Hydraulic Calculations
for

Project: Homewood Suites
3500 South Meridian
Puyallup, WA. 98373
Drawing no.: FS-10
Date: 5/6/2024

Design

Remote area number:	Area 10
Remote area location:	Attic
Occupancy classification:	Light Hazard
Density:	0.10 gpm./ft.2
Area of application:	Entire Area
Coverage per sprinkler:	100 sq.ft. maximum
Type of sprinklers calculated:	Upright
No. of sprinklers calculated:	12
In rack demand:	0 gpm.
Hose streams:	100 gpm. outside + 0 gpm. inside
Total water required (including hose streams):	308.13 gpm at -5.86 psi [57.67 psi safety margin]
Type of system:	dry pipe
Volume of dry or preaction system:	

Water Supply Information

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

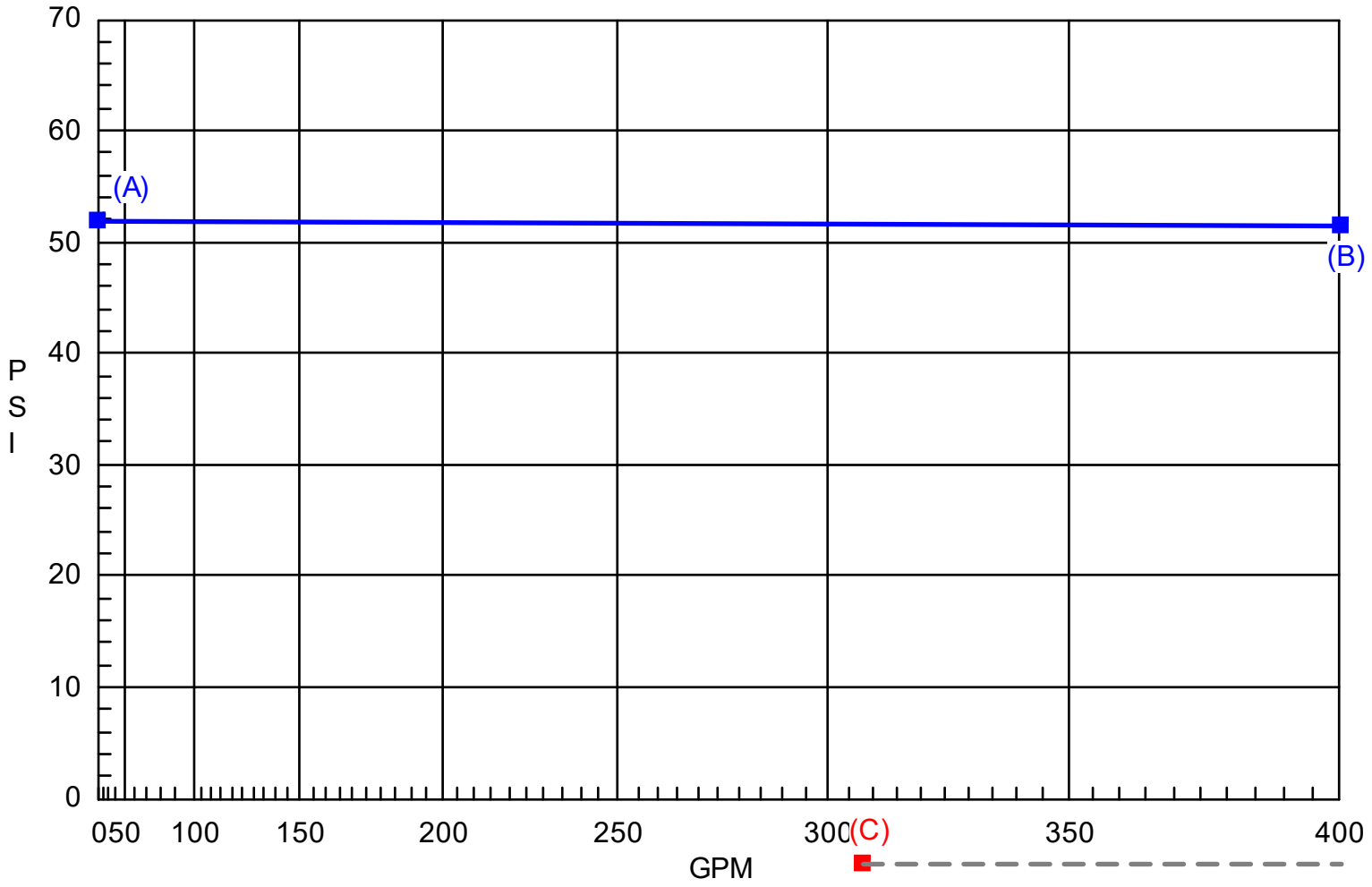
Contractor: Discount Fire Protection, LLC.
4 Red Bluff Court
Mansfield, TX. 76063

