

Hydraulic Calculations for

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

Drawing no.: FS-7
Date: 3/3/2024

Design

Remote area number: Area 4
Remote area location: 4th Floor Corridor
Occupancy classification: Light Hazard
Density: 0.10 gpm./ft.2
Area of application: 5 remote sprinklers
Coverage per sprinkler: 170 sq.ft. maximum
Type of sprinklers calculated: Residential Concealed Pendent
No. of sprinklers calculated: 5
In rack demand: 0 gpm.
Hose streams: 100 gpm. outside + 0 gpm. inside
Total water required (including hose streams): 186.99 gpm at -37.41 psi [89.33 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

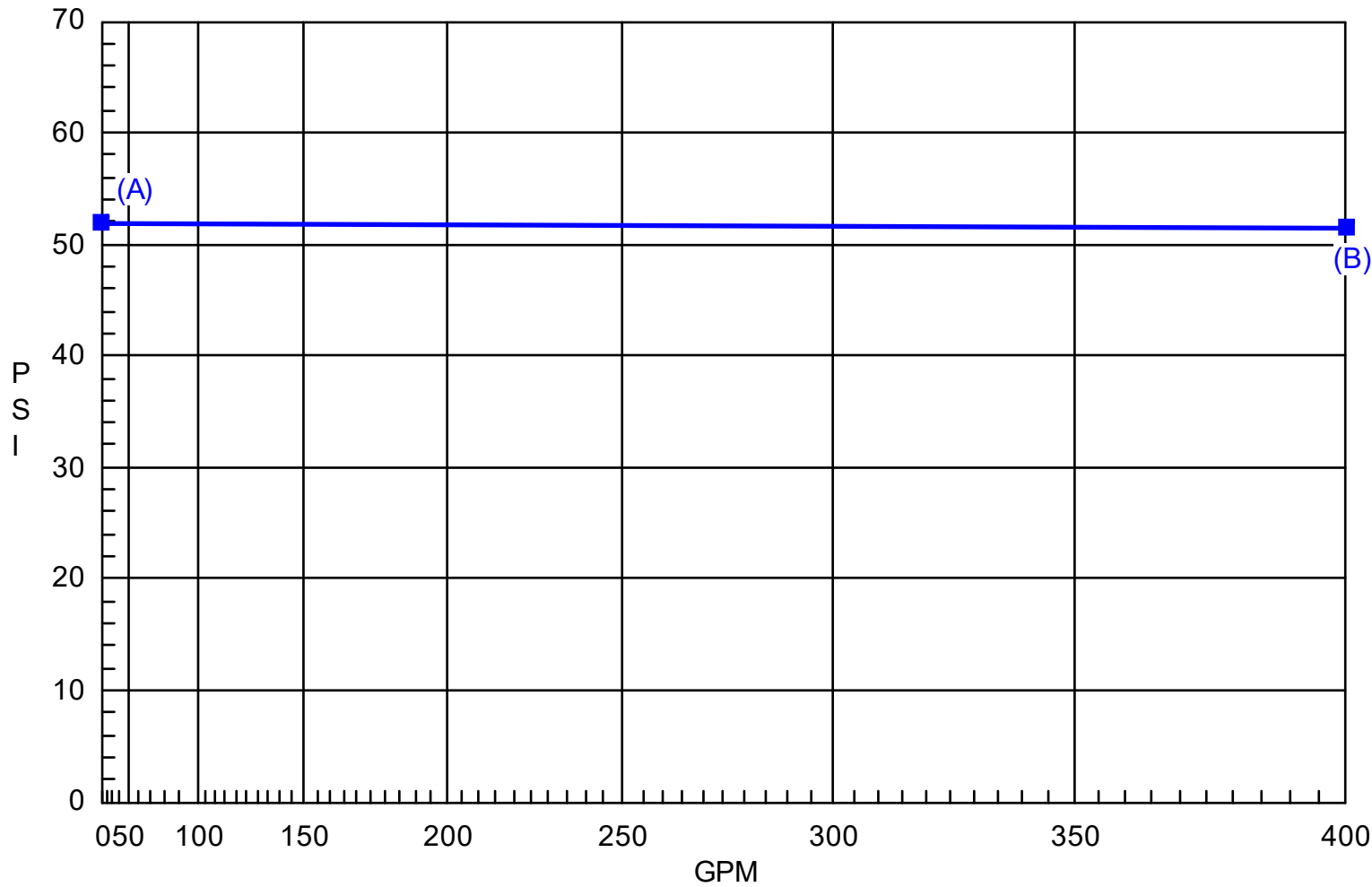
Contractor: Discount Fire Protection, LLC.
4 Red Bluff Court
Mansfield, TX. 76063

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) 187 gpm at -37.41 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	51.92	186.99	-37.41

