



AquaSAFE™ FIRE SAFETY SYSTEM

Uponor EP
5925 148th Street West

Apple Valley, MN 55124
800-321-4739

Job Name : LOT 33 - One Head Calculation (H.14)
Drawing : RESIDENTIAL
Location : ALLISON RD PORTLAND ME
Remote Area : 1
Contract : 121010-42L
Data File : 121010-42L Lot 33 Allison.wx1

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: (X)1 ()2 ()4 ()
S ()Other
T ()Specific Ruling Made by Date
E
M Listed Flow at Start Point - 18 gpm System Type
Listed Pres. at Start Point - 17.52psi (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 RFC43
I Elevation at Highest Outlet - 118 Feet Size 3/8 K-Factor 4.3
G Note: Temperature Rating 165°
N

Calculation gpm Required 18 psi Required 47.35 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

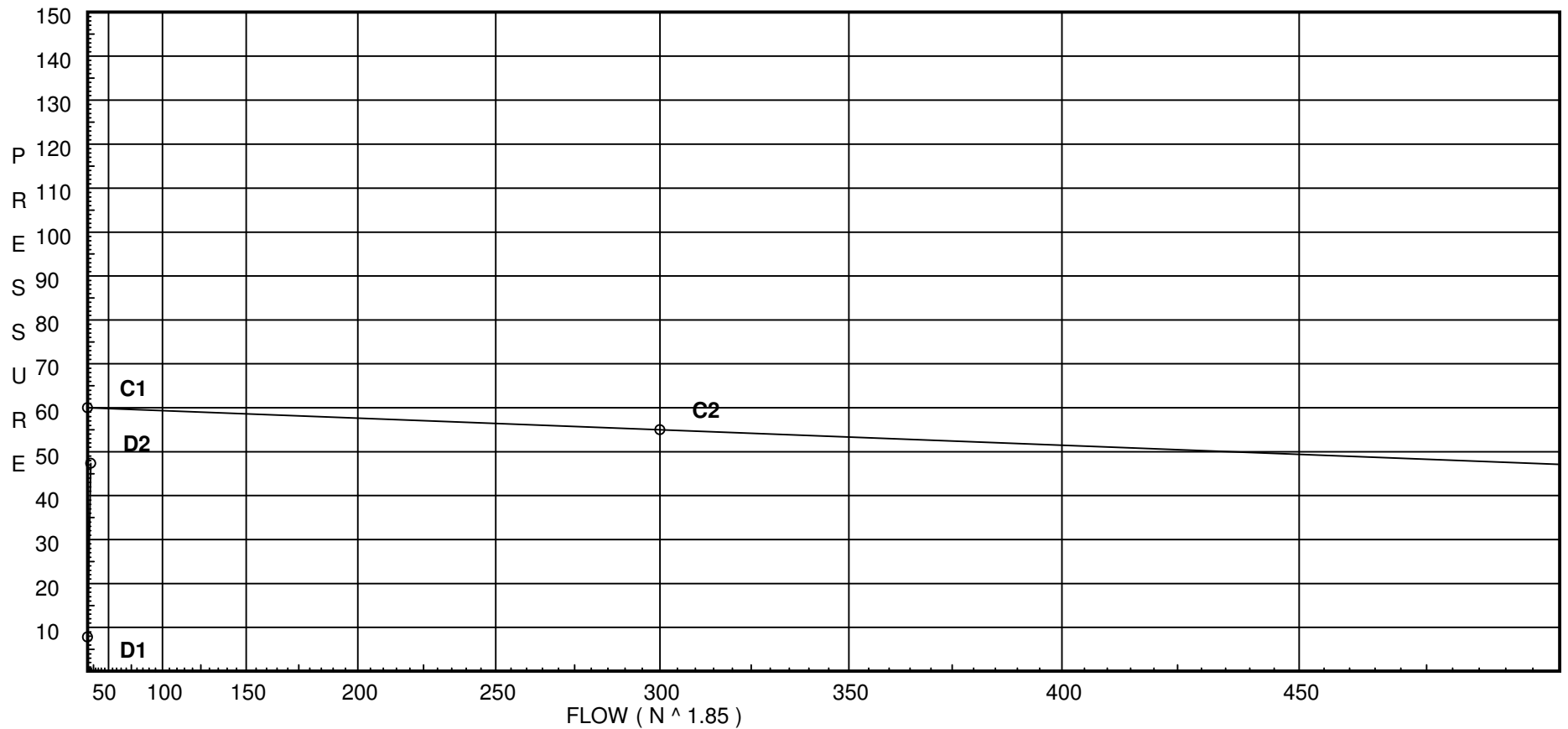
Water Supply Curve (C)

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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 : 17.9985
D2 - System Pressure : 47.350
Hose (Adj City) : _____
Hose (Demand) : _____
D3 - System Demand : 17.9985
Safety Margin : 12.622



