Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 05/15/13

Planner: Benjamin Wallace Jr

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

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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 Summary Gpm Required 26.0233 Psi Required 64.86 At Ref Pt STR
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
- D2 - System Fl
- D2 - System Pr
- Hose (Adj City) :
- Hose (Demand) :
- D3 - System Demand : 26.0233
- Safety Margin : 15.088

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				
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35				
G	Generic Gate Valve	1	1	1	1	1	1	1	1	1	2	2	3	4	5	6	7				
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

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	
STR	80.0	75	300.0	79.946	26.02	64.857

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
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		

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NODE ANALYSIS (cont.)

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
H.14	108.0		16.58		

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*******
H.22	11.55	0.862		0.0	14.000	7.040		K Factor = 4.90
to		150.0		0.0	0.0	0.0		
H.23	11.55	0.0811		0.0	14.000	1.136		Vel = 6.35
H.23	0.0	0.862	1Utr	2.0	12.000	8.176		
to		150.0		0.0	2.000	0.0		
H.20	11.55	0.0811		0.0	14.000	1.136		Vel = 6.35
H.20	0.0	0.862	1Utr	2.0	11.000	9.312		
to		150.0		0.0	2.000	0.0		
H.18	11.55	0.0811		0.0	13.000	1.054		Vel = 6.35
H.18	0.0	0.862	1Utr	2.0	3.000	10.366		
to		150.0		0.0	2.000	0.0		
T.42	11.55	0.0812		0.0	5.000	0.406		Vel = 6.35
T.42	-4.67	0.862	2Utb	34.0	32.689	10.772		
to		150.0		0.0	28.000	4.331		
T.29	6.88	0.0311		0.0	60.689	1.887		Vel = 3.78
T.29	7.77	0.862	1Utr	2.0	16.000	16.990		
to		150.0		0.0	2.000	0.0		
H.5	14.65	0.1260		0.0	18.000	2.268		Vel = 8.05
H.5	0.0	0.862	1Utb	17.0	4.000	19.258		
to		150.0	1Utr	2.0	16.000	0.0		
T.24	14.65	0.1260		0.0	20.000	2.520		Vel = 8.05
T.24	11.37	1.054	1T	2.44	18.000	21.778		
to		150.0		0.0	2.440	1.732		
S.1	26.02	0.1370		0.0	20.440	2.800		Vel = 9.57
S.1	0.0	1.054	2E	2.44	5.000	26.310		
to		150.0		0.0	2.440	10.465		* Fixed loss = 7
MTR	26.02	0.1370		0.0	7.440	1.019		Vel = 9.57
MTR	0.0	0.745	1E	1.85	30.000	37.794		
to		150.0	1T	3.7	6.475	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	1.45	0.862	1Utr	2.0	11.000	7.040		
to		150.0		0.0	2.000	0.0		
H.21	1.45	0.0018		0.0	13.000	0.023		Vel = 0.80
H.21	13.02	0.862	1Utr	2.0	14.000	7.063		K Factor = 4.90
to		150.0		0.0	2.000	0.0		
H.19	14.47	0.1232		0.0	16.000	1.971		Vel = 7.96
H.19	0.0	0.862	1Utr	2.0	7.000	9.034		
to		150.0		0.0	2.000	0.0		
T.43	14.47	0.1231		0.0	9.000	1.108		Vel = 7.96
T.43	-7.02	0.862	1Utb	17.0	23.742	10.142		
to		150.0		0.0	14.000	4.331		
T.40	7.45	0.0361		0.0	37.742	1.362		Vel = 4.10
T.40	0.0	0.862	1Utr	2.0	4.000	15.835		
to		150.0	1Utb	17.0	16.000	0.0		
T.38	7.45	0.0360		0.0	20.000	0.721		Vel = 4.10
T.38	-2.38	0.862		0.0	2.000	16.556		
to		150.0		0.0	0.0	0.0		
H.12	5.07	0.0180		0.0	2.000	0.036		Vel = 2.79

