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 3
Remote area location: 4th Floor Room 402
Occupancy classification: Light Hazard
Density: 0.10 gpm./ft.2
Area of application: 4 remote sprinklers
Coverage per sprinkler: 170 sq.ft. maximum
Type of sprinklers calculated: Residential Concealed Pendent
No. of sprinklers calculated: 4
In rack demand: 0 gpm.
Hose streams: 100 gpm. outside + 0 gpm. inside
Total water required (including hose streams): 178.35 gpm at 6.82 psi [45.11 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

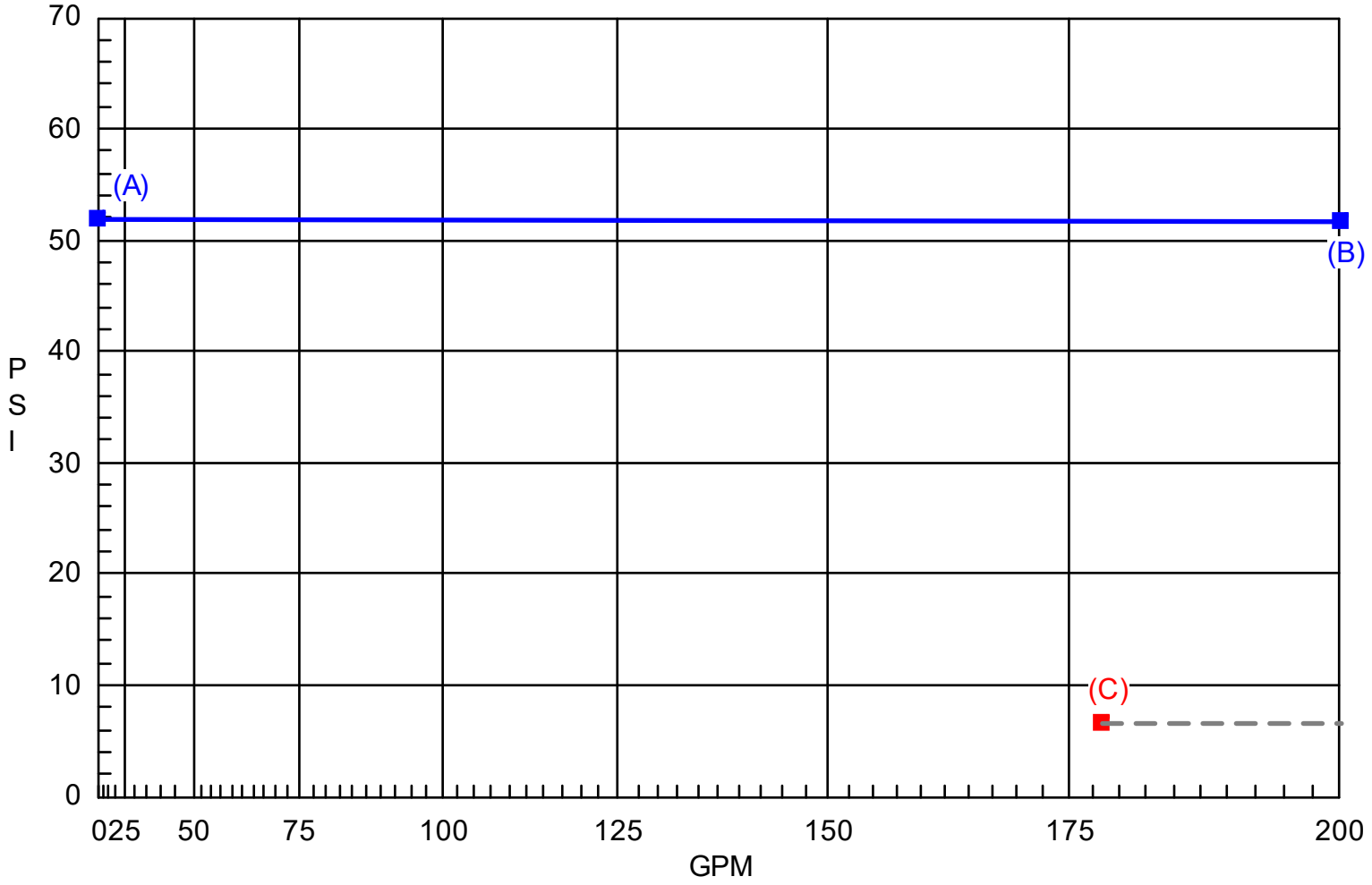
Contractor: Discount Fire Protection, LLC.
4 Red Bluff Court
Mansfield, TX. 76063

