CALCULATION SUMMARY

Project Name : MCDONALDS PUYALLUP

Project Location: 731 SHAW RD

Contract No. :

City: PUYALLUP, WA

Design Areas

Design Area Name	Calc. Mode (Model)	Occupancy	Area of Application	Total Water	Pressure @ Source	Min. Density	Min. Pressure	Min. Flow	Calculated Heads	Hose Streams	Margin To Source
			(ft²)	(gpm)	(psi)	(gpm/ft²)	(psi)	(gpm)	#	(gpm)	(psi)
1	Demand (HW)	OH-1	900	452.3	Required 35	0.15	9.5	17.3	12	250	7.1

File: S:\DFPD\McDonalds Puyallup (25236)\McDONALDS PUYALLUP.dwg

HYDRAULIC CALCULATIONS
for

Job Information

Project Name : MCDONALDS PUYALLUP

Contract No. :

City: PUYALLUP, WA

Project Location: 731 SHAW RD

Date: 9/17/2025

Contractor Information

Name of Contractor: BRIMSTONE

Address:

City:

Phone Number:

E-mail:

Name of Designer: ***

Authority Having Jurisdiction:

Design

Remote Area Name	1
Remote Area Location	KITCHEN
Occupancy Classification	OH-1
Density (gpm/ft²)	0.15
Area of Application (ft²)	900
Coverage per Sprinkler (ft²)	175
Number of Calculated Sprinklers	12
In-Rack Demand (gpm)	0
Special Heads	
Hose Streams (gpm)	250
Total Water Required (incl. Hose Streams) (gpm)	452.3
Required Pressure at Source (psi)	35
Type of System	Wet
Volume - Entire System (gal)	755.1 gal

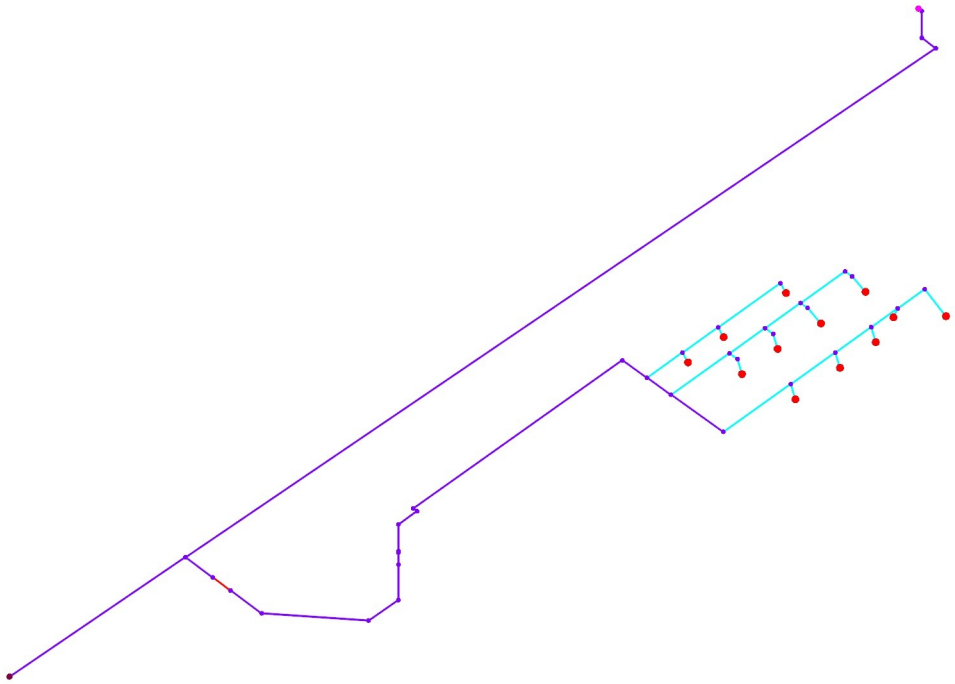
Water Supply Information

Date	04/16/24
Location	SHAW RD & E PIONEER
Source	W1

Notes

Node Labels: Off
Pipe Labels: Off

Diagram for Design Area : 1
(Optimized Hydraulic Simplified)



Hydraulic Analysis for : 1

Calculation Info

Calculation Mode	Demand
Hydraulic Model	Hazen-Williams
Fluid Name	Water @ 60F (15.6C)
Fluid Weight, (lb/ft³)	N/A for Hazen-Williams calculation.
Fluid Dynamic Viscosity, (lb·s/ft²)	N/A for Hazen-Williams calculation.

