Hydraulic Calculations
for

Project: Homewood Suites
3500 South Meridian
Puyallup, WA. 98373
Drawing no.: FS-4
Date: 3/3/2024

Design

Remote area number:	Area 7
Remote area location:	1st Floor Laundry
Occupancy classification:	ordinary hazard group I
Density:	0.15 gpm./ft.2
Area of application:	950 sq.ft.
Coverage per sprinkler:	130 sq.ft. maximum
Type of sprinklers calculated:	Concealed Pendent
No. of sprinklers calculated:	11
In rack demand:	0 gpm.
Hose streams:	250 gpm. outside + 0 gpm. inside
Total water required (including hose streams):	462.87 gpm at -24.44 psi [76.03 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

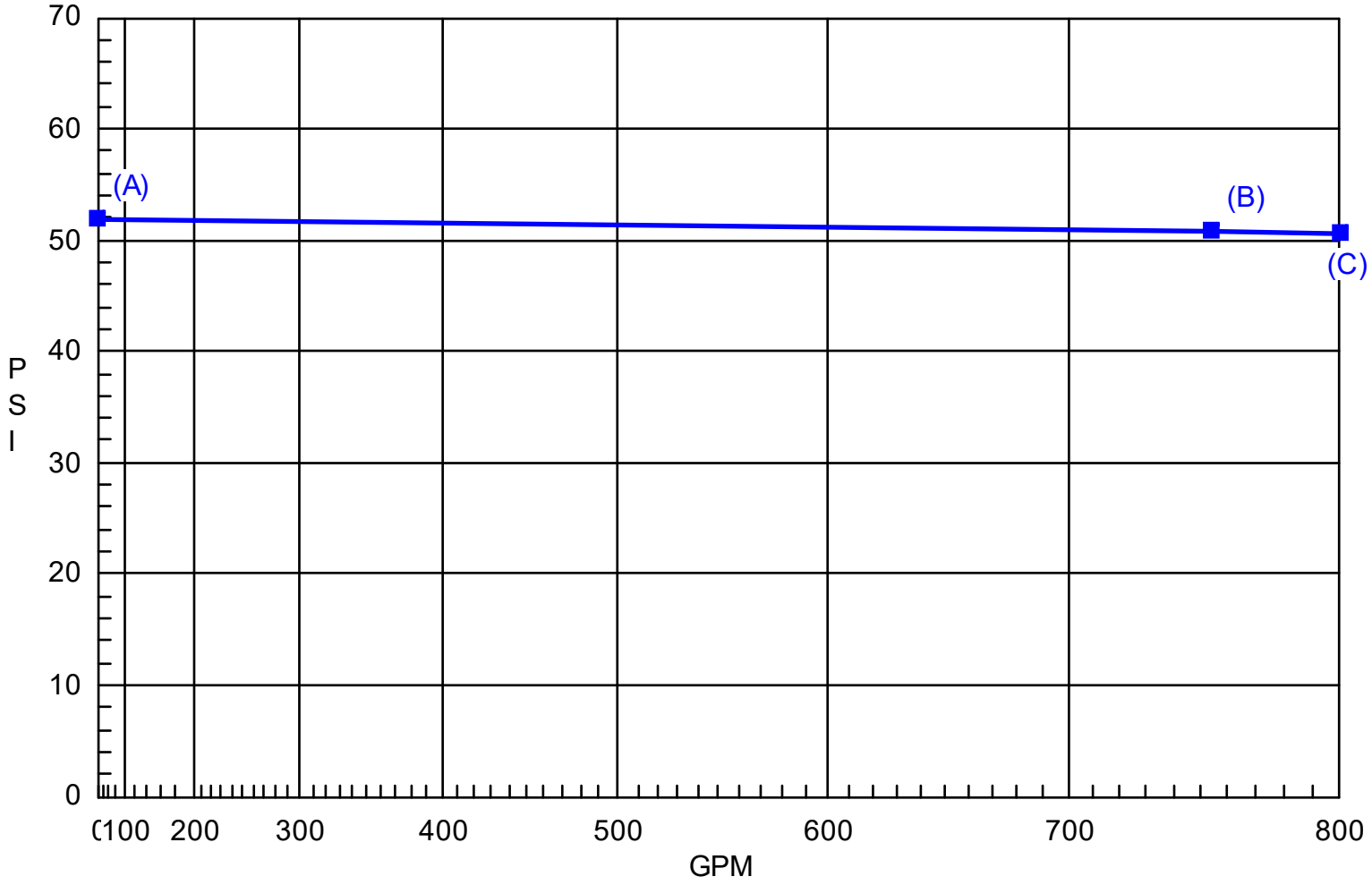
Contractor: Discount Fire Protection, LLC.
4 Red Bluff Court
Mansfield, TX. 76063

