 - System Demand : 13.0012
Safety Margin : 44.761



Fittings Used Summary

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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

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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	79.985	13.0	35.224

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.21	118.0		7.43		
H.19	118.0		7.91		
T.43	118.0		8.18		
T.40	108.0		12.85		
T.38	108.0		13.03		
H.12	108.0		13.04		
T.30	108.0		13.08		
H.9	108.0		13.1		
T.27	108.0		13.12		
H.6	108.0		13.38		
T.25	108.0		13.47		
H.2	108.0		13.78		
H.1	108.0		14.17		
T.24	108.0		14.47		
S.1	104.0		16.98		
MTR	96.0		27.73		
STR	96.0		35.22		
H.23	118.0		7.41		
H.20	118.0		7.77		
H.18	118.0		8.11		
T.42	118.0		8.24		
T.29	108.0		13.14		
H.5	108.0		13.77		
H.16	118.0		8.23		
H.15	118.0		8.27		
T.39	118.0		8.34		
H.11	118.0		8.41		
T.32	118.0		8.45		
T.28	118.0		8.46		
H.17	118.0		8.3		
H.13	118.0		8.35		
T.34	118.0		8.41		
T.33	118.0		8.46		
T.35	108.0		13.04		
H.10	108.0		13.08		
H.8	118.0		8.42		
H.4	118.0		8.43		
H.3	118.0		8.45		
H.7	118.0		8.46		
T.37	108.0		13.04		
T.36	108.0		13.04		

Flow Summary - NFPA 2007

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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		13.04		

Final Calculations - Hazen-Williams

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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.21	6.73	0.862 150.0	1Utr	2.0 0.0	11.000 2.000	7.040 0.0			K Factor = 4.90	
H.21 to H.19	6.73	0.0299		0.0	13.000	0.389			Vel = 3.70	
H.21 to H.19	0.0	0.862 150.0	1Utr	2.0 0.0	14.000 2.000	7.429 0.0				
H.19 to T.43	6.73	0.0299		0.0	16.000	0.478			Vel = 3.70	
H.19 to T.43	0.0	0.862 150.0	1Utr	2.0 0.0	7.000 2.000	7.907 0.0				
T.43 to T.40	6.73	0.0299		0.0	9.000	0.269			Vel = 3.70	
T.43 to T.40	-3.19	0.862 150.0	1Utb	17.0 0.0	23.742 14.000	8.176 4.331				
T.40 to T.38	3.54	0.0091		0.0	37.742	0.344			Vel = 1.95	
T.40 to T.38	0.0	0.862 150.0	1Utr 1Utb	2.0 17.0	4.000 16.000	12.851 0.0				
T.38 to H.12	3.54	0.0091		0.0	20.000	0.182			Vel = 1.95	
T.38 to H.12	-1.03	0.862 150.0		0.0 0.0	2.000 0.0	13.033 0.0				
H.12 to T.30	2.51	0.0045		0.0	2.000	0.009			Vel = 1.38	
H.12 to T.30	0.0	0.862 150.0	1Utr	2.0 0.0	6.000 2.000	13.042 0.0				
T.30 to H.9	2.51	0.0049		0.0	8.000	0.039			Vel = 1.38	
T.30 to H.9	0.0	0.862 150.0	1Utr	2.0 0.0	3.000 2.000	13.081 0.0				
H.9 to T.27	2.51	0.0048		0.0	5.000	0.024			Vel = 1.38	
H.9 to T.27	0.0	0.862 150.0	1Utr	2.0 0.0	2.000 2.000	13.105 0.0				
T.27 to H.6	2.51	0.0048		0.0	4.000	0.019			Vel = 1.38	
T.27 to H.6	3.16	0.862 150.0	1Utr	2.0 0.0	10.000 2.000	13.124 0.0				
H.6 to T.25	5.67	0.0218		0.0	12.000	0.261			Vel = 3.12	
H.6 to T.25	0.0	0.862 150.0	1Utr	2.0 0.0	2.000 2.000	13.385 0.0				
T.25 to H.2	5.67	0.0217		0.0	4.000	0.087			Vel = 3.12	
T.25 to H.2	0.0	0.862 150.0	1Utr	2.0 0.0	12.000 2.000	13.472 0.0				
H.2 to H.1	5.67	0.0218		0.0	14.000	0.305			Vel = 3.12	
H.2 to H.1	0.0	0.862 150.0	1Utr	2.0 0.0	16.000 2.000	13.777 0.0				
H.1 to T.24	5.67	0.0217		0.0	18.000	0.391			Vel = 3.12	
H.1 to T.24	0.0	0.862 150.0	1Utr	2.0 0.0	12.000 2.000	14.168 0.0				
T.24 to S.1	5.67	0.0218		0.0	14.000	0.305			Vel = 3.12	
T.24 to S.1	7.33	1.054 150.0	1T	2.44 0.0	18.000 2.440	14.473 1.732				
S.1 to MTR	13.0	0.0380		0.0	20.440	0.776			Vel = 4.78	
S.1 to MTR	0.0	1.054 150.0	2E	2.44 0.0	5.000 2.440	16.981 10.465			* Fixed loss = 7	
MTR	13.0	0.0379		0.0	7.440	0.282			Vel = 4.78	

