

Hydraulic Calculations

for

Project Name: Home2 Suites by Hilton

Location: 550 Gateway Boulevard, South San Francisco, CA,

Drawing Name: FLOOR 1.cad

Calculation Date: 12/20/2017

Design

Remote Area Number: 1.0
Remote Area Location: FLOOR 1 LAUNDRY
Occupancy Classification: Ordinary Group I
Commodity Classification: N/A

Density: 0.15gpm/ft²
Area of Application: 1500ft² (Actual 1540.8ft²)
Coverage per Sprinkler: 130ft²
Type of sprinklers calculated: Pendent
No. of sprinklers calculated: 20

In-rack Demand: N/A gpm at Node: N/A
Hose Streams: 250.00 at Node: 1 Type: Allowance at Source

Total Water Required (including Hose Streams where applicable):
From Water Supply at Node 1: 735.32 @ 60.766
Type of System: Wet
Volume of Dry or PreAction System: N/A

for Node: 1 Date: 6/9/2017
Location: 550 Gateway & Corporate Dr.
Source: ACKER

Name of Contractor: Aegis Fire Systems
Address: 500 Boulder Court - A, Pleasanton, CA 94566
Phone Number: (925) 417-5550
Name of designer: B. Williams
Authority Having Jurisdiction: San Francisco Fire Dept.

Notes:

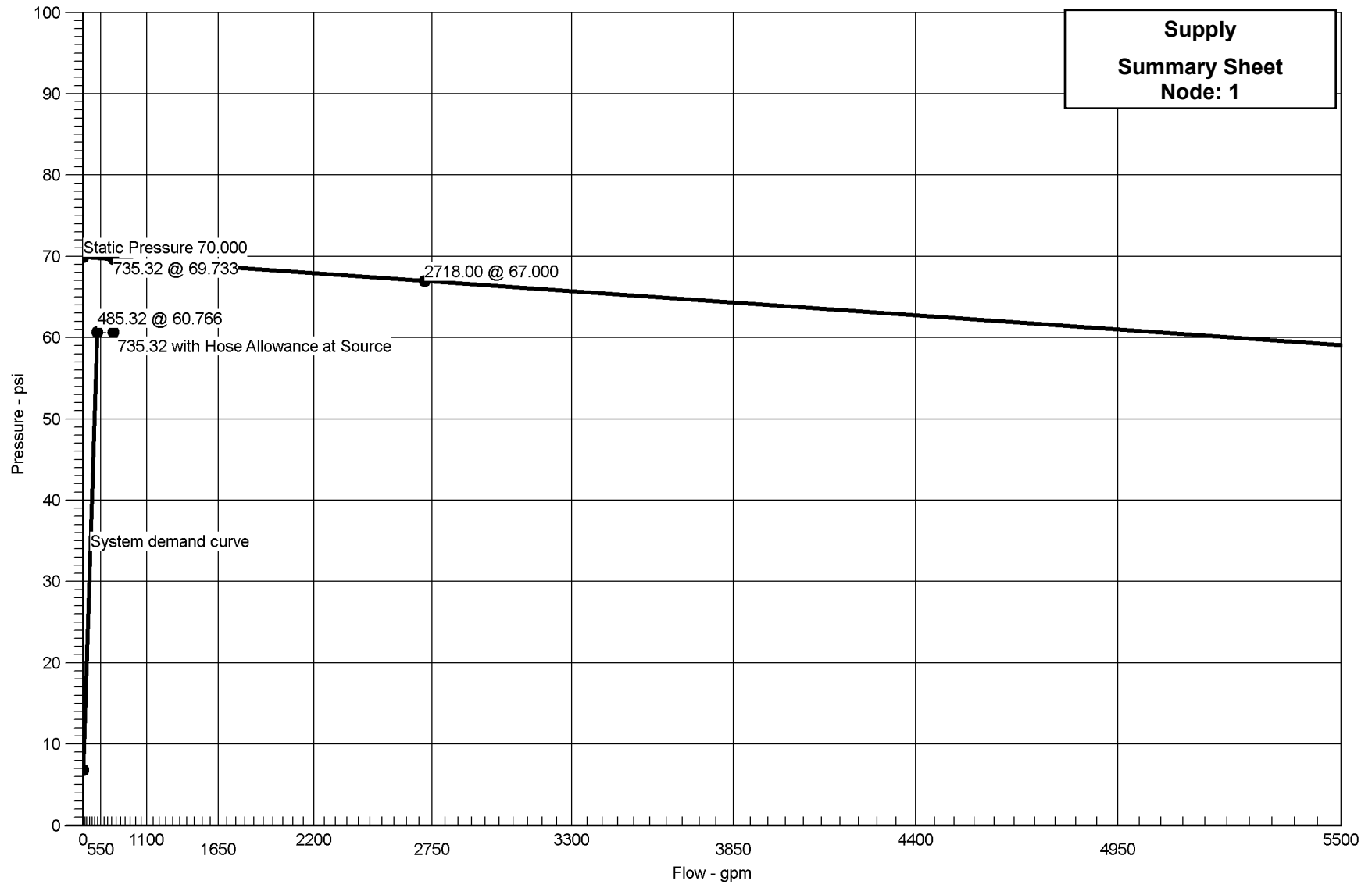
Automatic peaking results Left: N/A Right: N/A

Hydraulic Graph

Job Name: Home2 Suites by Hilton
Remote Area Number: 1.0

N 1.85

Date: 12/20/2017



Supply Analysis

Node	Name	Static (psi)	Residual (psi) @	Flow (gpm)	Available (psi) @	Total Demand (gpm)	Required Pressure (psi)
1	Water Supply	70.000	67.000	2718.00	69.733	735.32	60.766