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	59.973	18.0	47.35

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.14	118.0	4.3	17.52	18.0	
T.37	118.0		23.35		
H.20	118.0		24.19		
H.18	118.0		24.58		
T.36	118.0		24.85		
H.19	118.0		25.1		
H.21	118.0		25.22		
H.15	118.0		25.46		
H.16	118.0		25.59		
H.17	118.0		25.75		
H.11	118.0		25.93		
T.32	118.0		26.25		
T.22	108.0		30.69		
T.28	108.0		31.47		
T.29	108.0		31.83		
S.1	104.0		35.57		
MTR	100.0		44.81		
STR	100.0		47.35		
H.12	118.0		19.51		
T.33	118.0		20.74		
H.13	118.0		21.96		
T.35	118.0		26.1		
T.31	108.0		27.99		
H.8	108.0		28.79		
H.9	108.0		29.26		
H.7	108.0		29.93		
H.6	108.0		30.23		
H.5	108.0		30.63		
H.4	108.0		30.8		
T.30	108.0		30.96		
H.3	108.0		28.44		
T.25	108.0		28.71		
H.2	108.0		28.83		
T.27	108.0		29.2		
H.1	108.0		30.16		
T.23	108.0		30.44		
T.34	118.0		26.16		
H.10	118.0		26.17		

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.14 to T.37	9.58	0.671 150.0 0.1943	1Utb	17.0 0.0 0.0	13.000 17.000 30.000	17.520 0.0 5.829			K Factor = 4.30 Vel = 8.69	
T.37 to H.20	-6.27	0.671 150.0 0.0273	1Utb	17.0 0.0 0.0	14.000 17.000 31.000	23.349 0.0 0.845			Vel = 3.00	
H.20 to H.18	0.0	0.671 150.0 0.0273	1Utr	2.0 0.0 0.0	12.000 2.000 14.000	24.194 0.0 0.382			Vel = 3.00	
H.18 to T.36	0.0	0.671 150.0 0.0273	1Utr	2.0 0.0 0.0	8.000 2.000 10.000	24.576 0.0 0.273			Vel = 3.00	
T.36 to H.19	-1.24	0.671 150.0 0.0114	1Utb 1Utr	17.0 2.0 0.0	3.000 19.000 22.000	24.849 0.0 0.251			Vel = 1.88	
H.19 to H.21	0.0	0.671 150.0 0.0114		0.0 0.0 0.0	11.000 0.0 11.000	25.100 0.0 0.125			Vel = 1.88	
H.21 to H.15	0.0	0.671 150.0 0.0114	1Utr	2.0 0.0 0.0	19.000 2.000 21.000	25.225 0.0 0.240			Vel = 1.88	
H.15 to H.16	0.0	0.671 150.0 0.0114	1Utr	2.0 0.0 0.0	9.000 2.000 11.000	25.465 0.0 0.125			Vel = 1.88	
H.16 to H.17	0.0	0.671 150.0 0.0114		0.0 0.0 0.0	14.000 0.0 14.000	25.590 0.0 0.160			Vel = 1.88	
H.17 to H.11	0.0	0.671 150.0 0.0114	1Utr	2.0 0.0 0.0	14.000 2.000 16.000	25.750 0.0 0.183			Vel = 1.88	
H.11 to T.32	0.0	0.671 150.0 0.0114	1Utb 1Utr	17.0 2.0 0.0	9.000 19.000 28.000	25.933 0.0 0.319			Vel = 1.88	
T.32 to T.22	1.00	0.862 150.0 0.0070		0.0 0.0 0.0	15.000 0.0 15.000	26.252 4.331 0.105			Vel = 1.69	
T.22 to T.28	3.82	0.862 150.0 0.0312	1Utr 1Utb	2.0 17.0 0.0	9.000 16.000 25.000	30.688 0.0 0.779			Vel = 3.79	
T.28 to T.29	7.41	0.862 150.0 0.1207	1Utr	2.0 0.0 0.0	1.000 2.000 3.000	31.467 0.0 0.362			Vel = 7.86	
T.29 to S.1	3.70	0.862 150.0 0.1843	1T	7.528 0.0 0.0	8.000 2.904 10.904	31.829 1.732 2.010			Vel = 9.90	
S.1 to MTR	0.0	1.025 150.0 0.0794	2E	5.4 0.0 0.0	1.000 5.400 6.400	35.571 8.732 0.508			* Fixed loss = 7 Vel = 7.00	