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) 200 gpm at 51.91 psi

Demand at Source:
C) 178.4 gpm at 6.82 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	51.93	178.35	6.82

Node Analysis

Node Tag	Elev [ft]	Type	Pressure [psi]	Discharge [gpm]
CTY	1.000	source	6.819	-178.352
C01	43.500	ref	13.990	0.000
C02	43.500	ref	16.319	0.000
CP1	43.500	ref	23.388	0.000
CP5	43.500	ref	63.873	0.000
C03	43.500	ref	21.536	0.000
C04	43.500	ref	21.643	0.000
CP6	43.500	ref	64.396	0.000
CP7	43.500	ref	65.027	0.000
CP8	43.500	ref	66.856	0.000
CP9	43.500	ref	79.863	0.000
AP9	40.667	ref	86.565	0.000
Z12	40.667	ref	87.196	0.000
Z13	20.333	ref	96.037	0.000
Z14	13.667	ref	98.935	0.000
ZP1	13.667	ref	99.145	0.000
TR2	13.667	ref	99.226	0.000
BR2	2.000	ref	104.345	0.000
BR1	2.000	ref	104.351	0.000
SOP	2.000	ref	2.534	0.000
BOR	2.000	ref	6.219	0.000
M01	-4.000	ref	8.825	100.000
301	42.667	K=4.90	12.037	17.000
302	42.667	K=4.90	15.345	19.195
303	42.667	K=4.90	18.459	21.052
304	42.667	K=4.90	18.551	21.105

Pipe Information

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

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
301	42.667	4.9	q= 17.000	0.75	1PE=14.092	0.833		Pt= 12.037	Mat="1-CPVC"
			Q= -17.000	0.874		14.092	C=150	Pe= 0.361	
C01	43.500					14.925	0.155	Pf= -2.315	
C01	43.500		q= 0.000	0.75	1PTS=2.013	13.000		Pt= 13.990	Mat="1-CPVC"
			Q= -17.000	0.874		2.013	C=150	Pe= 0.000	
C02	43.500					15.013	0.155	Pf= -2.328	
C02	43.500		q= 0.000	0.75	1PTS=2.013	9.250		Pt= 16.319	Mat="1-CPVC"
			Q= -36.195	0.874		2.013	C=150	Pe= 0.000	
CP1	43.500					11.263	0.628	Pf= -7.069	
CP1	43.500		q= 0.000	0.75	1PTR=6.039	9.417		Pt= 23.388	Mat="1-CPVC"
			Q= -78.352	0.874		6.039	C=150	Pe= 0.000	
CP5	43.500					15.456	2.619	Pf=-40.486	
302	42.667	4.9	q= 19.195	0.75	1PTR=6.039	0.833		Pt= 15.345	Mat="1-CPVC"
			Q= -19.195	0.874		6.039	C=150	Pe= 0.361	
C02	43.500					6.873	0.194	Pf= -1.334	
303	42.667	4.9	q= 21.052	0.75	1PE=14.092	0.833		Pt= 18.459	Mat="1-CPVC"
			Q= -21.052	0.874		14.092	C=150	Pe= 0.361	
C03	43.500					14.925	0.23	Pf= -3.438	
C03	43.500		q= 0.000	0.75	1PTR=6.039	2.000		Pt= 21.536	Mat="1-CPVC"
			Q= -21.052	0.874		6.039	C=150	Pe= 0.000	
CP1	43.500					8.039	0.23	Pf= -1.852	
304	42.667	4.9	q= 21.105	0.75	1PE=14.092	0.833		Pt= 18.551	Mat="1-CPVC"
			Q= -21.105	0.874		14.092	C=150	Pe= 0.361	
C04	43.500					14.925	0.231	Pf= -3.453	
C04	43.500		q= 0.000	0.75	1PTR=6.039	1.500		Pt= 21.643	Mat="1-CPVC"
			Q= -21.105	0.874		6.039	C=150	Pe= 0.000	
CP1	43.500					7.539	0.231	Pf= -1.744	
CP5	43.500		q= 0.000	2		11.333		Pt= 63.873	Mat="1-CPVC"
			Q= -78.352	2.003		0.000	C=150	Pe= 0.000	
CP6	43.500					11.333	0.046	Pf= -0.523	
CP6	43.500		q= 0.000	2		13.667		Pt= 64.396	Mat="1-CPVC"
			Q= -78.352	2.003		0.000	C=150	Pe= 0.000	
CP7	43.500					13.667	0.046	Pf= -0.631	
CP7	43.500		q= 0.000	2	1PTR=12.965	26.667		Pt= 65.027	Mat="1-CPVC"
			Q= -78.352	2.003		12.965	C=150	Pe= 0.000	
CP8	43.500					39.631	0.046	Pf= -1.829	
CP8	43.500		q= 0.000	2	1PE=14.261	267.583		Pt= 66.856	Mat="1-CPVC"
			Q= -78.352	2.003		14.261	C=150	Pe= 0.000	
CP9	43.500					281.844	0.046	Pf=-13.007	
CP9	43.500		q= 0.000	2	2E=12.196	5.333		Pt= 79.863	Mat="1-WLML"
			Q= -78.352	2.153	1C=13.416	45.125	C=120	Pe= -1.227	Pdev=-3.0 psi
AP9	40.667				1B=7.318	50.458	0.049	Pf= -2.475	
					1T=12.196				
AP9	40.667		q= 0.000	2	1T=12.196	0.667		Pt= 86.565	Mat="1-WLML"
			Q= -78.352	2.153		12.196	C=120	Pe= 0.000	
Z12	40.667					12.863	0.049	Pf= -0.631	

