



AquaSAFE™ FIRE SAFETY SYSTEM

Uponor EP
5925 148th Street West

Apple Valley, MN 55124
800-321-4739

Job Name : LOT 33 - Two Head Calculation (H.16 & H.17)
Drawing : RESIDENTIAL
Location : ALLISON RD PORTLAND ME
Remote Area : 1
Contract : 121010-42L
Data File : 121010-42L Lot 33 Allison.wx2

HYDRAULIC DESIGN INFORMATION SHEET

Name - LOT 33 Date - 10/31/12
Location - PORTLAND ME
Building - RESIDENTIAL System No. - 1
Contractor - SPB PLUMBING Contract No. - 121010-42L
Calculated By - DAN HUBBARD SEY IV Drawing No. - F100
Construction: (X) Combustible () Non-Combustible Ceiling Height 8
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 - 9.14 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 RFC43
I Elevation at Highest Outlet - 118 Feet Size 3/8 K-Factor 4.3
G Note: Temperature Rating 165°
N

Calculation gpm Required 26.0718 psi Required 57.67 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) - 55 Other Well
Flow (gpm) - 300 Proof Flow gpm
S Elevation - 100

P Location: x
P
L Source of Information: x
Y

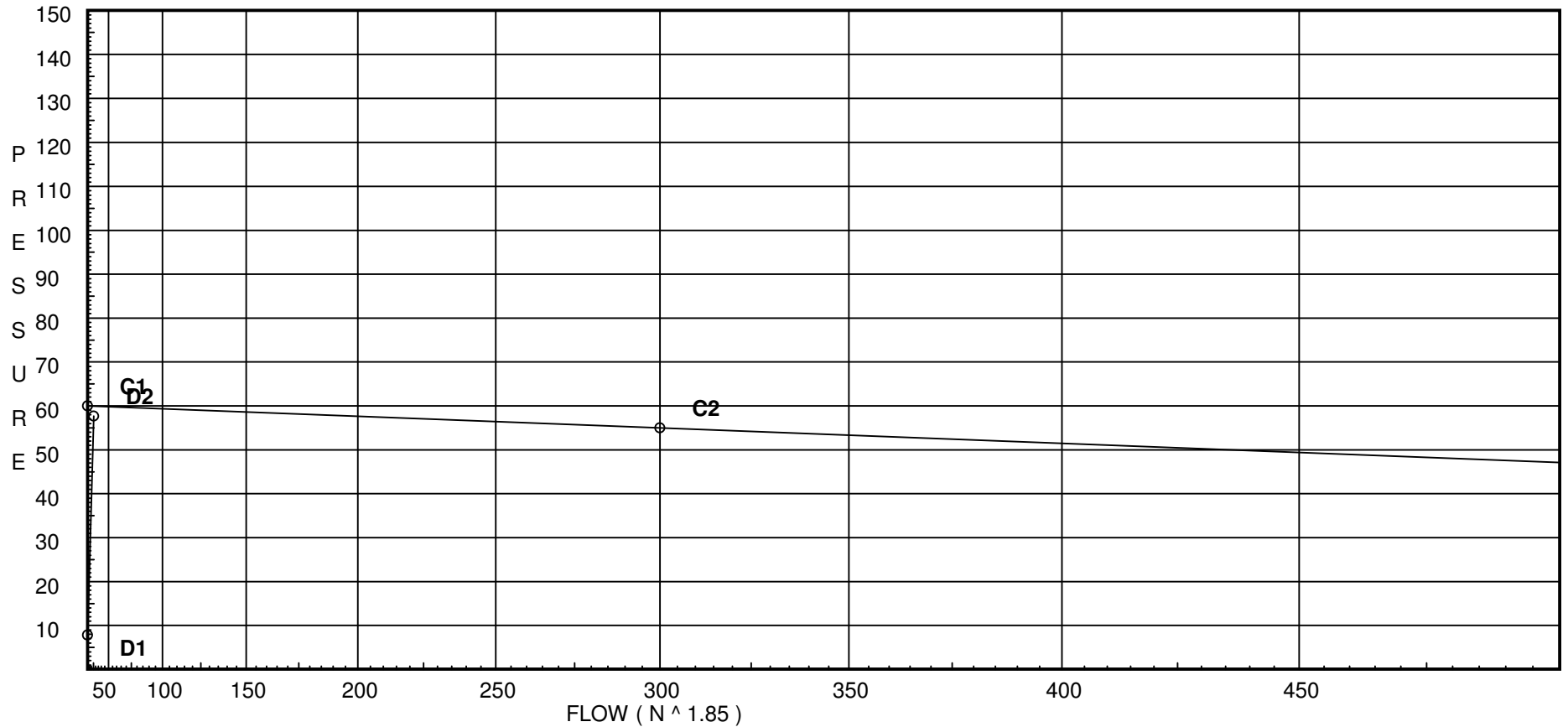
Water Supply Curve (C)