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) 754 gpm at 51 psi
C) 800 gpm at 50.88 psi

Demand at Source:
D) 462.9 gpm at -24.44 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	51.59	462.87	-24.44

Node Analysis

Node Tag	Elev [ft]	Type	Pressure [psi]	Discharge [gpm]
CTY	1.000	source	-24.437	-462.870
G01	13.000	ref	9.299	0.000
G02	13.000	ref	10.296	0.000
GP1	13.000	ref	12.217	0.000
GP2	13.000	ref	21.054	0.000
G03	13.000	ref	11.596	0.000
G04	13.000	ref	14.705	0.000
G05	13.000	ref	15.631	0.000
GP3	13.000	ref	21.382	0.000
G06	13.000	ref	10.147	0.000
GP4	13.000	ref	10.598	0.000
GP5	13.000	ref	13.022	0.000
GP6	13.000	ref	22.028	0.000
G07	13.000	ref	9.950	0.000
G08	13.000	ref	12.126	0.000
G09	13.000	ref	11.661	0.000
G10	13.000	ref	12.137	0.000
GP7	13.000	ref	14.412	0.000
GP8	13.000	ref	24.480	0.000
G11	13.000	ref	13.572	0.000
HP5	13.000	ref	26.752	0.000
HP6	13.000	ref	34.107	0.000
TR1	13.000	ref	43.871	0.000
BR1	2.000	ref	69.440	0.000
SOP	2.000	ref	-28.571	0.000
BOR	2.000	ref	-25.847	0.000
M01	-4.000	ref	-23.200	250.000
701	12.167	K=5.60	8.962	16.764
702	10.000	K=5.60	10.858	18.453
703	12.000	K=5.60	11.164	18.711
704	10.000	K=5.60	14.730	21.493
705	10.000	K=5.60	15.883	22.318
706	10.000	K=5.60	10.514	18.158
707	10.000	K=5.60	10.332	18.000
708	10.000	K=5.60	12.344	19.675
709	12.167	K=5.60	11.166	18.713
710	10.000	K=5.60	12.592	19.871
711	10.000	K=5.60	13.682	20.714