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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 18.0	1.314 150.0 0.0237	1E 1T 1G	2.247 4.495 0.562	100.000 7.304 107.304	44.811 0.0 2.539				Vel = 4.26
	0.0 18.00					47.350				K Factor = 2.62
H.14 to H.12	8.42 8.42	0.671 150.0 0.1532	1Utr	2.0 0.0 0.0	11.000 2.000 13.000	17.520 0.0 1.992				Vel = 7.64
H.12 to T.33	0.0 8.42	0.671 150.0 0.1531	1Utr	2.0 0.0 0.0	6.000 2.000 8.000	19.512 0.0 1.225				Vel = 7.64
T.33 to H.13	0.0 8.42	0.671 150.0 0.1532	1Utr	2.0 0.0 0.0	6.000 2.000 8.000	20.737 0.0 1.226				Vel = 7.64
H.13 to T.35	0.0 8.42	0.671 150.0 0.1532	1Utb	17.0 0.0 0.0	10.000 17.000 27.000	21.963 0.0 4.136				Vel = 7.64
T.35 to T.28	-1.00 7.42	0.862 150.0 0.0358	1Utb	17.0 0.0 0.0	15.000 14.000 29.000	26.099 4.331 1.037				Vel = 4.08
	0.0 7.42					31.467				K Factor = 1.32
T.37 to T.31	6.26 6.26	0.862 150.0 0.0261		0.0 0.0 0.0	12.000 0.0 12.000	23.349 4.331 0.313				Vel = 3.44
T.31 to H.8	-2.57 3.69	0.671 150.0 0.0334	1Utb 1Utr	17.0 2.0 0.0	5.000 19.000 24.000	27.993 0.0 0.801				Vel = 3.35
H.8 to H.9	0.0 3.69	0.671 150.0 0.0334		0.0 0.0 0.0	14.000 0.0 14.000	28.794 0.0 0.467				Vel = 3.35
H.9 to H.7	0.0 3.69	0.671 150.0 0.0334	1Utr	2.0 0.0 0.0	18.000 2.000 20.000	29.261 0.0 0.667				Vel = 3.35
H.7 to H.6	0.0 3.69	0.671 150.0 0.0333	1Utr	2.0 0.0 0.0	7.000 2.000 9.000	29.928 0.0 0.300				Vel = 3.35
H.6 to H.5	0.0 3.69	0.671 150.0 0.0333	1Utr	2.0 0.0 0.0	10.000 2.000 12.000	30.228 0.0 0.400				Vel = 3.35
H.5 to H.4	0.0 3.69	0.671 150.0 0.0334	1Utr	2.0 0.0 0.0	3.000 2.000 5.000	30.628 0.0 0.167				Vel = 3.35
H.4 to T.30	0.0 3.69	0.671 150.0 0.0334	1Utr	2.0 0.0 0.0	3.000 2.000 5.000	30.795 0.0 0.167				Vel = 3.35
T.30 to T.29	0.0 3.69	0.671 150.0 0.0333	1Utr 1Utb	2.0 17.0 0.0	7.000 19.000 26.000	30.962 0.0 0.867				Vel = 3.35

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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	*****
	0.0 3.69						31.829		K Factor = 0.65	
T.31 to H.3	2.57	0.671 150.0	1Utb	17.0 0.0	9.000 17.000	27.993 0.0				
H.3 to T.25	2.57	0.0170		0.0	26.000	0.443			Vel = 2.33	
H.3 to T.25	0.0	0.671 150.0	1Utr	2.0 0.0	14.000 2.000	28.436 0.0				
T.25 to H.2	2.57	0.0170		0.0	16.000	0.272			Vel = 2.33	
T.25 to H.2	0.0	0.671 150.0	1Utr	2.0 0.0	5.000 2.000	28.708 0.0				
H.2 to T.27	2.57	0.0171		0.0	7.000	0.120			Vel = 2.33	
H.2 to T.27	0.0	0.671 150.0	1Utb	17.0 0.0	5.000 17.000	28.828 0.0				
T.27 to H.1	2.57	0.0170		0.0	22.000	0.374			Vel = 2.33	
T.27 to H.1	1.24	0.671 150.0	1Utb	17.0 0.0	10.000 17.000	29.202 0.0				
H.1 to T.23	3.81	0.0354		0.0	27.000	0.955			Vel = 3.46	
H.1 to T.23	0.0	0.671 150.0	1Utr	2.0 0.0	6.000 2.000	30.157 0.0				
T.23 to T.22	3.81	0.0354		0.0	8.000	0.283			Vel = 3.46	
T.23 to T.22	0.0	0.671 150.0	1Utr	2.0 0.0	5.000 2.000	30.440 0.0				
T.22	3.81	0.0354		0.0	7.000	0.248			Vel = 3.46	
	0.0 3.81						30.688		K Factor = 0.69	
T.36 to T.27	1.25	0.862 150.0		0.0 0.0	17.000 0.0	24.849 4.331				
T.27	1.25	0.0013		0.0	17.000	0.022			Vel = 0.69	
	0.0 1.25						29.202		K Factor = 0.23	
T.35 to T.34	1.00	0.671 150.0	1Utb	17.0 0.0	4.000 17.000	26.099 0.0				
T.34 to H.10	1.0	0.0030		0.0	21.000	0.063			Vel = 0.91	
T.34 to H.10	0.0	0.671 150.0	1Utr	2.0 0.0	2.000 2.000	26.162 0.0				
H.10 to T.32	1.0	0.0030		0.0	4.000	0.012			Vel = 0.91	
H.10 to T.32	0.0	0.671 150.0	1Utb 1Utr	17.0 2.0	7.000 19.000	26.174 0.0				
T.32	1.0	0.0030		0.0	26.000	0.078			Vel = 0.91	
	0.0 1.00						26.252		K Factor = 0.20	