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
191	12'-4		8.783		
194	12'-4		10.002		
320	12'-4		12.090		
361	12'-4		11.627		
362	12'-4		11.018		
363	12'-4		10.377		
367	12'-4		21.056		
368	12'-4		13.739		
376	11'-4		22.369		
377	12'-4		21.570		
383	11'-4		20.162		
384	12'-4		15.784		
385	11'-4		19.633		
386	11'-4		18.479		
387	12'-4		14.836		
392	11'-4		17.234		
393	12'-4		14.435		
397	11'-4		16.867		
398	12'-4		13.405		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
1	-3'-6	Supply	60.766	485.32	
802	9'-0	Sprinkler	7.000	21.17	
813	10'-0	Sprinkler	9.498	24.66	
814	12'-4	Sprinkler	7.925	22.52	
815	9'-0	Sprinkler	8.745	23.66	
816	9'-0	Sprinkler	7.090	21.30	
820	9'-0	Sprinkler	7.918	22.51	
827	10'-0	Sprinkler	9.619	24.81	
829	9'-0	Sprinkler	8.855	23.81	
830	9'-0	Sprinkler	7.414	21.78	
832	9'-0	Sprinkler	8.179	22.88	
834	10'-0	Sprinkler	9.947	25.23	
836	9'-0	Sprinkler	9.155	24.21	
838	9'-0	Sprinkler	8.018	22.65	
842	10'-0	Sprinkler	10.428	25.83	
849	9'-0	Sprinkler	8.776	23.70	
850	9'-0	Sprinkler	8.084	22.75	
852	10'-0	Sprinkler	19.503	35.33	
854	9'-0	Sprinkler	8.936	23.91	
856	9'-0	Sprinkler	10.012	25.31	
857	10'-0	Sprinkler	11.649	27.30	
2	-3'-6		60.641		
3	-3'-6		57.711		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
4	-3'-6		57.592		
5	1'-0		54.445		
6	1'-2		54.373		
38	12'-4		6.586		
69	12'-4		9.690		
74	12'-4		8.566		
75	12'-4		6.688		
88	12'-4		8.001		
100	12'-4		9.825		
102	12'-4		8.691		
103	12'-4		7.056		
112	12'-4		8.309		
117	12'-4		10.192		
121	12'-4		9.031		
125	12'-4		7.742		
129	12'-4		10.728		
132	4'-0		45.511		
133	11'-10		42.984		
160	4'-6		41.630		
167	6'-5		30.971		
168	11'-4		27.993		
170	12'-4		9.213		
176	12'-4		9.307		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
186	12'-4		20.832		

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
						Total (Foot)		Friction(Pf)	
802	9'-0	8	21.17	1	(See Notes)	3'-4	120	7.000	***** Route 1 ***** Sprinkler, PO(5'-0)
38	12'-4		21.17	1.0830		5'-0	0.123721	-1.445	
						8'-4		1.031	
38	12'-4			1½		8'-0	120	6.586	
75	12'-4		21.17	1.7280		8'-0	0.012713	0.102	
75	12'-4		21.30	1½		8'-0	120	6.688	Flow (q) from Route 2
103	12'-4		42.47	1.7280		8'-0	0.046101	0.369	
103	12'-4		21.78	1½		6'-11	120	7.056	Flow (q) from Route 3
125	12'-4		64.25	1.7280		6'-11	0.099170	0.686	
125	12'-4		22.65	1½		6'-0	120	7.742	Flow (q) from Route 6
191	12'-4		86.90	1.7280		6'-0	0.173394	1.040	
191	12'-4		23.91	1½		5'-10½	120	8.783	Flow (q) from Route 12
363	12'-4		110.82	1.7280		5'-10½	0.271857	1.594	
363	12'-4			1½	(See Notes)	1'-0	120	10.377	T(8'-0)
398	12'-4		110.82	1.6540		8'-0	0.336443	-0.000	
						9'-0		3.028	
398	12'-4			1½	(See Notes)	1'-0	120	13.405	PO(8'-0)
397	11'-4		110.82	1.6540		8'-0	0.336443	0.434	
						9'-0		3.028	
397	11'-4			2½		12'-0	120	16.867	
392	11'-4		110.82	2.7050		12'-0	0.030657	0.368	
392	11'-4		96.98	2½		12'-8	120	17.234	Flow (q) from Route 9
386	11'-4		207.80	2.7050		12'-8	0.098093	1.245	
386	11'-4		114.36	2½		5'-2½	120	18.479	Flow (q) from Route 4
385	11'-4		322.15	2.7050		5'-2½	0.220759	1.154	

