

# Hydraulic Calculations for

**Project:** Homewood Suites  
3500 South Meridian  
Puyallup, WA. 98373

**Drawing no.:** FS-5  
**Date:** 3/3/2024

## Design

**Remote area number:** Area 5  
**Remote area location:** 2nd Floor Lodge  
**Occupancy classification:** Light Hazard  
**Density:** 0.10 gpm./ft.2  
**Area of application:** 1,013 sq.ft.  
**Coverage per sprinkler:** 162.5 sq.ft. maximum  
**Type of sprinklers calculated:** Concealed Pendent  
**No. of sprinklers calculated:** 9  
**In rack demand:** 0 gpm.  
**Hose streams:** 100 gpm. outside + 0 gpm. inside  
**Total water required (including hose streams):** 251.89 gpm at -21.41 psi [ 73.27 psi safety margin ]  
**Type of system:** wet pipe  
**Volume of dry or preaction system:**

## Water Supply Information

**Date:** 01-26-2024  
**Location:** 3601 9th Street Southwest  
**Source:** Fruitland Mutual Water Company

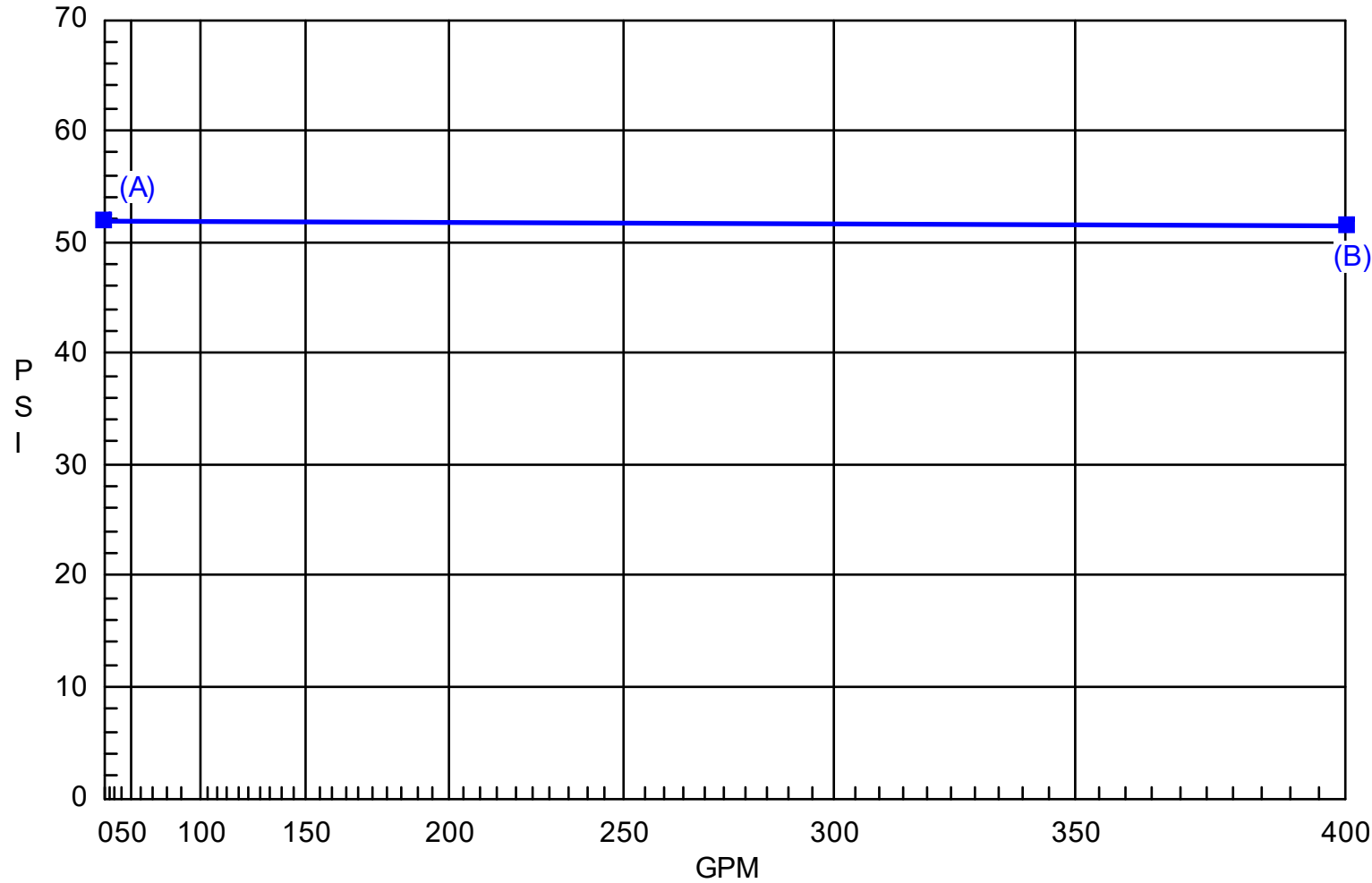
**Contractor:** Discount Fire Protection, LLC.  
4 Red Bluff Court  
Mansfield, TX. 76063