Node Analysis

Node Tag	Elev [ft]	Type	Pressure [psi]	Discharge [gpm]
CTY	1.000	source	-37.407	-186.991
D01	43.500	ref	14.869	0.000
CP2	43.500	ref	16.215	0.000
D02	43.500	ref	14.916	0.000
CP3	43.500	ref	16.265	0.000
D03	43.500	ref	15.044	0.000
CP4	43.500	ref	16.404	0.000
D04	43.500	ref	13.990	0.000
CP6	43.500	ref	16.833	0.000
D05	43.500	ref	14.505	0.000
CP7	43.500	ref	17.389	0.000
CP5	43.500	ref	16.553	0.000
CP8	43.500	ref	19.608	0.000
CP9	43.500	ref	35.392	0.000
AP9	40.667	ref	42.623	0.000
Z12	40.667	ref	43.389	0.000
Z13	20.333	ref	52.237	0.000
Z14	13.667	ref	55.138	0.000
ZP1	13.667	ref	55.392	0.000
TR2	13.667	ref	55.491	0.000
BR2	2.000	ref	60.624	0.000
BR1	2.000	ref	60.632	0.000
SOP	2.000	ref	-41.093	0.000
BOR	2.000	ref	-38.023	0.000
M01	-4.000	ref	-35.415	100.000
401	42.667	K=4.90	12.783	17.519
402	42.667	K=4.90	12.822	17.546
403	42.667	K=4.90	12.931	17.620
404	42.667	K=4.90	12.037	17.000
405	42.667	K=4.90	12.473	17.306

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
401	42.667	4.9	Q= 17.519	0.75	1PE=14.092	0.833		Pt= 12.783	Mat="1-CPVC"
D01	43.500		Q= -17.519	0.874		14.092	C=150	Pe= 0.361	
						14.925	0.164	Pf= -2.447	
D01	43.500		Q= 0.000	0.75	1PTR=6.039	2.167		Pt= 14.869	Mat="1-CPVC"
CP2	43.500		Q= -17.519	0.874		6.039	C=150	Pe= 0.000	
						8.206	0.164	Pf= -1.345	
402	42.667	4.9	Q= 17.546	0.75	1PE=14.092	0.833		Pt= 12.822	Mat="1-CPVC"
D02	43.500		Q= -17.546	0.874		14.092	C=150	Pe= 0.361	
						14.925	0.164	Pf= -2.454	
D02	43.500		Q= 0.000	0.75	1PTR=6.039	2.167		Pt= 14.916	Mat="1-CPVC"
CP3	43.500		Q= -17.546	0.874		6.039	C=150	Pe= 0.000	
						8.206	0.164	Pf= -1.349	
403	42.667	4.9	Q= 17.620	0.75	1PE=14.092	0.833		Pt= 12.931	Mat="1-CPVC"
D03	43.500		Q= -17.620	0.874		14.092	C=150	Pe= 0.361	
						14.925	0.166	Pf= -2.473	
D03	43.500		Q= 0.000	0.75	1PTR=6.039	2.167		Pt= 15.044	Mat="1-CPVC"
CP4	43.500		Q= -17.620	0.874		6.039	C=150	Pe= 0.000	
						8.206	0.166	Pf= -1.360	
404	42.667	4.9	Q= 17.000	0.75	1PE=14.092	0.833		Pt= 12.037	Mat="1-CPVC"
D04	43.500		Q= -17.000	0.874		14.092	C=150	Pe= 0.361	
						14.925	0.155	Pf= -2.315	
D04	43.500		Q= 0.000	0.75	2PTR=12.079	6.250		Pt= 13.990	Mat="1-CPVC"
CP6	43.500		Q= -17.000	0.874		12.079	C=150	Pe= 0.000	
						18.329	0.155	Pf= -2.842	
405	42.667	4.9	Q= 17.306	0.75	1PE=14.092	0.833		Pt= 12.473	Mat="1-CPVC"
D05	43.500		Q= -17.306	0.874		14.092	C=150	Pe= 0.361	
						14.925	0.16	Pf= -2.392	
D05	43.500		Q= 0.000	0.75	2PTR=12.079	5.917		Pt= 14.505	Mat="1-CPVC"
CP7	43.500		Q= -17.306	0.874		12.079	C=150	Pe= 0.000	
						17.996	0.16	Pf= -2.884	
CP2	43.500		Q= 0.000	2	1PTS=1.296	16.000		Pt= 16.215	Mat="1-CPVC"
CP3	43.500		Q= -17.519	2.003		1.296	C=150	Pe= 0.000	
						17.296	0.003	Pf= -0.050	
CP3	43.500		Q= 0.000	2	1PTS=1.296	12.000		Pt= 16.265	Mat="1-CPVC"
CP4	43.500		Q= -35.065	2.003		1.296	C=150	Pe= 0.000	
						13.296	0.01	Pf= -0.139	
CP4	43.500		Q= 0.000	2		6.750		Pt= 16.404	Mat="1-CPVC"
CP5	43.500		Q= -52.686	2.003		0.000	C=150	Pe= 0.000	
						6.750	0.022	Pf= -0.149	
CP5	43.500		Q= 0.000	2	1PTS=1.296	11.333		Pt= 16.553	Mat="1-CPVC"
CP6	43.500		Q= -52.686	2.003		1.296	C=150	Pe= 0.000	
						12.630	0.022	Pf= -0.280	
CP6	43.500		Q= 0.000	2	1PTS=1.296	13.667		Pt= 16.833	Mat="1-CPVC"
CP7	43.500		Q= -69.686	2.003		1.296	C=150	Pe= 0.000	
						14.963	0.037	Pf= -0.556	

Pipe Information, cont.