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
						Total (Foot)		Friction(Pf)	
385	11'-4			3		6'-7½	120	19.633	
383	11'-4		322.15	3.3340		6'-7½	0.079750	0.528	
383	11'-4		127.84	3		14'-11	120	20.162	
376	11'-4		449.99	3.3340		14'-11	0.147992	2.208	Flow (q) from Route 14
376	11'-4		35.33	3	(See Notes)	13'-0½	120	22.369	Flow (q) from Route 20 T(15'-0), LtE(5'-0)
168	11'-4		485.32	3.3340		20'-0	0.170202		
						33'-0½		5.624	
168	11'-4			3		4'-11	120	27.993	
167	6'-5		485.32	3.3340		4'-11	0.170202	2.139	
								0.840	
167	6'-5			3	(See Notes)	1'-1	120	30.971	f(-0.000), f(-3.000), CV(21'-6), BV(13'-5½)
160	4'-6		485.32	3.2600		34'-11½	0.189862	0.818	
						36'-0½		9.840	
160	4'-6			3	(See Notes)	1'-6	120	41.630	LtE(5'-0), PO(15'-0)
132	4'-0		485.32	3.3340		20'-0	0.170202	0.222	
						21'-6		3.659	
132	4'-0			4	(See Notes)	7'-10	120	45.511	E(10'-0)
133	11'-10		485.32	4.3100		10'-0	0.048742	-3.396	
						17'-10		0.869	
133	11'-10			4	(See Notes)	70'-9½	120	42.984	E(10'-0), 2T(20'-0), BV(12'-0), LtE(6'-0)
6	1'-2		485.32	4.3100		68'-0	0.048742	4.624	
						138'-9½		6.764	
6	1'-2			6		0'-0	140	54.373	
5	1'-0		485.32	6.2800		0'-0	0.005860	0.072	
								0.000	
5	1'-0			6	(See Notes)	57'-7	140	54.445	2E(22'-1), CV(50'-5), PIV(4'-8½), T(47'-3½)
4	-3'-6		485.32	6.2800		146'-6½	0.005860	1.951	
						204'-2		1.196	
4	-3'-6			8	(See Notes)	47'-0½	150	57.592	E(27'-2)
3	-3'-6		485.32	7.9800		27'-2	0.001606		
						74'-2½		0.119	

Pipe Information										
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.	
						Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)		
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Total (Foot)		Friction(Pf)		
3	-3'-6			8	(See Notes)	17'-0½	140	57.711	3E(30'-6½), BFP(-2.774)	
2	-3'-6		485.32	8.3900		91'-7½	0.001430			
						108'-8		2.930		
2	-3'-6			8	(See Notes)	24'-8	150	60.641	S	
1	-3'-6		485.32	7.9800		52'-10	0.001606			
						77'-5½		0.124		
			250.00					60.766	Hose Allowance At Source	
1			735.32							Total(Pt) Route 1
816	9'-0	8	21.30	1	(See Notes)	3'-4	120	7.090	***** Route 2 ***** Sprinkler, PO(5'-0)	
						5'-0	0.125184	-1.445		
75	12'-4		21.30	1.0830		8'-4		1.043		
								6.688	Total(Pt) Route 2	
830	9'-0	8	21.78	1	(See Notes)	3'-4	120	7.414	***** Route 3 ***** Sprinkler, PO(5'-0)	
						5'-0	0.130478	-1.445		
103	12'-4		21.78	1.0830		8'-4		1.087		
								7.056	Total(Pt) Route 3	
820	9'-0	8	22.51	1	(See Notes)	4'-0	120	7.918	***** Route 4 ***** Sprinkler, E(2'-0), PO(5'-0)	
88	12'-4		22.51	1.0830		7'-0	0.138652	-1.445		
						11'-0		1.528		
88	12'-4		22.52	1½		6'-0	120	8.001	Flow (q) from Route 5	
112	12'-4		45.03	1.7280			0.051383			
						6'-0		0.308		
112	12'-4		22.88	1½		8'-3	120	8.309	Flow (q) from Route 8	
170	12'-4		67.91	1.7280			0.109876			
						8'-3		0.904		
170	12'-4		22.75	1½		0'-6	120	9.213	Flow (q) from Route 7	
176	12'-4		90.66	1.7280			0.187504			
						0'-6		0.094		
176	12'-4		23.70	1½		8'-0½	120	9.307	Flow (q) from Route 10	
361	12'-4		114.36	1.7280			0.288135			
						8'-0½		2.320		

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
						Fitting (Foot)		Elev(Pe)	
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Total (Foot)	Pf Friction Loss Per Unit (psi)	Friction(Pf)	
361	12'-4			1½	(See Notes)	1'-0	120	11.627	T(8'-0)
387	12'-4		114.36	1.6540		8'-0	0.356588	-0.000	
						9'-0		3.209	
387	12'-4			1½	(See Notes)	1'-0	120	14.836	PO(8'-0)
386	11'-4		114.36	1.6540		8'-0	0.356588	0.434	
						9'-0		3.209	
								18.479	Total(Pt) Route 4
814	12'-4	8	22.52	1½	(See Notes)	5'-4	120	7.925	***** Route 5 ***** Sprinkler
88	12'-4		22.52	1.7280			0.014259		
						5'-4		0.076	
								8.001	Total(Pt) Route 5
838	9'-0	8	22.65	1	(See Notes)	3'-4	120	8.018	***** Route 6 ***** Sprinkler, PO(5'-0)
125	12'-4		22.65	1.0830		5'-0	0.140285	-1.445	
						8'-4		1.169	
								7.742	Total(Pt) Route 6
850	9'-0	8	22.75	1	(See Notes)	9'-2½	120	8.084	***** Route 7 ***** Sprinkler, 2E(2'-0), PO(5'-0)
170	12'-4		22.75	1.0830		9'-0	0.141352	-1.445	
						18'-2½		2.574	
								9.213	Total(Pt) Route 7
832	9'-0	8	22.88	1	(See Notes)	4'-0	120	8.179	***** Route 8 ***** Sprinkler, E(2'-0), PO(5'-0)
112	12'-4		22.88	1.0830		7'-0	0.142885	-1.445	
						11'-0		1.575	
								8.309	Total(Pt) Route 8
815	9'-0	8	23.66	1	(See Notes)	3'-4	120	8.745	***** Route 9 ***** Sprinkler, PO(5'-0)
74	12'-4		23.66	1.0830		5'-0	0.151998	-1.445	
						8'-4		1.267	
74	12'-4			1½		8'-0	120	8.566	
102	12'-4		23.66	1.7280			0.015619		
						8'-0		0.125	
102	12'-4		23.81	1½		6'-0	120	8.691	Flow (q) from Route 11
121	12'-4		47.46	1.7280			0.056633		
						6'-0		0.340	