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
Z12	40.667		q= 0.000	4		20.333		Pt= 87.196	Mat="1-WL10"
			Q= -78.352	4.26		0.000	C=120	Pe= -8.804	
Z13	20.333					20.333	0.002	Pf= -0.036	
Z13	20.333		q= 0.000	4		6.667		Pt= 96.037	Mat="1-WL10"
			Q= -78.352	4.26		0.000	C=120	Pe= -2.887	
Z14	13.667					6.667	0.002	Pf= -0.012	
Z14	13.667		q= 0.000	4	2E=26.334	50.167		Pt= 98.935	Mat="1-WL10"
			Q= -78.352	4.26	1B=15.800	68.469	C=120	Pe= 0.000	
ZP1	13.667				1T=26.334	118.635	0.002	Pf= -0.210	
ZP1	13.667		q= 0.000	4	1T=26.334	19.500		Pt= 99.145	Mat="1-WL10"
			Q= -78.352	4.26		26.334	C=120	Pe= 0.000	
TR2	13.667					45.834	0.002	Pf= -0.081	
TR2	13.667		q= 0.000	4	1T=26.334	11.667		Pt= 99.226	Mat="1-WL10"
			Q= -78.352	4.26		26.334	C=120	Pe= -5.052	
BR2	2.000					38.001	0.002	Pf= -0.067	
BR2	2.000		q= 0.000	3		1.000		Pt=104.345	Mat="1-WL10"
			Q= -78.352	3.26		0.000	C=120	Pe= 0.000	
BR1	2.000					1.000	0.007	Pf= -0.007	
BR1	2.000		q= 0.000	3	2G=2.688	6.500		Pt=104.351	Mat="1-WL10"
			Q= -78.352	3.26	1C=21.503	33.599	C=120	Pe= 0.000	Pdev=102.08 psi
SOP	2.000				1E=9.408	40.099	0.007	Pf= -0.261	
SOP	2.000		q= 0.000	3	1E=9.408	5.000		Pt= 2.534	Mat="1-WL10"
			Q= -78.352	3.26		9.408	C=120	Pe= 0.000	Pdev=-3.59 psi
BOR	2.000					14.408	0.007	Pf= -0.094	
BOR	2.000		q= 0.000	6	1E=14.000	10.000		Pt= 6.219	Mat="S40"
			Q= -78.352	6.065		14.000	C=120	Pe= -2.598	
M01	-4.000					24.000	0.000	Pf= -0.008	
M01	-4.000		q= 100.000	6	1G=4.588	96.000		Pt= 8.825	Mat="1-PVC"
			Q=-178.352	6.08	1E=21.411	71.880	C=150	Pe= 2.165	
CTY	1.000				1T=45.881	167.880	0.001	Pf= -0.159	

Material Codes

Pipe Material

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