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) 308.1 gpm at -5.86 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	51.81	308.13	-5.86

Node Analysis

Node Tag	Elev [ft]	Type	Pressure [psi]	Discharge [gpm]
CTY	1.000	source	-5.861	-308.127
M01	-4.000	ref	-4.134	100.000
JP4	54.500	ref	35.138	0.000
J11	59.250	ref	16.447	0.000
J12	59.250	ref	12.949	0.000
J13	59.250	ref	11.133	0.000
J14	59.250	ref	9.978	0.000
J15	59.250	ref	9.724	0.000
J16	59.250	ref	9.726	0.000
J17	59.250	ref	10.028	0.000
J18	59.250	ref	11.621	0.000
J19	59.250	ref	14.346	0.000
JP8	59.250	ref	17.469	0.000
J20	59.250	ref	8.107	0.000
J21	59.250	ref	9.214	0.000
J22	59.250	ref	13.459	0.000
JP5	54.500	ref	36.838	0.000
JP6	54.500	ref	39.384	0.000
JP7	13.667	ref	64.381	0.000
TR3	5.000	ref	83.177	0.000
BR3	2.000	ref	88.341	0.000
BR2	2.000	ref	88.773	0.000
BR1	2.000	ref	88.813	0.000
SOP	2.000	ref	-9.431	0.000
BOR	2.000	ref	-6.778	0.000
911	60.250	K=5.60	15.088	21.752
912	60.250	K=5.60	11.779	19.220
913	63.750	K=5.60	8.316	16.149
914	63.750	K=5.60	7.263	15.092
915	63.750	K=5.60	7.032	14.850
916	63.750	K=5.60	7.034	14.852
917	60.250	K=5.60	9.019	16.818
918	60.250	K=5.60	10.524	18.167
919	60.250	K=5.60	13.101	20.269
920	60.250	K=5.60	7.430	15.265
921	60.250	K=5.60	8.251	16.086
922	60.250	K=5.60	12.261	19.609