Water Supply Parameters

Supply 1 : W1

Flow (gpm)	Pressure (psi)
0	43
1920	29

Supply Analysis

Node at Source	Static Pressure (psi)	Residual Pressure (psi)	Flow (gpm)	Available Pressure (psi)	Total Demand (gpm)	Required Pressure (psi)
W1	43	29	1920	42	452.3	35

Hoses

Inside Hose Flow / Standpipe Demand (gpm)	0
Outside Hose Flow (gpm)	250
Additional Outside Hose Flow (gpm)	
Other (custom defined) Hose Flow (gpm)	0
Total Hose Flow (gpm)	250

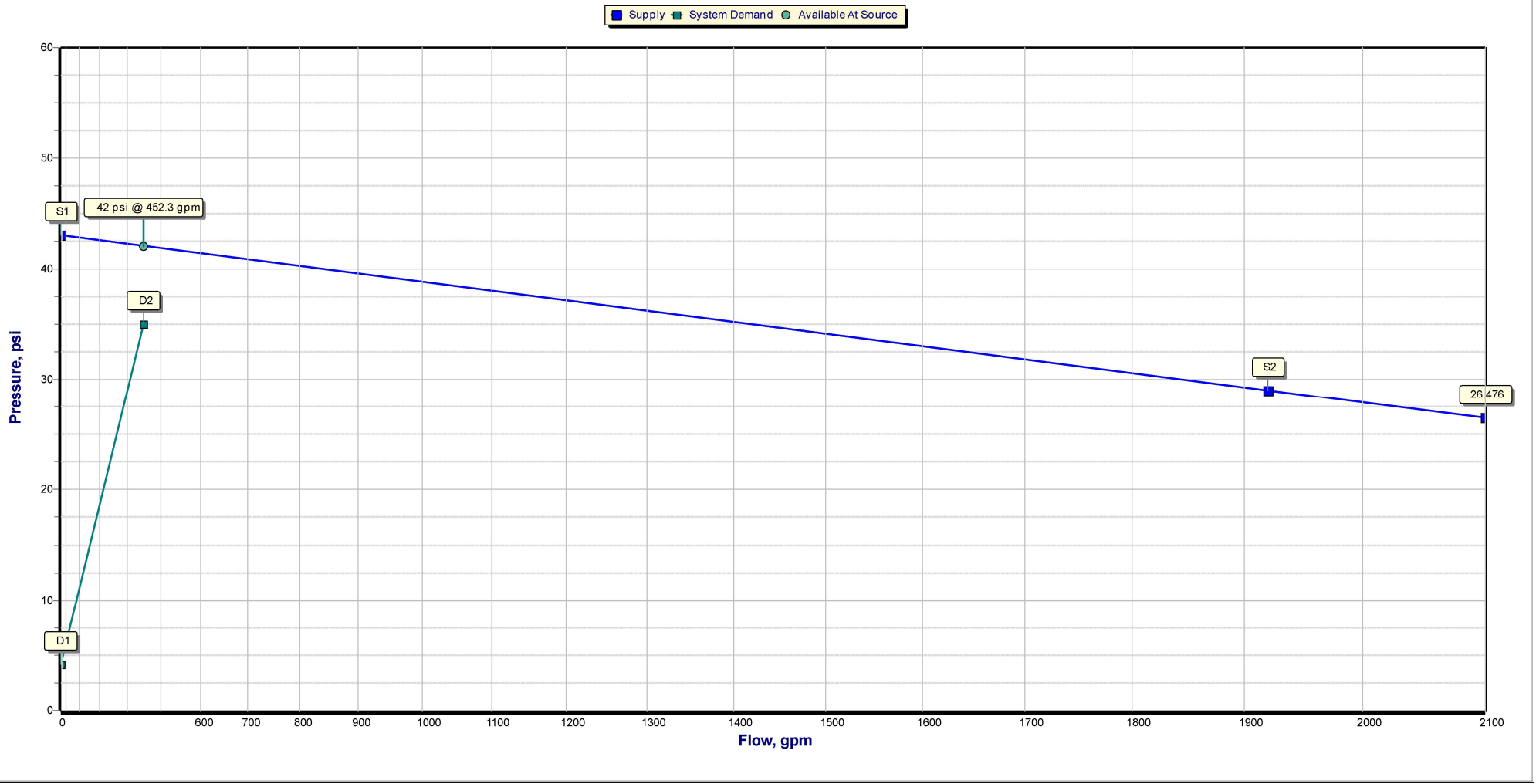
Sprinklers

Ovehead Sprinkler Flow (gpm)	202.3
InRack Sprinkler Flow (gpm)	0
Other (custom defined) Sprinkler Flow (gpm)	0
Total Sprinkler Flow (gpm)	202.3

Other

Required Margin of Safety (psi)	0
W1 - Pressure (psi)	35
W1 - Flow (gpm)	452.3
Demand w/o System Pump(s)	N/A

Hydraulic Analysis for : 1



Hydraulic Analysis for : 1

Graph Labels

Label	Description	Values	
		Flow (gpm)	Pressure (psi)
S1	Supply point #1 - Static	0	43
S2	Supply point #2 - Residual	1920	29
D1	Elevation Pressure	0	4.2
D2	System Demand	452.3	35