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City Water Supply:
C1 - Static Pressure : 60
C2 - Residual Pressure: 55
C2 - Residual Flow : 300

Demand:
D1 - Elevation : 7.796
D2 - System Flow : 26.0718
D2 - System Pressure : 57.675
Hose (Adj City) : _____
Hose (Demand) : _____
D3 - System Demand : 26.0718
Safety Margin : 2.270



Fittings Used Summary

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Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	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	60.0	55	300.0	59.946	26.07	57.675

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.16	118.0	4.3	9.14	13.0	
H.15	118.0		12.08		
H.21	118.0		17.7		
H.19	118.0		20.64		
T.36	118.0		26.52		
T.27	108.0		31.45		
H.1	108.0		32.67		
T.23	108.0		33.04		
T.22	108.0		33.36		
T.28	108.0		36.36		
T.29	108.0		37.17		
S.1	104.0		42.9		
MTR	100.0		52.64		
STR	100.0		57.68		
H.17	118.0	4.3	9.24	13.07	
H.11	118.0		16.1		
T.32	118.0		28.11		
H.10	118.0		29.5		
T.34	118.0		29.72		
T.35	118.0		30.85		
H.18	118.0		26.92		
H.20	118.0		27.47		
T.37	118.0		28.69		
H.14	118.0		29.44		
H.12	118.0		29.77		
T.33	118.0		29.97		
H.13	118.0		30.17		
H.2	108.0		31.94		
T.25	108.0		32.1		
H.3	108.0		32.45		
T.31	108.0		33.03		
H.8	108.0		33.9		
H.9	108.0		34.4		
H.7	108.0		35.12		
H.6	108.0		35.44		
H.5	108.0		35.88		
H.4	108.0		36.06		
T.30	108.0		36.24		