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
JP4	54.500		q= 0.000	1.25	1T=5.486	24.333		Pt= 35.138	Mat="1-ALXL"
			Q= 86.143	1.452		5.486	C=100	Pe= 2.057	
J11	59.250					29.819	0.558	Pf= 16.634	
J11	59.250		q= 0.000	1.25	1E=2.743	8.000		Pt= 16.447	Mat="1-ALXL"
			Q= 64.391	1.452		2.743	C=100	Pe= 0.000	
J12	59.250					10.743	0.326	Pf= 3.498	
J12	59.250		q= 0.000	1.25	1E=2.743	8.000		Pt= 12.949	Mat="1-ALXL"
			Q= 45.171	1.452		2.743	C=100	Pe= 0.000	
J13	59.250					10.743	0.169	Pf= 1.815	
J13	59.250		q= 0.000	1.25	1E=2.743	12.750		Pt= 11.133	Mat="1-ALXL"
			Q= 29.022	1.452		2.743	C=100	Pe= 0.000	
J14	59.250					15.493	0.075	Pf= 1.155	
J14	59.250		q= 0.000	1.25		13.250		Pt= 9.978	Mat="1-ALXL"
			Q= 13.930	1.452		0.000	C=100	Pe= 0.000	
J15	59.250					13.250	0.019	Pf= 0.254	
J15	59.250		q= 0.000	1.25	1E=2.743	12.750		Pt= 9.724	Mat="1-ALXL"
			Q= -0.920	1.452		2.743	C=100	Pe= 0.000	
J16	59.250					15.493	0.000	Pf= -0.002	
J16	59.250		q= 0.000	1.25	1E=2.743	9.750		Pt= 9.726	Mat="1-ALXL"
			Q= -15.772	1.452		2.743	C=100	Pe= 0.000	
J17	59.250					12.493	0.024	Pf= -0.301	
J17	59.250		q= 0.000	1.25	1E=2.743	14.500		Pt= 10.028	Mat="1-ALXL"
			Q= -32.590	1.452		2.743	C=100	Pe= 0.000	
J18	59.250					17.243	0.092	Pf= -1.593	
J18	59.250		q= 0.000	1.25		13.000		Pt= 11.621	Mat="1-ALXL"
			Q= -50.757	1.452		0.000	C=100	Pe= 0.000	
J19	59.250					13.000	0.21	Pf= -2.726	
J19	59.250		q= 0.000	1.25		8.000		Pt= 14.346	Mat="1-ALXL"
			Q= -71.026	1.452		0.000	C=100	Pe= 0.000	
JP8	59.250					8.000	0.39	Pf= -3.123	
JP8	59.250		q= 0.000	1.25	2T=10.971	5.333		Pt= 17.469	Mat="1-ALXL"
			Q=-121.985	1.452		10.971	C=100	Pe= -2.057	
JP5	54.500					16.305	1.062	Pf=-17.312	
911	60.250	5.6	q= 21.752	1	1T=4.577	1.000		Pt= 15.088	Mat="1-ALXL"
			Q= -21.752	1.104		4.577	C=100	Pe= -0.433	
J11	59.250					5.577	0.166	Pf= -0.926	
912	60.250	5.6	q= 19.220	1	1T=4.577	1.000		Pt= 11.779	Mat="1-ALXL"
			Q= -19.220	1.104		4.577	C=100	Pe= -0.433	
J12	59.250					5.577	0.132	Pf= -0.737	
913	63.750	5.6	q= 16.149	1	1T=4.577	4.500		Pt= 8.316	Mat="1-ALXL"
			Q= -16.149	1.104		4.577	C=100	Pe= -1.948	
J13	59.250					9.077	0.096	Pf= -0.869	
914	63.750	5.6	q= 15.092	1	1T=4.577	4.500		Pt= 7.263	Mat="1-ALXL"
			Q= -15.092	1.104		4.577	C=100	Pe= -1.948	
J14	59.250					9.077	0.084	Pf= -0.767	

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
915	63.750	5.6	q= 14.850	1	1T=4.577	4.500		Pt= 7.032	Mat="1-ALXL"
			Q= -14.850	1.104		4.577	C=100	Pe= -1.948	
J15	59.250					9.077	0.082	Pf= -0.744	
916	63.750	5.6	q= 14.852	1	1T=4.577	4.500		Pt= 7.034	Mat="1-ALXL"
			Q= -14.852	1.104		4.577	C=100	Pe= -1.948	
J16	59.250					9.077	0.082	Pf= -0.744	
917	60.250	5.6	q= 16.818	1	1T=4.577	1.000		Pt= 9.019	Mat="1-ALXL"
			Q= -16.818	1.104		4.577	C=100	Pe= -0.433	
J17	59.250					5.577	0.103	Pf= -0.575	
918	60.250	5.6	q= 18.167	1	1T=4.577	1.000		Pt= 10.524	Mat="1-ALXL"
			Q= -18.167	1.104		4.577	C=100	Pe= -0.433	
J18	59.250					5.577	0.119	Pf= -0.664	
919	60.250	5.6	q= 20.269	1	1T=4.577	1.000		Pt= 13.101	Mat="1-ALXL"
			Q= -20.269	1.104		4.577	C=100	Pe= -0.433	
J19	59.250					5.577	0.146	Pf= -0.813	
920	60.250	5.6	q= 15.265	1	1E=1.831	1.000		Pt= 7.430	Mat="1-ALXL"
			Q= -15.265	1.104		1.831	C=100	Pe= -0.433	
J20	59.250					2.831	0.086	Pf= -0.244	
J20	59.250		q= 0.000	1	1E=1.831	11.000		Pt= 8.107	Mat="1-ALXL"
			Q= -15.265	1.104		1.831	C=100	Pe= 0.000	
J21	59.250					12.831	0.086	Pf= -1.106	
J21	59.250		q= 0.000	1		13.000		Pt= 9.214	Mat="1-ALXL"
			Q= -31.350	1.104		0.000	C=100	Pe= 0.000	
J22	59.250					13.000	0.327	Pf= -4.245	
J22	59.250		q= 0.000	1		5.000		Pt= 13.459	Mat="1-ALXL"
			Q= -50.959	1.104		0.000	C=100	Pe= 0.000	
JP8	59.250					5.000	0.802	Pf= -4.011	
921	60.250	5.6	q= 16.086	1	1T=4.577	1.000		Pt= 8.251	Mat="1-ALXL"
			Q= -16.086	1.104		4.577	C=100	Pe= -0.433	
J21	59.250					5.577	0.095	Pf= -0.530	
922	60.250	5.6	q= 19.609	1	1T=4.577	1.000		Pt= 12.261	Mat="1-ALXL"
			Q= -19.609	1.104		4.577	C=100	Pe= -0.433	
J22	59.250					5.577	0.137	Pf= -0.764	
JP4	54.500		q= 0.000	2.5		55.500		Pt= 35.138	Mat="1-AL10"
			Q= -86.143	2.635		0.000	C=100	Pe= 0.000	
JP5	54.500					55.500	0.031	Pf= -1.700	
JP5	54.500		q= 0.000	2.5	2E=11.758	4.500		Pt= 36.838	Mat="1-AL10"
			Q=-208.127	2.635		11.758	C=100	Pe= 0.000	
JP6	54.500					16.258	0.157	Pf= -2.546	
JP6	54.500		q= 0.000	2.5	1E=5.879	40.833		Pt= 39.384	Mat="1-AL10"
			Q=-208.127	2.635		5.879	C=100	Pe=-17.681	
JP7	13.667					46.712	0.157	Pf= -7.316	
JP7	13.667		q= 0.000	2.5	3E=17.636	78.417		Pt= 64.381	Mat="1-AL10"
			Q=-208.127	2.635		17.636	C=100	Pe= -3.753	
TR3	5.000					96.053	0.157	Pf=-15.044	