Curve Intersections & Safety Margins

Curve Name	Intersection		Safety Margin	
	Pressure (psi)	Flow (gpm)	Pressure (psi)	@ Flow (gpm)
Supply	41.8	504.1	7.1	452.3

Open Heads

Head Ref.	Head Type	Coverage	K-Factor	Required			Calculated		
				Density	Flow	Pressure	Density	Flow	Pressure
		(ft²)	(gpm/psi½)	(gpm/ft²)	(gpm)	(psi)	(gpm/ft²)	(gpm)	(psi)
101	Overhead Sprinkler	99	5.6	0.15	14.8	7	0.155	15.4	7.5
102	Overhead Sprinkler	99	5.6	0.15	14.8	7	0.156	15.4	7.6
103	Overhead Sprinkler	99	5.6	0.15	14.8	7	0.157	15.5	7.7
105	Overhead Sprinkler	99	5.6	0.15	14.8	7	0.169	16.7	8.9
107	Overhead Sprinkler	148	5.6	0.1	14.8	7	0.112	16.6	8.8
108	Overhead Sprinkler	175	5.6	0.1	17.5	9.8	0.104	18.2	10.6
109	Overhead Sprinkler	148	5.6	0.1	14.8	7	0.113	16.7	8.9
110	Overhead Sprinkler	115	5.6	0.15	17.3	9.5	0.15	17.3	9.5
111	Overhead Sprinkler	168	5.6	0.1	16.8	9	0.109	18.3	10.7
112	Overhead Sprinkler	100	5.6	0.15	15	7.2	0.177	17.7	9.9
113	Overhead Sprinkler	148	5.6	0.1	14.8	7	0.125	18.5	11
120	Overhead Sprinkler	99	5.6	0.15	14.8	7	0.161	15.9	8.1