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.16 to H.15	11.38	0.671 150.0	1Utr	2.0 0.0	9.000 2.000	9.140 0.0			K Factor = 4.30	
H.15 to H.21	11.38	0.2675 150.0		0.0	11.000	2.942			Vel = 10.32	
H.15 to H.21	0.0	0.671 150.0	1Utr	2.0 0.0	19.000 2.000	12.082 0.0				
H.21 to H.19	11.38	0.2674 150.0		0.0	21.000	5.615			Vel = 10.32	
H.21 to H.19	0.0	0.671 150.0		0.0	11.000	17.697				
H.19 to T.36	11.38	0.2675 150.0		0.0	11.000	2.942			Vel = 10.32	
H.19 to T.36	0.0	0.671 150.0	1Utb 1Utr	17.0 2.0	3.000 19.000	20.639 0.0				
T.36 to T.27	11.38	0.2674 150.0		0.0	22.000	5.883			Vel = 10.32	
T.36 to T.27	-4.04	0.862 150.0		0.0	17.000	26.522				
T.27 to T.27	7.34	0.0351 150.0		0.0	17.000	0.596			Vel = 4.04	
T.27 to H.1	-2.98	0.671 150.0	1Utb	17.0 0.0	10.000 17.000	31.449 0.0				
H.1 to T.23	4.36	0.0454 150.0		0.0	27.000	1.226			Vel = 3.96	
H.1 to T.23	0.0	0.671 150.0	1Utr	2.0 0.0	6.000 2.000	32.675 0.0				
T.23 to T.22	4.36	0.0454 150.0		0.0	8.000	0.363			Vel = 3.96	
T.23 to T.22	0.0	0.671 150.0	1Utr	2.0 0.0	5.000 2.000	33.038 0.0				
T.22 to T.28	4.36	0.0454 150.0		0.0	7.000	0.318			Vel = 3.96	
T.22 to T.28	9.92	0.862 150.0	1Utr 1Utb	2.0 17.0	9.000 16.000	33.356 0.0				
T.28 to T.29	14.28	0.1200 150.0		0.0	25.000	3.001			Vel = 7.85	
T.28 to T.29	7.94	0.862 150.0	1Utr	2.0 0.0	1.000 2.000	36.357 0.0				
T.29 to S.1	22.22	0.2723 150.0		0.0	3.000	0.817			Vel = 12.22	
T.29 to S.1	3.85	0.862 150.0	1T	7.528 0.0	8.000 2.904	37.174 1.732				
S.1 to MTR	26.07	0.3659 150.0		0.0	10.904	3.990			Vel = 14.33	
S.1 to MTR	0.0	1.025 150.0	2E	5.4 0.0	1.000 5.400	42.896 8.732			* Fixed loss = 7	
MTR to STR	26.07	0.1575 150.0		0.0	6.400	1.008			Vel = 10.14	
MTR to STR	0.0	1.314 150.0	1E 1T	2.247 4.495	100.000 7.304	52.636 0.0				
STR	26.07	0.0470 0.0	1G	0.562	107.304	5.039			Vel = 6.17	
	0.0 26.07					57.675			K Factor = 3.43	
H.16 to H.17	1.62	0.671 150.0		0.0	14.000	9.140				
H.17 to H.11	1.62	0.0072 150.0		0.0	14.000	0.101			Vel = 1.47	
H.17 to H.11	13.07	0.671 150.0	1Utr	2.0 0.0	14.000 2.000	9.241 0.0			K Factor = 4.30	
H.11 to H.11	14.69	0.4288 150.0		0.0	16.000	6.861			Vel = 13.33	
H.11 to T.32	0.0	0.671 150.0	1Utb 1Utr	17.0 2.0	9.000 19.000	16.102 0.0				
T.32	14.69	0.4288 0.0		0.0	28.000	12.006			Vel = 13.33	

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	*****
T.32	-9.91	0.671	1Utb 17.0	7.000	28.108				
to H.10	4.78	150.0 0.0537	1Utr 2.0 0.0	19.000 26.000	0.0 1.397		Vel = 4.34		
H.10	0.0	0.671	1Utr 2.0	2.000	29.505				
to T.34	4.78	150.0 0.0538	0.0 0.0	2.000 4.000	0.0 0.215		Vel = 4.34		
T.34	0.0	0.671	1Utb 17.0	4.000	29.720				
to T.35	4.78	150.0 0.0537	0.0 0.0	17.000 21.000	0.0 1.128		Vel = 4.34		
T.35	3.17	0.862	1Utb 17.0	15.000	30.848				
to T.28	7.95	150.0 0.0406	0.0 0.0	14.000 29.000	4.331 1.178		Vel = 4.37		
	0.0 7.95					36.357	K Factor = 1.32		
T.36	4.05	0.671	1Utr 2.0	8.000	26.522				
to H.18	4.05	150.0 0.0395	0.0 0.0	2.000 10.000	0.0 0.395		Vel = 3.67		
H.18	0.0	0.671	1Utr 2.0	12.000	26.917				
to H.20	4.05	150.0 0.0394	0.0 0.0	2.000 14.000	0.0 0.552		Vel = 3.67		
H.20	0.0	0.671	1Utb 17.0	14.000	27.469				
to T.37	4.05	150.0 0.0395	0.0 0.0	17.000 31.000	0.0 1.223		Vel = 3.67		
T.37	-0.88	0.671	1Utb 17.0	13.000	28.692				
to H.14	3.17	150.0 0.0251	0.0 0.0	17.000 30.000	0.0 0.752		Vel = 2.88		
H.14	0.0	0.671	1Utr 2.0	11.000	29.444				
to H.12	3.17	150.0 0.0251	0.0 0.0	2.000 13.000	0.0 0.326		Vel = 2.88		
H.12	0.0	0.671	1Utr 2.0	6.000	29.770				
to T.33	3.17	150.0 0.0251	0.0 0.0	2.000 8.000	0.0 0.201		Vel = 2.88		
T.33	0.0	0.671	1Utr 2.0	6.000	29.971				
to H.13	3.17	150.0 0.0251	0.0 0.0	2.000 8.000	0.0 0.201		Vel = 2.88		
H.13	0.0	0.671	1Utb 17.0	10.000	30.172				
to T.35	3.17	150.0 0.0250	0.0 0.0	17.000 27.000	0.0 0.676		Vel = 2.88		
	0.0 3.17					30.848	K Factor = 0.57		
T.27	2.97	0.671	1Utb 17.0	5.000	31.449				
to H.2	2.97	150.0 0.0223	0.0 0.0	17.000 22.000	0.0 0.490		Vel = 2.69		
H.2	0.0	0.671	1Utr 2.0	5.000	31.939				
to T.25	2.97	150.0 0.0223	0.0 0.0	2.000 7.000	0.0 0.156		Vel = 2.69		
T.25	0.0	0.671	1Utr 2.0	14.000	32.095				
to H.3	2.97	150.0 0.0223	0.0 0.0	2.000 16.000	0.0 0.357		Vel = 2.69		