**Name of designer:** Timothy McBride  
**Authority having jurisdiction:**

## Notes

Pdev at node BOR to SOP - 3" AMEs 3000SS Backflow Preventer

### Hydraulic Demand Graph



Water Source:  
A) 52 psi Static  
B) 400 gpm at 51.69 psi

Demand at Source:  
C) 251.9 gpm at -21.41 psi

## Supply Analysis

Node at	Static Pressure [psi]	Residual Pressure [psi]	Flow [gpm]	Available Pressure [psi]	Total Demand [gpm]	Required Pressure [psi]
CTY	52.0	51.0	754.0	51.87	251.89	-21.41

## Node Analysis

Node Tag	Elev [ft]	Type	Pressure [psi]	Discharge [gpm]
CTY	1.000	source	-21.406	-251.888
E01	23.167	ref	5.143	0.000
EP1	23.167	ref	6.465	0.000
EP2	23.167	ref	8.864	0.000
EP3	23.167	ref	17.932	0.000
EP7	23.167	ref	22.519	0.000
E02	23.167	ref	5.883	0.000
E03	23.167	ref	8.152	0.000
E04	23.167	ref	5.424	0.000
E05	23.167	ref	6.062	0.000
E06	23.167	ref	8.540	0.000
EP8	23.167	ref	22.726	0.000
E07	23.167	ref	5.482	0.000
EP4	23.167	ref	6.852	0.000
EP5	23.167	ref	9.338	0.000
EP6	23.167	ref	18.732	0.000
EP9	23.167	ref	23.486	0.000
E08	23.167	ref	6.249	0.000
E09	23.167	ref	8.600	0.000
EP10	23.167	ref	54.306	0.000
Z13	20.333	ref	66.956	0.000
Z14	13.667	ref	69.883	0.000
ZP1	13.667	ref	70.596	0.000
TR2	13.667	ref	70.872	0.000
BR2	2.000	ref	76.152	0.000
BR1	2.000	ref	76.174	0.000
SOP	2.000	ref	-24.485	0.000
BOR	2.000	ref	-22.166	0.000
M01	-4.000	ref	-19.543	100.000
501	15.000	K=5.60	7.754	15.593
502	15.000	K=5.60	8.420	16.250
503	15.000	K=5.60	10.467	18.117
504	15.000	K=5.60	8.007	15.846
505	15.000	K=5.60	8.747	16.562
506	15.000	K=5.60	11.022	18.592
507	15.000	K=5.60	8.059	15.897
508	15.000	K=5.60	8.750	16.565
509	15.000	K=5.60	10.872	18.464