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
						Total (Foot)		Friction(Pf)	
121	12'-4		24.21	1½		8'-0	120	9.031	Flow (q) from Route 13
194	12'-4		71.67	1.7280		8'-0	0.121385	0.971	
194	12'-4		25.31	1½		4'-9½	120	10.002	Flow (q) from Route 17
362	12'-4		96.98	1.7280		4'-9½	0.212414	1.016	
362	12'-4			1½	(See Notes)	1'-0	120	11.018	E(8'-0), T(8'-0)
393	12'-4		96.98	1.6540		12'-0	0.262877	-0.000	
						13'-0		3.417	
393	12'-4			1½	(See Notes)	1'-0	120	14.435	PO(8'-0)
392	11'-4		96.98	1.6540		8'-0	0.262877	0.434	
						9'-0		2.366	
								17.234	Total(Pt) Route 9
849	9'-0	8	23.70	1	(See Notes)	5'-11½	120	8.776	••••• Route 10 ••••• Sprinkler, E(2'-0), PO(5'-0)
176	12'-4		23.70	1.0830		7'-0	0.152499	-1.445	
						12'-11½		1.976	
								9.307	Total(Pt) Route 10
829	9'-0	8	23.81	1	(See Notes)	3'-4	120	8.855	••••• Route 11 ••••• Sprinkler, PO(5'-0)
102	12'-4		23.81	1.0830		5'-0	0.153769	-1.445	
						8'-4		1.281	
								8.691	Total(Pt) Route 11
854	9'-0	8	23.91	1	(See Notes)	3'-4	120	8.936	••••• Route 12 ••••• Sprinkler, PO(5'-0)
191	12'-4		23.91	1.0830		5'-0	0.155067	-1.445	
						8'-4		1.292	
								8.783	Total(Pt) Route 12
836	9'-0	8	24.21	1	(See Notes)	3'-4	120	9.155	••••• Route 13 ••••• Sprinkler, PO(5'-0)
121	12'-4		24.21	1.0830		5'-0	0.158578	-1.445	
						8'-4		1.321	
								9.031	Total(Pt) Route 13
813	10'-0	8	24.66	1	(See Notes)	2'-4	120	9.498	••••• Route 14 ••••• Sprinkler, PO(5'-0)
69	12'-4		24.66	1.0830		5'-0	0.164078	-1.012	
						7'-4		1.203	

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
						Total (Foot)		Friction(Pf)	
69	12'-4			1½		8'-0	120	9.690	
100	12'-4		24.66	1.7280		8'-0	0.016860	0.135	
100	12'-4		24.81	1½		6'-0	120	9.825	Flow (q) from Route 15
117	12'-4		49.47	1.7280		6'-0	0.061136	0.367	
117	12'-4		25.23	1½		4'-1	120	10.192	Flow (q) from Route 16
129	12'-4		74.70	1.7280		4'-1	0.131052	0.536	
129	12'-4		25.83	1½		6'-0	120	10.728	Flow (q) from Route 18
320	12'-4		100.53	1.7280		6'-0	0.227029	1.362	
320	12'-4		27.30	1½		4'-8	120	12.090	Flow (q) from Route 19
368	12'-4		127.84	1.7280		4'-8	0.354101	1.649	
368	12'-4			1½	(See Notes)	0'-8	120	13.739	E(4'-0)
384	12'-4		127.84	1.6540		4'-0	0.438225	-0.000	
						4'-8		2.045	
384	12'-4			1½	(See Notes)	1'-0	120	15.784	PO(8'-0)
383	11'-4		127.84	1.6540		8'-0	0.438225	0.434	
						9'-0		3.944	
								20.162	Total(Pt) Route 14
827	10'-0	8	24.81	1	(See Notes)	2'-4	120	9.619	 Route 15 Sprinkler, PO(5'-0)
100	12'-4		24.81	1.0830		5'-0	0.166006	-1.012	
						7'-4		1.217	
								9.825	Total(Pt) Route 15
834	10'-0	8	25.23	1	(See Notes)	2'-4	120	9.947	 Route 16 Sprinkler, PO(5'-0)
117	12'-4		25.23	1.0830		5'-0	0.171243	-1.012	
						7'-4		1.256	
								10.192	Total(Pt) Route 16
856	9'-0	8	25.31	1	(See Notes)	3'-4	120	10.012	 Route 17 Sprinkler, PO(5'-0)
194	12'-4		25.31	1.0830		5'-0	0.172264	-1.445	
						8'-4		1.436	

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
					Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID				Total (Foot)	
								10.002	
842	10'-0	8	25.83	1	(See Notes)	2'-4	120	10.428	***** Route 18 ***** Sprinkler, PO(5'-0)
						5'-0	0.178880	-1.012	
129	12'-4		25.83	1.0830		7'-4		1.312	
								10.728	Total(Pt) Route 18
857	10'-0	8	27.30	1	(See Notes)	2'-4	120	11.649	***** Route 19 ***** Sprinkler, PO(5'-0)
						5'-0	0.198168	-1.012	
320	12'-4		27.30	1.0830		7'-4		1.453	
								12.090	Total(Pt) Route 19
852	10'-0	8	35.33	1	(See Notes)	2'-4	120	19.503	***** Route 20 ***** Sprinkler, PO(5'-0)
						5'-0	0.319209	-1.012	
186	12'-4		35.33	1.0830		7'-4		2.341	
186	12'-4			1½		6'-10	120	20.832	
367	12'-4		35.33	1.7280		6'-10	0.032800	0.224	
367	12'-4			1½	(See Notes)	0'-8	120	21.056	E(7'-0), T(8'-0)
						12'-0	0.040593	-0.000	
377	12'-4		35.33	1.6540		12'-8		0.514	
377	12'-4			1½	(See Notes)	1'-0	120	21.570	PO(8'-0)
						8'-0	0.040593	0.434	
376	11'-4		35.33	1.6540		9'-0		0.365	
								22.369	Total(Pt) Route 20