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
TR3	5.000		q= 0.000	2.5	1T=16.474	3.000		Pt= 83.177	Mat="1-WL10"
			Q=-208.127	2.635	1D=5.491	31.576	C=120	Pe= -1.299	
BR3	2.000				1B=9.610	34.576	0.112	Pf= -3.865	
BR3	2.000		q= 0.000	3	1E=9.408	1.500		Pt= 88.341	Mat="1-WL10"
			Q=-208.127	3.26		9.408	C=120	Pe= 0.000	
BR2	2.000					10.908	0.04	Pf= -0.432	
BR2	2.000		q= 0.000	3		1.000		Pt= 88.773	Mat="1-WL10"
			Q=-208.127	3.26		0.000	C=120	Pe= 0.000	
BR1	2.000					1.000	0.04	Pf= -0.040	
BR1	2.000		q= 0.000	3	2G=2.688	6.500		Pt= 88.813	Mat="1-WL10"
			Q=-208.127	3.26	1C=21.503	33.599	C=120	Pe= 0.000	Pdev=99.83 psi
SOP	2.000				1E=9.408	40.099	0.04	Pf= -1.590	
SOP	2.000		q= 0.000	3	1E=9.408	5.000		Pt= -9.431	Mat="1-WL10"
			Q=-208.127	3.26		9.408	C=120	Pe= 0.000	Pdev=-2.08 psi
BOR	2.000					14.408	0.04	Pf= -0.571	
BOR	2.000		q= 0.000	6	1E=14.000	10.000		Pt= -6.778	Mat="S40"
			Q=-208.127	6.065		14.000	C=120	Pe= -2.598	
M01	-4.000					24.000	0.002	Pf= -0.046	
M01	-4.000		q= 100.000	6	1G=4.588	96.000		Pt= -4.134	Mat="1-PVC"
			Q=-308.127	6.08	1E=21.411	71.880	C=150	Pe= 2.165	
CTY	1.000				1T=45.881	167.880	0.003	Pf= -0.437	

Material Codes

Pipe Material

S40 - Schedule 40 Steel
1-PVC - PVC C900 Underround Pipe
1-AL10 - Allied Tube schedule 10
1-ALXL - Allied Tube XL
1-WL10 - Wheatland's schedule 10

Fittings

B - Butterfly Valve
C - Check Valve
D - Dry Valve
E - Standard 90 degree elbow
G - Gate Valve
T - Tee - Flow turn 90 degrees