Node Data

Node# Elev	Type Hgroup	K-Fact. Open/Closed	Discharge Overdischarge	Coverage Density	Tot. Pres. Elev. Pres.	Req. Pres. Req. Discharge
ft		gpm/psi½	gpm gpm	ft² gpm/ft²	psi psi	psi gpm
101 8.33	Overhead Sprinkler HEAD	5.6 Open	15.4 0.5	99 0.155	7.5 -3.6	7 14.8
102 8.33	Overhead Sprinkler HEAD	5.6 Open	15.4 0.6	99 0.156	7.6 -3.6	7 14.8
103 8.33	Overhead Sprinkler HEAD	5.6 Open	15.5 0.7	99 0.157	7.7 -3.6	7 14.8
120 8.33	Overhead Sprinkler HEAD	5.6 Open	15.9 1.1	99 0.161	8.1 -3.6	7 14.8
107 9.67	Overhead Sprinkler HEAD	5.6 Open	16.6 1.8	148 0.112	8.8 -4.2	7 14.8
109 9.67	Overhead Sprinkler HEAD	5.6 Open	16.7 1.9	148 0.113	8.9 -4.2	7 14.8
105 8.33	Overhead Sprinkler HEAD	5.6 Open	16.7 1.9	99 0.169	8.9 -3.6	7 14.8
110 8.33	Overhead Sprinkler HEAD	5.6 Open	17.3 0	115 0.15	9.5 -3.6	9.5 17.3
112 8.33	Overhead Sprinkler HEAD	5.6 Open	17.7 2.7	100 0.177	9.9 -3.6	7.2 15
108 9.67	Overhead Sprinkler HEAD	5.6 Open	18.2 0.7	175 0.104	10.6 -4.2	9.8 17.5
111 9.67	Overhead Sprinkler HEAD	5.6 Open	18.3 1.5	168 0.109	10.7 -4.2	9 16.8
113 9.67	Overhead Sprinkler HEAD	5.6 Open	18.5 3.7	148 0.125	11 -4.2	7 14.8
001 11	Node NODE				8.7 -4.8	
003 11	Node NODE				8.7 -4.8	
005 11	Node NODE				8.9 -4.8	
008 11	Node NODE				9.4 -4.8	
011 11	Node NODE				10.5 -4.8	
252 11	Node NODE				11 -4.8	
247 11	Node NODE				11.1 -4.8	
241 11	Node NODE				11.4 -4.8	
236 11	Node NODE				12 -4.8	
226 11	Node NODE				13.2 -4.8	
224 11	Node NODE				13.3 -4.8	
223 11	Node NODE				13.7 -4.8	
015 11	Node NODE				14.6 -4.8	