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)

C Value Multiplier

$$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$$

Value Of C	100	130	140	150
Multiplying Factor	0.713	1.16	1.33	1.51

Fittings Legend

ALV	Alarm Valve	AngV	Angle Valve	b	Bushing
BaIV	Ball Valve	BFP	Backflow Preventer	BV	Butterfly Valve
C	Cross Flow Turn 90°	cplg	Coupling	Cr	Cross Run
CV	Check Valve	DelV	Deluge Valve	DPV	Dry Pipe Valve
E	90° Elbow	EE	45° Elbow	Ee1	11¼° Elbow
Ee2	22½° Elbow	f	Flow Device	fd	Flex Drop
FDC	Fire Department Connection	fE	90° FireLock(TM) Elbow	fEE	45° FireLock(TM) Elbow
flg	Flange	FN	Floating Node	fT	FireLock(TM) Tee
g	Gauge	GloV	Globe Valve	GV	Gate Valve
Ho	Hose	Hose	Hose	HV	Hose Valve
Hyd	Hydrant	LtE	Long Turn Elbow	mecT	Mechanical Tee
Noz	Nozzle	P1	Pump In	P2	Pump Out
PIV	Post Indicating Valve	PO	Pipe Outlet	PrV	Pressure Relief Valve
PRV	Pressure Reducing Valve	red	Reducer/Adapter	S	Supply
sCV	Swing Check Valve	SFx	Seismic Flex	Spr	Sprinkler
St	Strainer	T	Tee Flow Turn 90°	Tr	Tee Run
U	Union	WirF	Wirsbo	WMV	Water Meter Valve
Z	Cap				

Hydraulic Calculations

for

Project Name: Home2 Suites by Hilton

Location: 550 Gateway Boulevard, South San Francisco, CA,

Drawing Name: FLOOR 1.cad

Calculation Date: 12/20/2017

Design

Remote Area Number: 1.1
Remote Area Location: FLOOR 1 BREAKFAST AREA
Occupancy Classification: Light Hazard
Commodity Classification: N/A

Density: 0.10gpm/ft²
Area of Application: 1500ft² (Actual 964.74ft²)
Coverage per Sprinkler: 217.5ft²
Type of sprinklers calculated: Pendent
No. of sprinklers calculated: 7

In-rack Demand: N/A gpm at Node: N/A
Hose Streams: 100.00 at Node: 1 Type: Allowance at Source

Total Water Required (including Hose Streams where applicable):
From Water Supply at Node 1: 279.07 @ 59.091
Type of System: Wet
Volume of Dry or PreAction System: N/A

for Node: 1 Date: 6/9/2017
Location: 550 Gateway & Corporate Dr.
Source: ACKER

Name of Contractor: Aegis Fire Systems
Address: 500 Boulder Court - A, Pleasanton, CA 94566
Phone Number: (925) 417-5550
Name of designer: B. Williams
Authority Having Jurisdiction: San Francisco Fire Dept.

Notes:

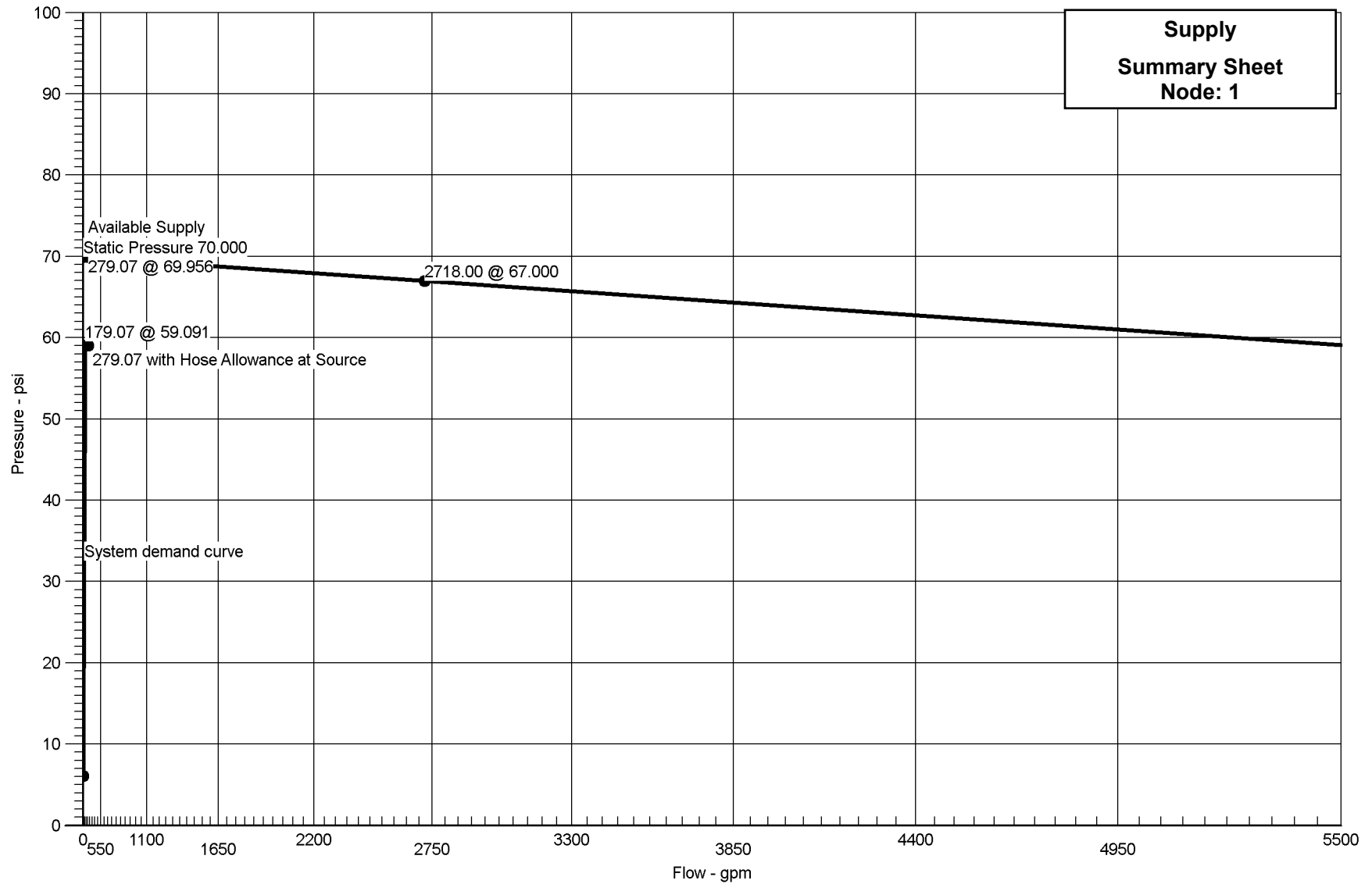
Automatic peaking results Left: N/A Right: N/A