Node 1 Node 2	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
CP7	43.500		q= 0.000 Q= -86.991	2 2.003	1PTR=12.965	26.667 12.965		Pt= 17.389 Pe= 0.000	Mat="1-CPVC"
CP8	43.500					39.631	0.056	Pf= -2.219	
CP8	43.500		q= 0.000 Q= -86.991	2 2.003	1PE=14.261	267.583 14.261		Pt= 19.608 Pe= 0.000	Mat="1-CPVC"
CP9	43.500					281.844	0.056	Pf= -15.784	
CP9	43.500		q= 0.000 Q= -86.991	2 2.153	2E=12.196 1C=13.416	5.333 45.125		Pt= 35.392 Pe= -1.227	Mat="1-WLML" Pdev=-3.0 psi
AP9	40.667				1B=7.318 1T=12.196	50.458	0.06	Pf= -3.004	
AP9	40.667		q= 0.000 Q= -86.991	2 2.153	1T=12.196	0.667 12.196		Pt= 42.623 Pe= 0.000	Mat="1-WLML"
Z12	40.667					12.863	0.06	Pf= -0.766	
Z12	40.667		q= 0.000 Q= -86.991	4 4.26		20.333 0.000		Pt= 43.389 Pe= -8.804	Mat="1-WL10"
Z13	20.333					20.333	0.002	Pf= -0.044	
Z13	20.333		q= 0.000 Q= -86.991	4 4.26		6.667 0.000		Pt= 52.237 Pe= -2.887	Mat="1-WL10"
Z14	13.667					6.667	0.002	Pf= -0.014	
Z14	13.667		q= 0.000 Q= -86.991	4 4.26	2E=26.334 1B=15.800	50.167 68.469		Pt= 55.138 Pe= 0.000	Mat="1-WL10"
ZP1	13.667				1T=26.334	118.635	0.002	Pf= -0.254	
ZP1	13.667		q= 0.000 Q= -86.991	4 4.26	1T=26.334	19.500 26.334		Pt= 55.392 Pe= 0.000	Mat="1-WL10"
TR2	13.667					45.834	0.002	Pf= -0.098	
TR2	13.667		q= 0.000 Q= -86.991	4 4.26	1T=26.334	11.667 26.334		Pt= 55.491 Pe= -5.052	Mat="1-WL10"
BR2	2.000					38.001	0.002	Pf= -0.082	
BR2	2.000		q= 0.000 Q= -86.991	3 3.26		1.000 0.000		Pt= 60.624 Pe= 0.000	Mat="1-WL10"
BR1	2.000					1.000	0.008	Pf= -0.008	
BR1	2.000		q= 0.000 Q= -86.991	3 3.26	2G=2.688 1C=21.503	6.500 33.599		Pt= 60.632 Pe= 0.000	Mat="1-WL10" Pdev=102.04 psi
SOP	2.000				1E=9.408	40.099	0.008	Pf= -0.317	
SOP	2.000		q= 0.000 Q= -86.991	3 3.26	1E=9.408	5.000 9.408		Pt= -41.093 Pe= 0.000	Mat="1-WL10" Pdev=-2.96 psi
BOR	2.000					14.408	0.008	Pf= -0.114	
BOR	2.000		q= 0.000 Q= -86.991	6 6.065	1E=14.000	10.000 14.000		Pt= -38.023 Pe= -2.598	Mat="S40"
M01	-4.000					24.000	0.000	Pf= -0.009	
M01	-4.000		q= 100.000 Q= -186.991	6 6.08	1G=4.588 1E=21.411	96.000 71.880		Pt= -35.415 Pe= 2.165	Mat="1-PVC"
CTY	1.000				1T=45.881	167.880	0.001	Pf= -0.174	

Material Codes

Pipe Material

S40 - Schedule 40 Steel
1-PVC - PVC C900 Underround Pipe
1-CPVC - Blazemaster
1-WL10 - Wheatland's schedule 10
1-WMLM - Wheatland's MLT

Fittings

B - Butterfly Valve
C - Check Valve
E - Standard 90 degree elbow
G - Gate Valve
T - Tee - Flow turn 90 degrees
PE - CPVC 90 degree elbow
PTR - CPVC Tee - Flow turn 90 degree
PTS - CPVC Tee - Flow straight thru path