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
MTR to STR	0.0 13.0	0.745 150.0 0.2055	1E 1T 1G	1.85 3.7 0.925	30.000 6.475 36.475	27.728 0.0 7.496				
	0.0 13.00						35.224			Vel = 9.57 K Factor = 2.19
H.22 to H.23	6.27	0.862 150.0 0.0262		0.0 0.0 0.0	14.000 0.0 14.000	7.040 0.0 0.367				Vel = 3.45
H.23 to H.20	0.0 6.27	0.862 150.0 0.0261	1Utr	2.0 0.0 0.0	12.000 2.000 14.000	7.407 0.0 0.366				Vel = 3.45
H.20 to H.18	0.0 6.27	0.862 150.0 0.0262	1Utr	2.0 0.0 0.0	11.000 2.000 13.000	7.773 0.0 0.341				Vel = 3.45
H.18 to T.42	0.0 6.27	0.862 150.0 0.0262	1Utr	2.0 0.0 0.0	3.000 2.000 5.000	8.114 0.0 0.131				Vel = 3.45
T.42 to T.29	-2.68 3.59	0.862 150.0 0.0093	2Utb	34.0 0.0 0.0	32.689 28.000 60.689	8.245 4.331 0.567				Vel = 1.97
T.29 to H.5	3.74 7.33	0.862 150.0 0.0350	1Utr	2.0 0.0 0.0	16.000 2.000 18.000	13.143 0.0 0.630				Vel = 4.03
H.5 to T.24	0.0 7.33	0.862 150.0 0.0350	1Utb 1Utr	17.0 2.0 0.0	4.000 16.000 20.000	13.773 0.0 0.700				Vel = 4.03
	0.0 7.33						14.473			K Factor = 1.93
T.43 to H.16	3.19	0.862 150.0 0.0076	1Utr	2.0 0.0 0.0	5.000 2.000 7.000	8.176 0.0 0.053				Vel = 1.75
H.16 to H.15	0.0 3.19	0.862 150.0 0.0075	1Utr	2.0 0.0 0.0	4.000 2.000 6.000	8.229 0.0 0.045				Vel = 1.75
H.15 to T.39	0.0 3.19	0.862 150.0 0.0074	1Utr	2.0 0.0 0.0	7.000 2.000 9.000	8.274 0.0 0.067				Vel = 1.75
T.39 to H.11	0.0 3.19	0.862 150.0 0.0076	1Utr	2.0 0.0 0.0	7.000 2.000 9.000	8.341 0.0 0.068				Vel = 1.75
H.11 to T.32	0.0 3.19	0.862 150.0 0.0074	1Utr	2.0 0.0 0.0	3.000 2.000 5.000	8.409 0.0 0.037				Vel = 1.75
T.32 to T.28	-1.00 2.19	0.862 150.0 0.0038	1Utr	2.0 0.0 0.0	3.000 2.000 5.000	8.446 0.0 0.019				Vel = 1.20
T.28 to T.27	0.97 3.16	0.862 150.0 0.0074	2Utb	34.0 0.0 0.0	16.576 28.000 44.576	8.465 4.331 0.328				Vel = 1.74