Node Data

Node# Elev	Type Hgroup	K-Fact. Open/Closed	Discharge Overdischarge	Coverage Density	Tot. Pres. Elev. Pres.	Req. Pres. Req. Discharge
ft		gpm/psi½	gpm gpm	ft² gpm/ft²	psi psi	psi gpm
051 11	Node NODE				14.9 -4.8	
100 11	Node NODE				15.2 -4.8	
124-O 4.99	Node NODE				28 -2.2	
124-I 4.67	Node NODE				29.2 -2	
125 1.96	Node NODE				30.7 -0.8	
129-O -6	Node NODE				34.2 2.6	
W1 0	Supply SUPPLY		-452.3		35 0	
129-I -6	Node NODE				37.2 2.6	
H1 -6	Outside Hose HOSE		250		37.2 2.6	250
130 -6	Node NODE				37.2 2.6	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 1									
110	8.33	5.6	17.3	1	1x(Short Tee-Br)=5	25.8	120	9.5	Flex-48"
241	11		17.3	1.049		5	0.0986	-1.2	
						30.8		3	
241	11		33.3	1.5		8	120	11.4	
236	11		50.5	1.68		0	0.0728	0	
						8		0.6	
236	11		17.7	1.5	1x(us.Tee-Br)=9.84	13.11	120	12	
051	11		68.2	1.68		9.84	0.1268	0	
						22.96		2.9	
051	11		79	2.5		5.4	120	14.9	
100	11		147.2	2.635		0	0.0589	0	
						5.4		0.3	
100	11		55.1	2.5	3x(Short 90)=17.71	63.56	120	15.2	
124-O	4.99		202.3	2.635	1x(Short Tee-Br)=14.83	32.54	0.1061	2.6	
						96.1		10.2	
124-O	4.99		0	2.5		0.32		28	BFV-N
124-I	4.67		202.3	0		0	3.3519	0.1	***
						0.32		1.1	
124-I	4.67		0	2.5		2.71	120	29.2	
125	1.96		202.3	2.635		0	0.1061	1.2	
						2.71		0.3	
125	1.96		0	6	2x(us.45)=24.19	38.71	140	30.7	
129-O	-6		202.3	6.4	1x(us.90)=24.19	48.39	0.0011	3.4	
						87.1		0.1	
129-O	-6		0	6		4.04		34.2	Ames3000SS
129-I	-6		202.3	0		0	0.7357	0	***
						4.04		3	
129-I	-6		0	6	1x(us.Tee-Br)=51.84	6.26	140	37.2	
130	-6		202.3	6.4		51.84	0.0011	0	
						58.11		0.1	
130	-6		250	8	2x(us.90)=63.4	174.94	140	37.2	
W1	0		452.3	8.55	1x(us.Tee-Br)=61.64	125.04	0.0011	-2.6	
						299.98		0.3	
W1								**35**	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 2									
101	8.33	5.6	15.4	1	1x(Short Tee-Br)=5	24	120	7.5	Flex-48"
001	11		15.4	1.049		5	0.0797	-1.2	
						29		2.3	
001	11		0	1.5		6.08	120	8.7	
003	11		15.4	1.68		0	0.008	0	
						6.08		0.0	
003	11		15.4	1.5		5.92	120	8.7	
005	11		30.8	1.68		0	0.0291	0	
						5.92		0.2	
005	11		15.5	1.5		8.08	120	8.9	
008	11		46.3	1.68		0	0.062	0	
						8.08		0.5	
008	11		15.9	1.5		10	120	9.4	
011	11		62.3	1.68		0	0.1072	0	
						10		1.1	
011	11		16.7	1.5	1x(us.Tee-Br)=9.84	15.11	120	10.5	
015	11		79	1.68		9.84	0.1666	0	
						24.96		4.2	
015	11		0	2.5		11.75	120	14.6	
051	11		79	2.635		0	0.0186	0	
						11.75		0.2	
051								**14.9**	
Path No: 3									
102	8.33	5.6	15.4	1	1x(Short Tee-Br)=5	24	120	7.6	Flex-48"
003	11		15.4	1.049		5	0.08	-1.2	
						29		2.3	
003								**8.7**	
Path No: 4									
103	8.33	5.6	15.5	1	1x(Short Tee-Br)=5	24	120	7.7	Flex-48"
005	11		15.5	1.049		5	0.0813	-1.2	
						29		2.4	
005								**8.9**	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 5									
108	9.67	5.6	18.2	1	1x(Short Tee-Br)=5	24	120	10.6	Flex-48"
226	11		18.2	1.049		5	0.1092	-0.6	
						29		3.2	
226	11		0	1.5		14	120	13.2	
224	11		18.2	1.68		0	0.011	0	
						14		0.2	
224	11		18.3	1.5		8	120	13.3	
223	11		36.6	1.68		0	0.04	0	
						8		0.3	
223	11		18.5	1.5	1x(Short Tee-Br)=9.84	7.97	120	13.7	
100	11		55.1	1.68		9.84	0.0855	0	
						17.82		1.5	
100								**15.2**	
Path No: 6									
120	8.33	5.6	15.9	1	1x(Short Tee-Br)=5	24	120	8.1	Flex-48"
008	11		15.9	1.049		5	0.0851	-1.2	
						29		2.5	
008								**9.4**	
Path No: 7									
111	9.67	5.6	18.3	1	1x(Short Tee-Br)=5	24	120	10.7	Flex-48"
224	11		18.3	1.049		5	0.1103	-0.6	
						29		3.2	
224								**13.3**	
Path No: 8									
107	9.67	5.6	16.6	1	1x(Short Tee-Br)=5	25.56	120	8.8	Flex-48"
252	11		16.6	1.049		5	0.0918	-0.6	
						30.56		2.8	
252	11		0	1.5		10	120	11	
247	11		16.6	1.68		0	0.0093	0	
						10		0.1	
247	11		16.7	1.5		7.97	120	11.1	
241	11		33.3	1.68		0	0.0336	0	
						7.97		0.3	
241								**11.4**	
Path No: 9									
109	9.67	5.6	16.7	1	1x(Short Tee-Br)=5	25.56	120	8.9	Flex-48"
247	11		16.7	1.049		5	0.0925	-0.6	
						30.56		2.8	
247								**11.1**	