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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	*****	Notes	*****
H.3 to T.31	0.0 2.97	0.671 150.0 0.0223	1Utb	17.0 0.0 0.0	9.000 17.000 26.000	32.452 0.0 0.580			Vel = 2.69	
T.31 to H.8	0.88 3.85	0.671 150.0 0.0360	1Utb 1Utr	17.0 2.0 0.0	5.000 19.000 24.000	33.032 0.0 0.864			Vel = 3.49	
H.8 to H.9	0.0 3.85	0.671 150.0 0.0361		0.0 0.0 0.0	14.000 0.0 14.000	33.896 0.0 0.505			Vel = 3.49	
H.9 to H.7	0.0 3.85	0.671 150.0 0.0360	1Utr	2.0 0.0 0.0	18.000 2.000 20.000	34.401 0.0 0.720			Vel = 3.49	
H.7 to H.6	0.0 3.85	0.671 150.0 0.0360	1Utr	2.0 0.0 0.0	7.000 2.000 9.000	35.121 0.0 0.324			Vel = 3.49	
H.6 to H.5	0.0 3.85	0.671 150.0 0.0360	1Utr	2.0 0.0 0.0	10.000 2.000 12.000	35.445 0.0 0.432			Vel = 3.49	
H.5 to H.4	0.0 3.85	0.671 150.0 0.0362	1Utr	2.0 0.0 0.0	3.000 2.000 5.000	35.877 0.0 0.181			Vel = 3.49	
H.4 to T.30	0.0 3.85	0.671 150.0 0.0360	1Utr	2.0 0.0 0.0	3.000 2.000 5.000	36.058 0.0 0.180			Vel = 3.49	
T.30 to T.29	0.0 3.85	0.671 150.0 0.0360	1Utr 1Utb	2.0 17.0 0.0	7.000 19.000 26.000	36.238 0.0 0.936			Vel = 3.49	
	0.0 3.85					37.174			K Factor = 0.63	
T.32 to T.22	9.91 9.91	0.862 150.0 0.0611		0.0 0.0 0.0	15.000 0.0 15.000	28.108 4.331 0.917			Vel = 5.45	
	0.0 9.91					33.356			K Factor = 1.72	
T.37 to T.31	0.88 0.88	0.862 150.0 0.0007		0.0 0.0 0.0	12.000 0.0 12.000	28.692 4.331 0.009			Vel = 0.48	
	0.0 0.88					33.032			K Factor = 0.15	