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
701	12.167	5.6	q= 16.764	1	1PE=13.388	0.833		Pt= 8.962	Mat="1-CPVC"
			Q= -16.764	1.101		13.388	C=150	Pe= 0.361	
G01	13.000					14.221	0.049	Pf= -0.698	
G01	13.000		q= 0.000	1	1PE=13.388	5.000		Pt= 9.299	Mat="1-CPVC"
			Q= -16.764	1.101	1PTS=1.913	15.300	C=150	Pe= 0.000	
G02	13.000					20.300	0.049	Pf= -0.997	
G02	13.000		q= 0.000	1	1PTS=1.913	8.000		Pt= 10.296	Mat="1-CPVC"
			Q= -35.217	1.101		1.913	C=150	Pe= 0.000	
GP1	13.000					9.913	0.194	Pf= -1.921	
GP1	13.000		q= 0.000	1	1PTR=9.563	11.167		Pt= 12.217	Mat="1-CPVC"
			Q= -53.928	1.101		9.563	C=150	Pe= 0.000	
GP2	13.000					20.729	0.426	Pf= -8.837	
702	10.000	5.6	q= 18.453	1	1PTR=9.563	3.000		Pt= 10.858	Mat="1-CPVC"
			Q= -18.453	1.101		9.563	C=150	Pe= 1.299	
G02	13.000					12.563	0.059	Pf= -0.736	
703	12.000	5.6	q= 18.711	1	1PE=13.388	1.000		Pt= 11.164	Mat="1-CPVC"
			Q= -18.711	1.101		13.388	C=150	Pe= 0.433	
G03	13.000					14.388	0.06	Pf= -0.865	
G03	13.000		q= 0.000	1	1PTR=9.563	0.750		Pt= 11.596	Mat="1-CPVC"
			Q= -18.711	1.101		9.563	C=150	Pe= 0.000	
GP1	13.000					10.313	0.06	Pf= -0.620	
704	10.000	5.6	q= 21.493	1	1PE=13.388	3.000		Pt= 14.730	Mat="1-CPVC"
			Q= -21.493	1.101		13.388	C=150	Pe= 1.299	
G04	13.000					16.388	0.078	Pf= -1.274	
G04	13.000		q= 0.000	1	1PTS=1.913	10.000		Pt= 14.705	Mat="1-CPVC"
			Q= -21.493	1.101		1.913	C=150	Pe= 0.000	
G05	13.000					11.913	0.078	Pf= -0.926	
G05	13.000		q= 0.000	1	1PTR=9.563	10.250		Pt= 15.631	Mat="1-CPVC"
			Q= -43.811	1.101		9.563	C=150	Pe= 0.000	
GP3	13.000					19.813	0.29	Pf= -5.751	
705	10.000	5.6	q= 22.318	1	1PTR=9.563	3.000		Pt= 15.883	Mat="1-CPVC"
			Q= -22.318	1.101		9.563	C=150	Pe= 1.299	
G05	13.000					12.563	0.083	Pf= -1.047	
706	10.000	5.6	q= 18.158	1	1PE=13.388	3.000		Pt= 10.514	Mat="1-CPVC"
			Q= -18.158	1.101		13.388	C=150	Pe= 1.299	
G06	13.000					16.388	0.057	Pf= -0.933	
G06	13.000		q= 0.000	1	1PTS=1.913	6.000		Pt= 10.147	Mat="1-CPVC"
			Q= -18.158	1.101		1.913	C=150	Pe= 0.000	
GP4	13.000					7.913	0.057	Pf= -0.450	
GP4	13.000		q= 0.000	1	1PTS=1.913	10.000		Pt= 10.598	Mat="1-CPVC"
			Q= -36.158	1.101		1.913	C=150	Pe= 0.000	
GP5	13.000					11.913	0.203	Pf= -2.424	
GP5	13.000		q= 0.000	1	1PTR=9.563	10.250		Pt= 13.022	Mat="1-CPVC"
			Q= -55.833	1.101		9.563	C=150	Pe= 0.000	
GP6	13.000					19.813	0.455	Pf= -9.006	