Hydraulic Graph

Job Name: Home2 Suites by Hilton
Remote Area Number: 1.1

N 1.85

Date: 12/20/2017



Supply Analysis

Node	Name	Static (psi)	Residual (psi)	@ Flow (gpm)	Available (psi)	@ Total Demand (gpm)	Required Pressure (psi)
1	Water Supply	70.000	67.000	2718.00	69.956	279.07	59.091

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
1	-3'-6	Supply	59.091	179.07	
910	10'-1	Sprinkler	25.120	28.07	
911	10'-7	Sprinkler	23.372	27.07	
917	9'-7	Sprinkler	25.929	28.52	
922	10'-1	Sprinkler	20.161	25.14	
923	10'-1	Sprinkler	16.159	22.51	
924	10'-1	Sprinkler	15.085	21.75	
927	9'-7	Sprinkler	21.575	26.01	
2	-3'-6		59.071		
3	-3'-6		53.105		
4	-3'-6		53.086		
5	1'-0		50.946		
6	1'-2		50.874		
132	4'-0		48.438		
133	11'-10		45.180		
160	4'-6		47.638		
167	6'-5		42.738		
168	11'-4		40.466		
385	11'-4		38.998		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
547	11'-4		28.533		
549	12'-4		27.114		
550	12'-4		25.061		
558	11'-4		28.334		
560	12'-4		27.113		
573	11'-4		28.118		
575	12'-4		24.966		
576	12'-4		22.087		
577	12'-4		19.932		

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
						Total (Foot)		Friction(Pf)	
924	10'-1	5.6	21.75	1	(See Notes)	14'-3½	150	15.085	••••• Route 1 ••••• Sprinkler, E(7'-0)
578	12'-4		21.75	1.1010		7'-0	0.079463	-0.984	
						21'-3½		1.690	
578	12'-4		22.51	1		14'-0	150	15.791	Flow (q) from Route 2
577	12'-4		44.26	1.1010			0.295808		
						14'-0		4.141	
577	12'-4		25.14	1¼		10'-0	150	19.932	Flow (q) from Route 3
576	12'-4		69.41	1.3940			0.215473		
						10'-0		2.155	
576	12'-4		26.01	1¼	(See Notes)	1'-5	150	22.087	Flow (q) from Route 4 T(6'-0)
575	12'-4		95.42	1.3940		6'-0	0.388258	-0.000	
						7'-5		2.880	
575	12'-4			1¼	(See Notes)	1'-0	150	24.966	PO(6'-0)
573	11'-4		95.42	1.3940		6'-0	0.388258	0.434	
						7'-0		2.718	
573	11'-4			2½		9'-3½	120	28.118	
558	11'-4		95.42	2.7050			0.023244		
						9'-3½		0.216	
558	11'-4		28.52	2½		5'-3½	120	28.334	Flow (q) from Route 7
547	11'-4		123.93	2.7050			0.037705		
						5'-3½		0.200	
547	11'-4		55.14	2½	(See Notes)	128'-5½	120	28.533	Flow (q) from Route 5 T(12'-0)
385	11'-4		179.07	2.7050		12'-0	0.074491		
						140'-5½		10.464	
385	11'-4			3	(See Notes)	34'-7	120	38.998	T(15'-0), LtE(5'-0)
168	11'-4		179.07	3.3340		20'-0	0.026910		
						54'-7		1.469	
168	11'-4			3		4'-11	120	40.466	
167	6'-5		179.07	3.3340			0.026910	2.139	
						4'-11		0.133	
167	6'-5			3	(See Notes)	1'-1	120	42.738	f(-0.000), f(-3.000), CV(21'-6), BV(13'-5½)
160	4'-6		179.07	3.2600		34'-11½	0.030018	0.818	
						36'-0½		4.081	