## Pipe Information

negative pipe flow (Q) indicates flow is from node 2 towards node 1

Node 1	Elev [ft]	K-factor	Discharge & Flow [gpm]	Nom i.d. [in]	Fittings num & length [ft]	L [ft] F [ft] T [ft]	C factor psi/ft	total (Pt) elev (Pe) frict (Pf)	Notes
501	15.000	5.6	Q= 15.593	1	1PE=13.388	8.167		Pt= 7.754	Mat="1-CPVC"
E01	23.167		Q= -15.593	1.101		13.388	C=150	Pe= 3.536	
						21.554	0.043	Pf= -0.925	
E01	23.167		Q= 0.000	1	1PE=13.388	15.500		Pt= 5.143	Mat="1-CPVC"
EP1	23.167		Q= -15.593	1.101	1PTS=1.913	15.300	C=150	Pe= 0.000	
						30.800	0.043	Pf= -1.322	
EP1	23.167		Q= 0.000	1	1PTS=1.913	13.000		Pt= 6.465	Mat="1-CPVC"
EP2	23.167		Q= -31.843	1.101		1.913	C=150	Pe= 0.000	
						14.913	0.161	Pf= -2.399	
EP2	23.167		Q= 0.000	1		24.500		Pt= 8.864	Mat="1-CPVC"
EP3	23.167		Q= -49.961	1.101		0.000	C=150	Pe= 0.000	
						24.500	0.37	Pf= -9.068	
EP3	23.167		Q= 0.000	1	1PTR=9.563	2.833		Pt= 17.932	Mat="1-CPVC"
EP7	23.167		Q= -49.961	1.101		9.563	C=150	Pe= 0.000	
						12.396	0.37	Pf= -4.588	
502	15.000	5.6	Q= 16.250	1	1PE=13.388	8.167		Pt= 8.420	Mat="1-CPVC"
E02	23.167		Q= -16.250	1.101		13.388	C=150	Pe= 3.536	
						21.554	0.046	Pf= -0.999	
E02	23.167		Q= 0.000	1	1PTR=9.563	3.000		Pt= 5.883	Mat="1-CPVC"
EP1	23.167		Q= -16.250	1.101		9.563	C=150	Pe= 0.000	
						12.563	0.046	Pf= -0.582	
503	15.000	5.6	Q= 18.117	1	1PE=13.388	8.167		Pt= 10.467	Mat="1-CPVC"
E03	23.167		Q= -18.117	1.101		13.388	C=150	Pe= 3.536	
						21.554	0.057	Pf= -1.221	
E03	23.167		Q= 0.000	1	1PTR=9.563	3.000		Pt= 8.152	Mat="1-CPVC"
EP2	23.167		Q= -18.117	1.101		9.563	C=150	Pe= 0.000	
						12.563	0.057	Pf= -0.712	
504	15.000	5.6	Q= 15.846	1	1PE=13.388	8.167		Pt= 8.007	Mat="1-CPVC"
E04	23.167		Q= -15.846	1.101		13.388	C=150	Pe= 3.536	
						21.554	0.044	Pf= -0.953	
E04	23.167		Q= 0.000	1	1PTS=1.913	12.500		Pt= 5.424	Mat="1-CPVC"
E05	23.167		Q= -15.846	1.101		1.913	C=150	Pe= 0.000	
						14.413	0.044	Pf= -0.637	
E05	23.167		Q= 0.000	1	1PTS=1.913	13.000		Pt= 6.062	Mat="1-CPVC"
E06	23.167		Q= -32.409	1.101		1.913	C=150	Pe= 0.000	
						14.913	0.166	Pf= -2.478	
E06	23.167		Q= 0.000	1	1PTR=9.563	27.333		Pt= 8.540	Mat="1-CPVC"
EP8	23.167		Q= -51.001	1.101		9.563	C=150	Pe= 0.000	
						36.896	0.384	Pf= -14.186	
505	15.000	5.6	Q= 16.562	1	1PTR=9.563	8.167		Pt= 8.747	Mat="1-CPVC"
E05	23.167		Q= -16.562	1.101		9.563	C=150	Pe= 3.536	
						17.729	0.048	Pf= -0.851	
506	15.000	5.6	Q= 18.592	1	1PTR=9.563	8.167		Pt= 11.022	Mat="1-CPVC"
E06	23.167		Q= -18.592	1.101		9.563	C=150	Pe= 3.536	
						17.729	0.059	Pf= -1.054	

Pipe Information, cont.