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
707	10.000	5.6	q= 18.000	1	1PE=13.388	3.000		Pt= 10.332	Mat="1-CPVC"
			Q= -18.000	1.101		13.388	C=150	Pe= 1.299	
G07	13.000					16.388	0.056	Pf= -0.918	
G07	13.000		q= 0.000	1	1PTR=9.563	2.000		Pt= 9.950	Mat="1-CPVC"
			Q= -18.000	1.101		9.563	C=150	Pe= 0.000	
GP4	13.000					11.563	0.056	Pf= -0.647	
708	10.000	5.6	q= 19.675	1	1PE=13.388	3.000		Pt= 12.344	Mat="1-CPVC"
			Q= -19.675	1.101		13.388	C=150	Pe= 1.299	
G08	13.000					16.388	0.066	Pf= -1.082	
G08	13.000		q= 0.000	1	1PTR=9.563	4.000		Pt= 12.126	Mat="1-CPVC"
			Q= -19.675	1.101		9.563	C=150	Pe= 0.000	
GP5	13.000					13.563	0.066	Pf= -0.895	
709	12.167	5.6	q= 18.713	1	1PE=13.388	0.833		Pt= 11.166	Mat="1-CPVC"
			Q= -18.713	1.101		13.388	C=150	Pe= 0.361	
G09	13.000					14.221	0.06	Pf= -0.856	
G09	13.000		q= 0.000	1	1PTS=1.913	6.000		Pt= 11.661	Mat="1-CPVC"
			Q= -18.713	1.101		1.913	C=150	Pe= 0.000	
G10	13.000					7.913	0.06	Pf= -0.476	
G10	13.000		q= 0.000	1	1PTS=1.913	8.000		Pt= 12.137	Mat="1-CPVC"
			Q= -38.584	1.101		1.913	C=150	Pe= 0.000	
GP7	13.000					9.913	0.229	Pf= -2.275	
GP7	13.000		q= 0.000	1	1PTR=9.563	10.250		Pt= 14.412	Mat="1-CPVC"
			Q= -59.298	1.101		9.563	C=150	Pe= 0.000	
GP8	13.000					19.813	0.508	Pf=-10.068	
710	10.000	5.6	q= 19.871	1	1PTR=9.563	3.000		Pt= 12.592	Mat="1-CPVC"
			Q= -19.871	1.101		9.563	C=150	Pe= 1.299	
G10	13.000					12.563	0.067	Pf= -0.845	
711	10.000	5.6	q= 20.714	1	1PE=13.388	3.000		Pt= 13.682	Mat="1-CPVC"
			Q= -20.714	1.101		13.388	C=150	Pe= 1.299	
G11	13.000					16.388	0.073	Pf= -1.190	
G11	13.000		q= 0.000	1	1PTR=9.563	2.000		Pt= 13.572	Mat="1-CPVC"
			Q= -20.714	1.101		9.563	C=150	Pe= 0.000	
GP7	13.000					11.563	0.073	Pf= -0.839	
GP2	13.000		q= 0.000	2	1PTS=1.296	12.917		Pt= 21.054	Mat="1-CPVC"
			Q= -53.928	2.003		1.296	C=150	Pe= 0.000	
GP3	13.000					14.213	0.023	Pf= -0.329	
GP3	13.000		q= 0.000	2	1PTS=1.296	8.000		Pt= 21.382	Mat="1-CPVC"
			Q= -97.739	2.003		1.296	C=150	Pe= 0.000	
GP6	13.000					9.296	0.069	Pf= -0.646	
GP6	13.000		q= 0.000	2	1PTS=1.296	14.000		Pt= 22.028	Mat="1-CPVC"
			Q=-153.572	2.003		1.296	C=150	Pe= 0.000	
GP8	13.000					15.296	0.16	Pf= -2.452	
GP8	13.000		q= 0.000	2		7.750		Pt= 24.480	Mat="1-CPVC"
			Q=-212.870	2.003		0.000	C=150	Pe= 0.000	
HP5	13.000					7.750	0.293	Pf= -2.272	

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
HP5	13.000		q= 0.000	2		25.083		Pt= 26.752	Mat="1-CPVC"
			Q=-212.870	2.003		0.000	C=150	Pe= 0.000	
HP6	13.000					25.083	0.293	Pf= -7.355	
HP6	13.000		q= 0.000	2	1PTR=12.965	20.333		Pt= 34.107	Mat="1-CPVC"
			Q=-212.870	2.003		12.965	C=150	Pe= 0.000	
TR1	13.000					33.298	0.293	Pf= -9.764	
TR1	13.000		q= 0.000	2	1C=13.416	12.000		Pt= 43.871	Mat="1-WLML"
			Q=-212.870	2.153	1B=7.318	45.125	C=120	Pe= -4.763	Pdev=-3.0 psi
BR1	2.000				2T=24.392	57.125	0.312	Pf=-17.806	
BR1	2.000		q= 0.000	3	2G=2.688	6.500		Pt= 69.440	Mat="1-WL10"
			Q=-212.870	3.26	1C=21.503	33.599	C=120	Pe= 0.000	Pdev=99.67 psi
SOP	2.000				1E=9.408	40.099	0.041	Pf= -1.657	
SOP	2.000		q= 0.000	3	1E=9.408	5.000		Pt=-28.571	Mat="1-WL10"
			Q=-212.870	3.26		9.408	C=120	Pe= 0.000	Pdev=-2.13 psi
BOR	2.000					14.408	0.041	Pf= -0.596	
BOR	2.000		q= 0.000	6	1E=14.000	10.000		Pt=-25.847	Mat="S40"
			Q=-212.870	6.065		14.000	C=120	Pe= -2.598	
M01	-4.000					24.000	0.002	Pf= -0.048	
M01	-4.000		q= 250.000	6	1G=4.588	96.000		Pt=-23.200	Mat="1-PVC"
			Q=-462.870	6.08	1E=21.411	71.880	C=150	Pe= 2.165	
CTY	1.000				1T=45.881	167.880	0.006	Pf= -0.929	

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