PIPE INFORMATION

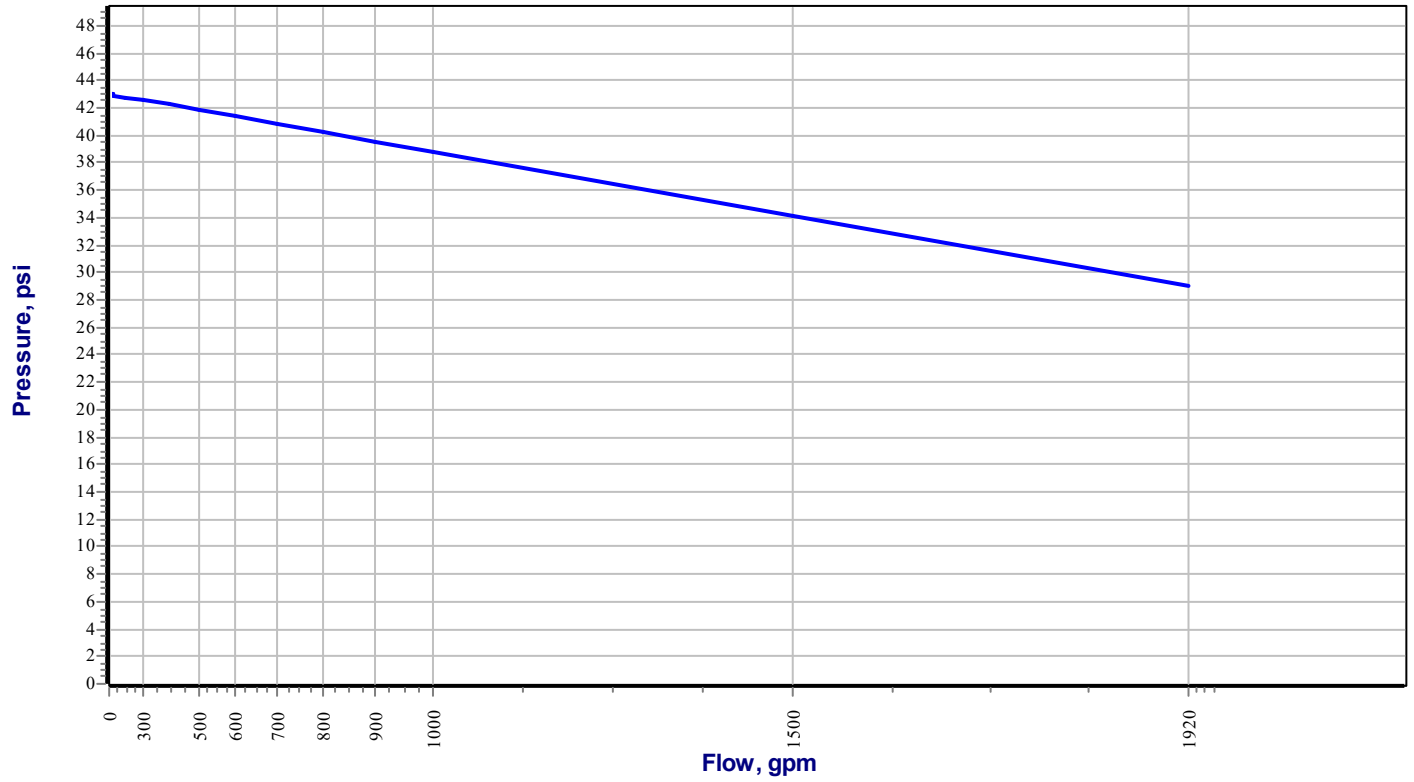
Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 10									
105	8.33	5.6	16.7	1	1x(Short Tee-Br)=5	24	120	8.9	Flex-48"
011	11		16.7	1.049		5	0.0933	-1.2	
						29		2.7	
011								**10.5**	
Path No: 11									
112	8.33	5.6	17.7	1	1x(Short Tee-Br)=5	25.8	120	9.9	Flex-48"
236	11		17.7	1.049		5	0.1029	-1.2	
						30.8		3.2	
236								**12**	
Path No: 12									
113	9.67	5.6	18.5	1	1x(Short Tee-Br)=5	24	120	11	Flex-48"
223	11		18.5	1.049		5	0.1127	-0.6	
						29		3.3	
223								**13.7**	
Path No: 13									
H1	-6		250	8	1x(us.Tee)=61.64	38.67	140	37.2	
130	-6		250	8.55		61.64	0.0004	0	
						100.31		0.0	
130								**37.2**	

* Pressures are balanced to a high degree of accuracy. Values may vary by 0.1 psi due to display rounding.