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
						Total (Foot)		Friction(Pf)	
160	4'-6			3	(See Notes)	1'-6	120	47.638	LtE(5'-0), PO(15'-0)
132	4'-0		179.07	3.3340		20'-0	0.026910	0.222	
						21'-6		0.579	
132	4'-0			4	(See Notes)	7'-10	120	48.438	E(10'-0)
133	11'-10		179.07	4.3100		10'-0	0.007706	-3.396	
						17'-10		0.137	
133	11'-10			4	(See Notes)	70'-9½	120	45.180	E(10'-0), 2T(20'-0), BV(12'-0), LtE(6'-0)
6	1'-2		179.07	4.3100		68'-0	0.007706	4.624	
						138'-9½		1.069	
6	1'-2			6		0'-0	140	50.874	
5	1'-0		179.07	6.2800			0.000926	0.072	
						0'-0		0.000	
5	1'-0			6	(See Notes)	57'-7	140	50.946	2E(22'-1), CV(50'-5), PIV(4'-8½) , T(47'-3½)
4	-3'-6		179.07	6.2800		146'-6½	0.000926	1.951	
						204'-2		0.189	
4	-3'-6			8	(See Notes)	47'-0½	150	53.086	E(27'-2)
3	-3'-6		179.07	7.9800		27'-2	0.000254		
						74'-2½		0.019	
3	-3'-6			8	(See Notes)	17'-0½	140	53.105	3E(30'-6½), BFP(-5.942)
2	-3'-6		179.07	8.3900		91'-7½	0.000226		
						108'-8		5.966	
2	-3'-6			8	(See Notes)	24'-8	150	59.071	S
1	-3'-6		179.07	7.9800		52'-10	0.000254		
						77'-5½		0.020	
			100.00					59.091	Hose Allowance At Source
1			279.07						Total(Pt) Route 1
923	10'-1	5.6	22.51	1	(See Notes)	2'-3	150	16.159	 Route 2 Sprinkler, T(5'-0)
578	12'-4		22.51	1.1010		5'-0	0.084685	-0.984	
						7'-3		0.616	
								15.791	Total(Pt) Route 2

Pipe Information

Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
						Total (Foot)		Friction(Pf)	
922	10'-1	5.6	25.14	1	(See Notes)	2'-3	150	20.161	***** Route 3 ***** Sprinkler, T(5'-0)
577	12'-4		25.14	1.1010		5'-0	0.103917	-0.984	
						7'-3		0.756	
								19.932	Total(Pt) Route 3
927	9'-7	5.6	26.01	1	(See Notes)	3'-5½	150	21.575	***** Route 4 ***** Sprinkler, E(7'-0), T(5'-0)
576	12'-4		26.01	1.1010		12'-0	0.110643	-1.201	
						15'-5½		1.713	
								22.087	Total(Pt) Route 4
911	10'-7	5.6	27.07	1	(See Notes)	15'-7½	150	23.372	***** Route 5 ***** Sprinkler, T(5'-0)
550	12'-4		27.07	1.1010		5'-0	0.119139	-0.768	
						20'-7½		2.457	
550	12'-4		28.07	1¼	(See Notes)	8'-7	150	25.061	Flow (q) from Route 6 T(6'-0)
549	12'-4		55.14	1.3940		6'-0	0.140773	-0.000	
						14'-7		2.053	
549	12'-4			1¼	(See Notes)	1'-0	150	27.114	PO(6'-0)
547	11'-4		55.14	1.3940		6'-0	0.140773	0.434	
						7'-0		0.985	
								28.533	Total(Pt) Route 5
910	10'-1	5.6	28.07	1	(See Notes)	2'-3	150	25.120	***** Route 6 ***** Sprinkler, T(5'-0)
550	12'-4		28.07	1.1010		5'-0	0.127358	-0.984	
						7'-3		0.926	
								25.061	Total(Pt) Route 6
917	9'-7	5.6	28.52	1	(See Notes)	4'-2½	150	25.929	***** Route 7 ***** Sprinkler, 2E(7'-0)
560	12'-4		28.52	1.1010		14'-0	0.131150	-1.201	
						18'-2½		2.385	
560	12'-4			1	(See Notes)	1'-0	150	27.113	PO(5'-0)
558	11'-4		28.52	1.1010		5'-0	0.131150	0.434	
						6'-0		0.787	
								28.334	Total(Pt) Route 7

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)

C Value Multiplier

$$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$$

Value Of C	100	130	140	150
Multiplying Factor	0.713	1.16	1.33	1.51

Fittings Legend

ALV	Alarm Valve	AngV	Angle Valve	b	Bushing
BaIV	Ball Valve	BFP	Backflow Preventer	BV	Butterfly Valve
C	Cross Flow Turn 90°	cplg	Coupling	Cr	Cross Run
CV	Check Valve	DelV	Deluge Valve	DPV	Dry Pipe Valve
E	90° Elbow	EE	45° Elbow	Ee1	11¼° Elbow
Ee2	22½° Elbow	f	Flow Device	fd	Flex Drop
FDC	Fire Department Connection	fE	90° FireLock(TM) Elbow	fEE	45° FireLock(TM) Elbow
flg	Flange	FN	Floating Node	fT	FireLock(TM) Tee
g	Gauge	GloV	Globe Valve	GV	Gate Valve
Ho	Hose	Hose	Hose	HV	Hose Valve
Hyd	Hydrant	LtE	Long Turn Elbow	mecT	Mechanical Tee
Noz	Nozzle	P1	Pump In	P2	Pump Out
PIV	Post Indicating Valve	PO	Pipe Outlet	PrV	Pressure Relief Valve
PRV	Pressure Reducing Valve	red	Reducer/Adapter	S	Supply
sCV	Swing Check Valve	SFx	Seismic Flex	Spr	Sprinkler
St	Strainer	T	Tee Flow Turn 90°	Tr	Tee Run
U	Union	WirF	Wirsbo	WMV	Water Meter Valve
Z	Cap				