Node 1	Elev [ft]	K-factor	Discharge & Flow [gpm]	Nom i.d. [in]	Fittings num & length [ft]	L [ft] F [ft] T [ft]	C factor psi/ft	total (Pt) elev (Pe) frict (Pf)	Notes
507	15.000	5.6	q= 15.897 Q= -15.897	1 1.101	1PE=13.388	8.167 13.388	C=150	Pt= 8.059 Pe= 3.536	Mat="1-CPVC"
E07	23.167					21.554	0.044	Pf= -0.959	
E07	23.167		q= 0.000 Q= -15.897	1 1.101	1PE=13.388 1PTS=1.913	15.500 15.300	C=150	Pt= 5.482 Pe= 0.000	Mat="1-CPVC"
EP4	23.167					30.800	0.044	Pf= -1.370	
EP4	23.167		q= 0.000 Q= -32.462	1 1.101	1PTS=1.913	13.000 1.913	C=150	Pt= 6.852 Pe= 0.000	Mat="1-CPVC"
EP5	23.167					14.913	0.167	Pf= -2.486	
EP5	23.167		q= 0.000 Q= -50.926	1 1.101		24.500 0.000	C=150	Pt= 9.338 Pe= 0.000	Mat="1-CPVC"
EP6	23.167					24.500	0.383	Pf= -9.395	
EP6	23.167		q= 0.000 Q= -50.926	1 1.101	1PTR=9.563	2.833 9.563	C=150	Pt= 18.732 Pe= 0.000	Mat="1-CPVC"
EP9	23.167					12.396	0.383	Pf= -4.753	
508	15.000	5.6	q= 16.565 Q= -16.565	1 1.101	1PE=13.388	8.167 13.388	C=150	Pt= 8.750 Pe= 3.536	Mat="1-CPVC"
E08	23.167					21.554	0.048	Pf= -1.035	
E08	23.167		q= 0.000 Q= -16.565	1 1.101	1PTR=9.563	3.000 9.563	C=150	Pt= 6.249 Pe= 0.000	Mat="1-CPVC"
EP4	23.167					12.563	0.048	Pf= -0.603	
509	15.000	5.6	q= 18.464 Q= -18.464	1 1.101	1PE=13.388	8.167 13.388	C=150	Pt= 10.872 Pe= 3.536	Mat="1-CPVC"
E09	23.167					21.554	0.059	Pf= -1.265	
E09	23.167		q= 0.000 Q= -18.464	1 1.101	1PTR=9.563	3.000 9.563	C=150	Pt= 8.600 Pe= 0.000	Mat="1-CPVC"
EP5	23.167					12.563	0.059	Pf= -0.737	
EP7	23.167		q= 0.000 Q= -49.961	2 2.003	1PTS=1.296	9.000 1.296	C=150	Pt= 22.519 Pe= 0.000	Mat="1-CPVC"
EP8	23.167					10.296	0.02	Pf= -0.207	
EP8	23.167		q= 0.000 Q= -100.961	2 2.003	1PTS=1.296	9.000 1.296	C=150	Pt= 22.726 Pe= 0.000	Mat="1-CPVC"
EP9	23.167					10.296	0.074	Pf= -0.760	
EP9	23.167		q= 0.000 Q= -151.888	2 2.003	1PE=14.261	182.000 14.261	C=150	Pt= 23.486 Pe= 0.000	Mat="1-CPVC"
EP10	23.167					196.261	0.157	Pf= -30.820	
EP10	23.167		q= 0.000 Q= -151.888	2 2.153	2E=12.196 1C=13.416	5.333 45.125	C=120	Pt= 54.306 Pe= -1.227	Mat="1-WLML" Pdev=-3.0 psi
Z13	20.333				1B=7.318 1T=12.196	50.458	0.167	Pf= -8.423	
Z13	20.333		q= 0.000 Q= -151.888	4 4.26		6.667 0.000	C=120	Pt= 66.956 Pe= -2.887	Mat="1-WL10"
Z14	13.667					6.667	0.006	Pf= -0.040	
Z14	13.667		q= 0.000 Q= -151.888	4 4.26	2E=26.334 1B=15.800	50.167 68.469	C=120	Pt= 69.883 Pe= 0.000	Mat="1-WL10"
ZP1	13.667				1T=26.334	118.635	0.006	Pf= -0.714	