Final Calculations - Hazen-Williams

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H.12	0.0	0.862	1Utr	2.0	6.000	16.592		
to		150.0		0.0	2.000	0.0		
T.30	5.07	0.0176		0.0	8.000	0.141		Vel = 2.79
T.30	0.0	0.862	1Utr	2.0	3.000	16.733		
to		150.0		0.0	2.000	0.0		
H.9	5.07	0.0176		0.0	5.000	0.088		Vel = 2.79
H.9	0.0	0.862	1Utr	2.0	2.000	16.821		
to		150.0		0.0	2.000	0.0		
T.27	5.07	0.0177		0.0	4.000	0.071		Vel = 2.79
T.27	6.30	0.862	1Utr	2.0	10.000	16.892		
to		150.0		0.0	2.000	0.0		
H.6	11.37	0.0788		0.0	12.000	0.946		Vel = 6.25
H.6	0.0	0.862	1Utr	2.0	2.000	17.838		
to		150.0		0.0	2.000	0.0		
T.25	11.37	0.0788		0.0	4.000	0.315		Vel = 6.25
T.25	0.0	0.862	1Utr	2.0	12.000	18.153		
to		150.0		0.0	2.000	0.0		
H.2	11.37	0.0788		0.0	14.000	1.103		Vel = 6.25
H.2	0.0	0.862	1Utr	2.0	16.000	19.256		
to		150.0		0.0	2.000	0.0		
H.1	11.37	0.0788		0.0	18.000	1.419		Vel = 6.25
H.1	0.0	0.862	1Utr	2.0	12.000	20.675		
to		150.0		0.0	2.000	0.0		
T.24	11.37	0.0788		0.0	14.000	1.103		Vel = 6.25
	0.0							
	11.37					21.778		K Factor = 2.44
T.43	7.02	0.862	1Utr	2.0	5.000	10.142		
to		150.0		0.0	2.000	0.0		
H.16	7.02	0.0323		0.0	7.000	0.226		Vel = 3.86
H.16	0.0	0.862	1Utr	2.0	4.000	10.368		
to		150.0		0.0	2.000	0.0		
H.15	7.02	0.0323		0.0	6.000	0.194		Vel = 3.86
H.15	0.0	0.862	1Utr	2.0	7.000	10.562		
to		150.0		0.0	2.000	0.0		
T.39	7.02	0.0323		0.0	9.000	0.291		Vel = 3.86
T.39	0.0	0.862	1Utr	2.0	7.000	10.853		
to		150.0		0.0	2.000	0.0		
H.11	7.02	0.0323		0.0	9.000	0.291		Vel = 3.86
H.11	0.0	0.862	1Utr	2.0	3.000	11.144		
to		150.0		0.0	2.000	0.0		
T.32	7.02	0.0322		0.0	5.000	0.161		Vel = 3.86
T.32	-4.67	0.862	1Utb	17.0	5.000	11.305		
to		150.0		0.0	14.000	0.0		
T.33	2.35	0.0043		0.0	19.000	0.081		Vel = 1.29
T.33	3.04	0.862	2Utb	34.0	16.543	11.386		
to		150.0		0.0	28.000	4.331		
T.35	5.39	0.0198		0.0	44.543	0.883		Vel = 2.96
T.35	2.39	0.862	1Utr	2.0	2.000	16.600		
to		150.0		0.0	2.000	0.0		
H.10	7.78	0.0390		0.0	4.000	0.156		Vel = 4.28

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H.10	0.0	0.862	1Utr	2.0	4.000	16.756		
to		150.0		0.0	2.000	0.0		
T.29	7.78	0.0390		0.0	6.000	0.234		Vel = 4.28
	0.0							
	7.78					16.990		K Factor = 1.89
T.42	4.67	0.862	1Utr	2.0	8.000	10.772		
to		150.0		0.0	2.000	0.0		
H.17	4.67	0.0152		0.0	10.000	0.152		Vel = 2.57
H.17	0.0	0.862	1Utr	2.0	8.000	10.924		
to		150.0		0.0	2.000	0.0		
H.13	4.67	0.0152		0.0	10.000	0.152		Vel = 2.57
H.13	0.0	0.862	1Utr	2.0	8.000	11.076		
to		150.0		0.0	2.000	0.0		
T.34	4.67	0.0152		0.0	10.000	0.152		Vel = 2.57
T.34	-1.63	0.862	1Utb	17.0	7.000	11.228		
to		150.0	1Utr	2.0	16.000	0.0		
T.33	3.04	0.0069		0.0	23.000	0.158		Vel = 1.67
	0.0							
	3.04					11.386		K Factor = 0.90
T.34	1.64	0.862	1Utr	2.0	8.000	11.228		
to		150.0		0.0	2.000	0.0		
H.8	1.64	0.0022		0.0	10.000	0.022		Vel = 0.90
H.8	0.0	0.862	1Utr	2.0	15.000	11.250		
to		150.0		0.0	2.000	0.0		
H.4	1.64	0.0022		0.0	17.000	0.037		Vel = 0.90
H.4	0.0	0.862	1Utr	2.0	17.000	11.287		
to		150.0		0.0	2.000	0.0		
H.3	1.64	0.0022		0.0	19.000	0.042		Vel = 0.90
H.3	0.0	0.862	1Utr	2.0	15.000	11.329		
to		150.0		0.0	2.000	0.0		
H.7	1.64	0.0022		0.0	17.000	0.037		Vel = 0.90
H.7	0.0	0.862	1Utr	2.0	5.000	11.366		
to		150.0		0.0	2.000	0.0		
T.28	1.64	0.0021		0.0	7.000	0.015		Vel = 0.90
T.28	4.66	0.862	2Utb	34.0	16.576	11.381		
to		150.0		0.0	28.000	4.331		
T.27	6.3	0.0265		0.0	44.576	1.180		Vel = 3.46
	0.0							
	6.30					16.892		K Factor = 1.53
T.32	4.67	0.862	1Utr	2.0	3.000	11.305		
to		150.0		0.0	2.000	0.0		
T.28	4.67	0.0152		0.0	5.000	0.076		Vel = 2.57
	0.0							
	4.67					11.381		K Factor = 1.38
T.38	2.39	0.862	1Utr	2.0	2.000	16.556		
to		150.0		0.0	2.000	0.0		
T.37	2.39	0.0045		0.0	4.000	0.018		Vel = 1.31
T.37	-0.13	0.862		0.0	1.000	16.574		
to		150.0		0.0	0.0	0.0		
T.36	2.26	0.0040		0.0	1.000	0.004		Vel = 1.24

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