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 3.16					13.124		K Factor = 0.87	
T.42 to H.17	2.68	0.862 150.0	1Utr 2.0 0.0	8.000 2.000	8.245 0.0			Vel = 1.47	
H.17 to H.13	2.68	0.0054	0.0	10.000	0.054			Vel = 1.47	
H.17 to H.13	0.0	0.862 150.0	1Utr 2.0 0.0	8.000 2.000	8.299 0.0			Vel = 1.47	
H.13 to T.34	2.68	0.0055	0.0	10.000	0.055			Vel = 1.47	
H.13 to T.34	0.0	0.862 150.0	1Utr 2.0 0.0	8.000 2.000	8.354 0.0			Vel = 1.47	
T.34 to T.33	-0.96	0.862 150.0	1Utb 17.0 1Utr 2.0	7.000 16.000	8.408 0.0			Vel = 0.95	
T.33 to T.35	1.72	0.0024	0.0	23.000	0.055			Vel = 0.95	
T.33 to T.35	0.99	0.862 150.0	2Utb 34.0 0.0	16.543 28.000	8.463 4.331			Vel = 1.49	
T.35 to H.10	2.71	0.0056	0.0	44.543	0.248			Vel = 1.49	
T.35 to H.10	1.03	0.862 150.0	1Utr 2.0 0.0	2.000 2.000	13.042 0.0			Vel = 2.06	
H.10 to T.29	3.74	0.0100	0.0	4.000	0.040			Vel = 2.06	
H.10 to T.29	0.0	0.862 150.0	1Utr 2.0 0.0	4.000 2.000	13.082 0.0			Vel = 2.06	
	0.0 3.74					13.143		K Factor = 1.03	
T.34 to H.8	0.96	0.862 150.0	1Utr 2.0 0.0	8.000 2.000	8.408 0.0			Vel = 0.53	
H.8 to H.4	0.96	0.0008	0.0	10.000	0.008			Vel = 0.53	
H.8 to H.4	0.0	0.862 150.0	1Utr 2.0 0.0	15.000 2.000	8.416 0.0			Vel = 0.53	
H.4 to H.3	0.96	0.0008	0.0	17.000	0.014			Vel = 0.53	
H.4 to H.3	0.0	0.862 150.0	1Utr 2.0 0.0	17.000 2.000	8.430 0.0			Vel = 0.53	
H.3 to H.7	0.96	0.0008	0.0	19.000	0.016			Vel = 0.53	
H.3 to H.7	0.0	0.862 150.0	1Utr 2.0 0.0	15.000 2.000	8.446 0.0			Vel = 0.53	
H.7 to T.28	0.96	0.0008	0.0	17.000	0.013			Vel = 0.53	
H.7 to T.28	0.0	0.862 150.0	1Utr 2.0 0.0	5.000 2.000	8.459 0.0			Vel = 0.53	
	0.0 0.96					8.465		K Factor = 0.33	
T.32 to T.33	1.00	0.862 150.0	1Utb 17.0 0.0	5.000 14.000	8.446 0.0			Vel = 0.55	
T.33 to T.37	1.0	0.0009	0.0	19.000	0.017			Vel = 0.55	
	0.0 1.00					8.463		K Factor = 0.34	
T.38 to T.37	1.03	0.862 150.0	1Utr 2.0 0.0	2.000 2.000	13.033 0.0			Vel = 0.57	
T.37 to T.37	1.03	0.0008	0.0	4.000	0.003			Vel = 0.57	

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftn'g's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
T.37 to T.36	-0.05 0.98	0.862 150.0 0.0010	0.0 0.0	1.000 0.0	13.036 0.0			Vel = 0.54	
T.36 to T.35	0.05 1.03	0.862 150.0 0.0010	1Utr 2.0 0.0	3.000 2.000 5.000	13.037 0.0			Vel = 0.57	
	0.0 1.03				13.042			K Factor = 0.29	
T.37 to H.14	0.05 0.05	0.671 150.0 0.0	1Utb 17.0 0.0	15.000 17.000	13.036 0.0			Vel = 0.05	
H.14 to T.36	0.0 0.05	0.671 150.0 0.0	1Utb 17.0 1Utr 2.0	14.000 19.000 33.000	13.037 0.0			Vel = 0.05	
	0.0 0.05				13.037			K Factor = 0.01	