### Pipe Information, cont.

Node 1	Elev	Discharge & Flow	Nom i.d.	Fittings num & length	L [ft]	C factor	total elev (Pe)	Notes
Node 2	[ft]	[gpm]	[in]	[ft]	F [ft]	psi/ft	frict (Pf)	
ZP1	13.667	q= 0.000 Q=-151.888	4 4.26	1T=26.334	19.500 26.334		Pt= 70.596 Pe= 0.000	Mat="1-WL10"
TR2	13.667				45.834	0.006	Pf= -0.276	
TR2	13.667	q= 0.000 Q=-151.888	4 4.26	1T=26.334	11.667 26.334		Pt= 70.872 Pe= -5.052	Mat="1-WL10"
BR2	2.000				38.001	0.006	Pf= -0.229	
BR2	2.000	q= 0.000 Q=-151.888	3 3.26		1.000 0.000		Pt= 76.152 Pe= 0.000	Mat="1-WL10"
BR1	2.000				1.000	0.022	Pf= -0.022	
BR1	2.000	q= 0.000 Q=-151.888	3 3.26	2G=2.688 1C=21.503	6.500 33.599		Pt= 76.174 Pe= 0.000	Mat="1-WL10"
SOP	2.000			1E=9.408	40.099	0.022	Pf= -0.888	Pdev=101.55 psi
SOP	2.000	q= 0.000 Q=-151.888	3 3.26	1E=9.408	5.000 9.408		Pt=-24.485 Pe= 0.000	Mat="1-WL10"
BOR	2.000				14.408	0.022	Pf= -0.319	Pdev=-2.0 psi
BOR	2.000	q= 0.000 Q=-151.888	6 6.065	1E=14.000	10.000 14.000		Pt=-22.166 Pe= -2.598	Mat="S40"
M01	-4.000				24.000	0.001	Pf= -0.026	
M01	-4.000	q= 100.000 Q=-251.888	6 6.08	1G=4.588 1E=21.411	96.000 71.880		Pt=-19.543 Pe= 2.165	Mat="1-PVC"
CTY	1.000			1T=45.881	167.880	0.002	Pf= -0.301	

### Material Codes

- |  |   |
|--|---|
| <p><b><u>Pipe Material</u></b></p> <ul style="list-style-type: none"> <li>S40 - Schedule 40 Steel</li> <li>1-PVC - PVC C900 Underround Pipe</li> <li>1-CPVC - Blazemaster</li> <li>1-WL10 - Wheatland's schedule 10</li> <li>1-WLML - Wheatland's MLT</li> </ul> | <p><b><u>Fittings</u></b></p> <ul style="list-style-type: none"> <li>B - Butterfly Valve</li> <li>C - Check Valve</li> <li>E - Standard 90 degree elbow</li> <li>G - Gate Valve</li> <li>T - Tee - Flow turn 90 degrees</li> <li>PE - CPVC 90 degree elbow</li> <li>PTR - CPVC Tee - Flow turn 90 degree</li> <li>PTS - CPVC Tee - Flow straight thru path</li> </ul> |
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