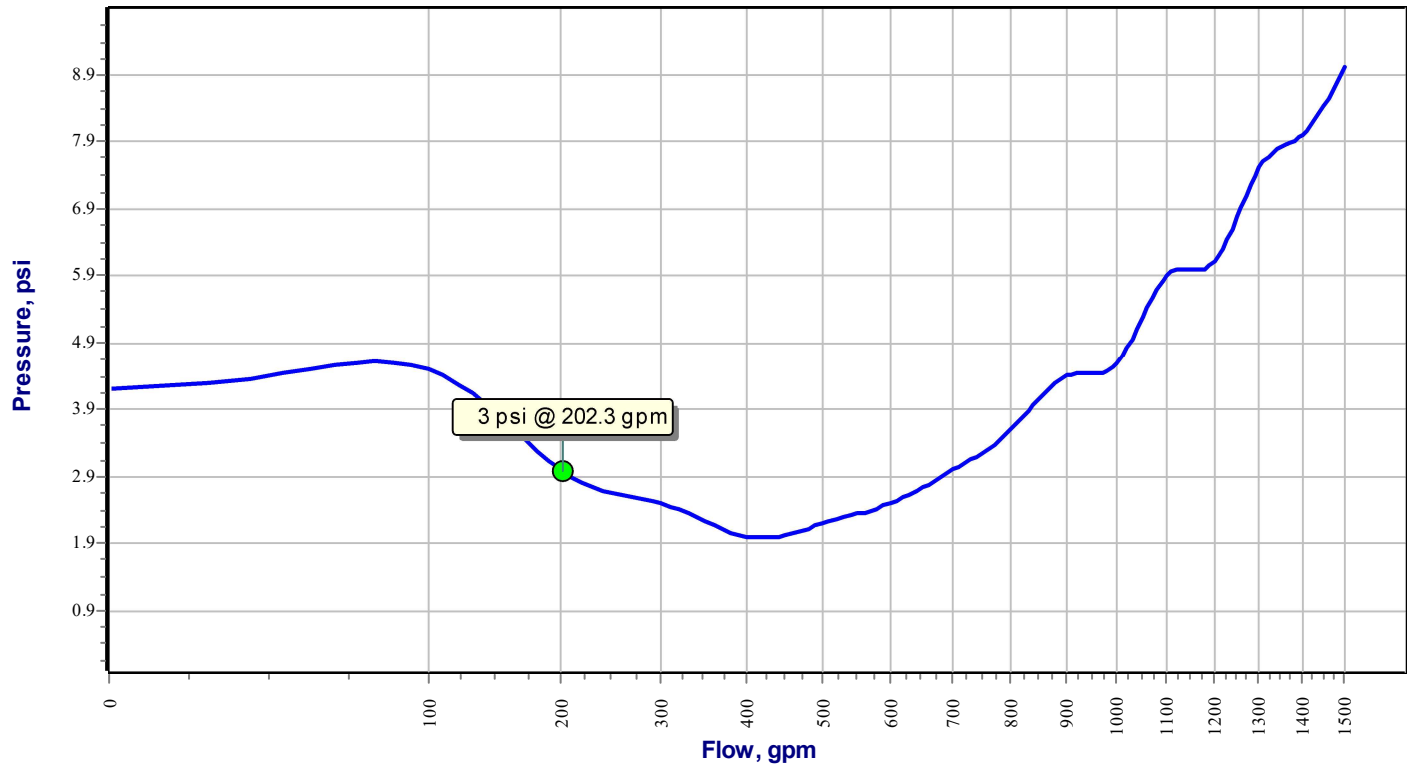
* Maximum Velocity of 11.9 ft/s occurs in the following pipe(s): (124-O-100), (125-124-I)

*** Device pressure loss (gain in the case of pumps) is calculated from the device's curve. If the device curve is printed with this report, it will appear below. The length of the device as shown in the table above comes from the CAD drawing. The friction loss per unit of length is calculated based upon the length and the curve-based loss/gain value. Internal ID and C Factor values are irrelevant as the device is not represented as an addition to any pipe, but is an individual item whose loss/gain is based solely on the curve data.

Pressure vs. Flow Function
Design Area: 1; Supply Ref.: W1; Supply Name:W1



Pressure Loss Function
Design Area: 1; BFP Ref.: 345 (Ames3000SS, Size = 6); Inlet Node: 129-I; Outlet Node: 129-O



File: S:\DFPD\McDonalds Puyallup (25236)\McDONALDS PUYALLUP.dwg

Pressure Loss Function

Design Area: 1; Valve Ref.: 344 (BFV-N, Size = 2.5); Inlet Node: 124-I; Outlet Node: 124-O