Hydraulic Calculations

for

Project Name: Home2 Suites by Hilton

Location: 550 Gateway Boulevard, South San Francisco, CA,

Drawing Name: FLOOR 4.cad

Calculation Date: 12/20/2017

Design

Remote Area Number: 4.1
Remote Area Location: FLOOR 4 UNIT
Occupancy Classification: Residential
Commodity Classification: N/A

Density: 0.10gpm/ft²
Area of Application: 900ft² (Actual 432.58ft²)
Coverage per Sprinkler: 155ft²
Type of sprinklers calculated: Pendent
No. of sprinklers calculated: 4

In-rack Demand: N/A gpm at Node: N/A
Hose Streams: 100.00 at Node: 1 Type: Allowance at Source

Total Water Required (including Hose Streams where applicable):
From Water Supply at Node 1: 166.82 @ 59.755
Type of System: Wet
Volume of Dry or PreAction System: N/A

for Node: 1 Date: 6/9/2017
Location: 550 Gateway & Corporate Dr.
Source: ACKER

Name of Contractor: Aegis Fire Systems
Address: 500 Boulder Court - A, Pleasanton, CA 94566
Phone Number: (925) 417-5550
Name of designer: B. Williams
Authority Having Jurisdiction: San Francisco Fire Dept.

Notes:

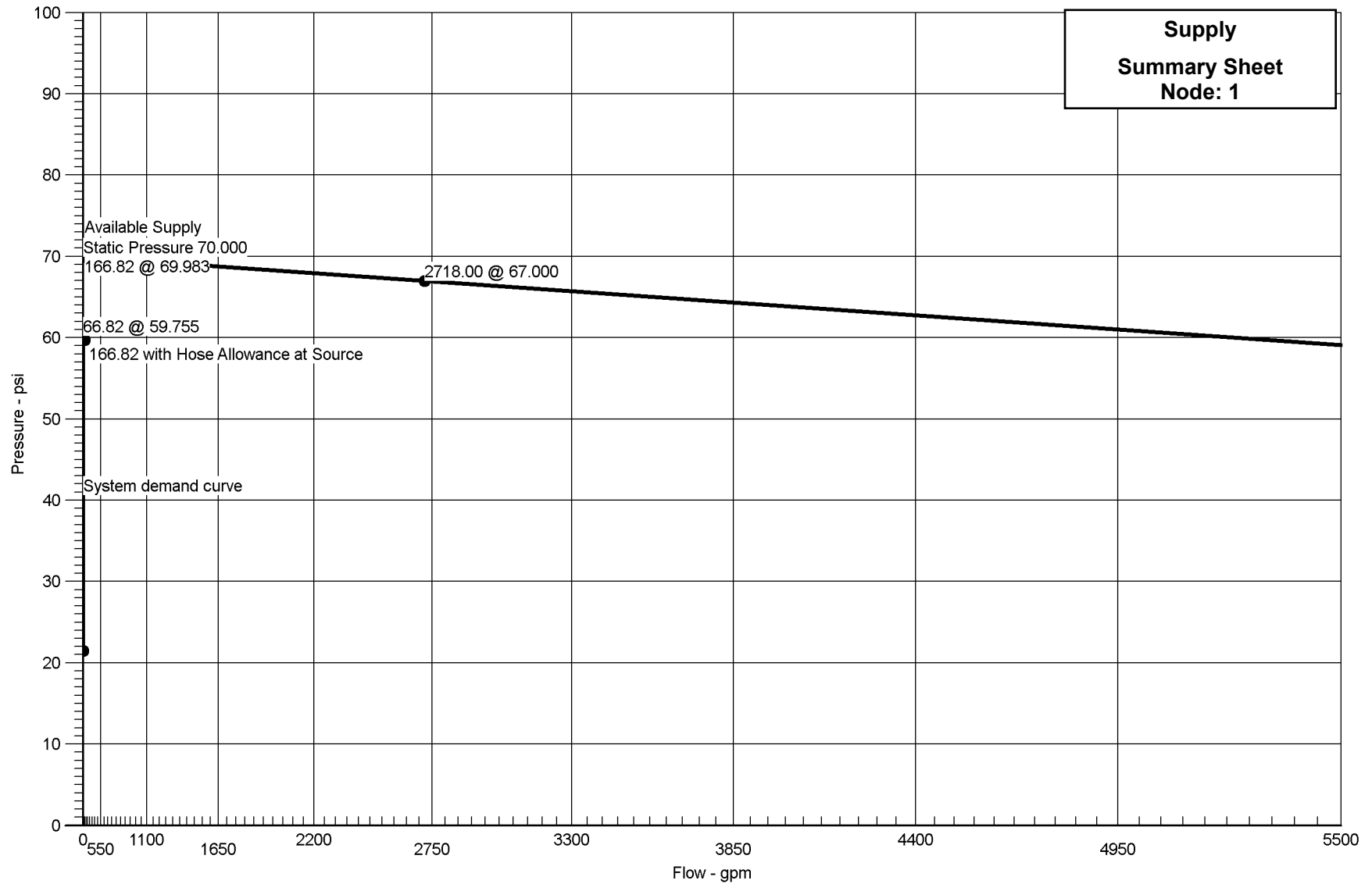
Automatic peaking results Left: 59.755 Right: 59.755

Hydraulic Graph

Job Name: Home2 Suites by Hilton
Remote Area Number: 4.1

N 1.85

Date: 12/20/2017

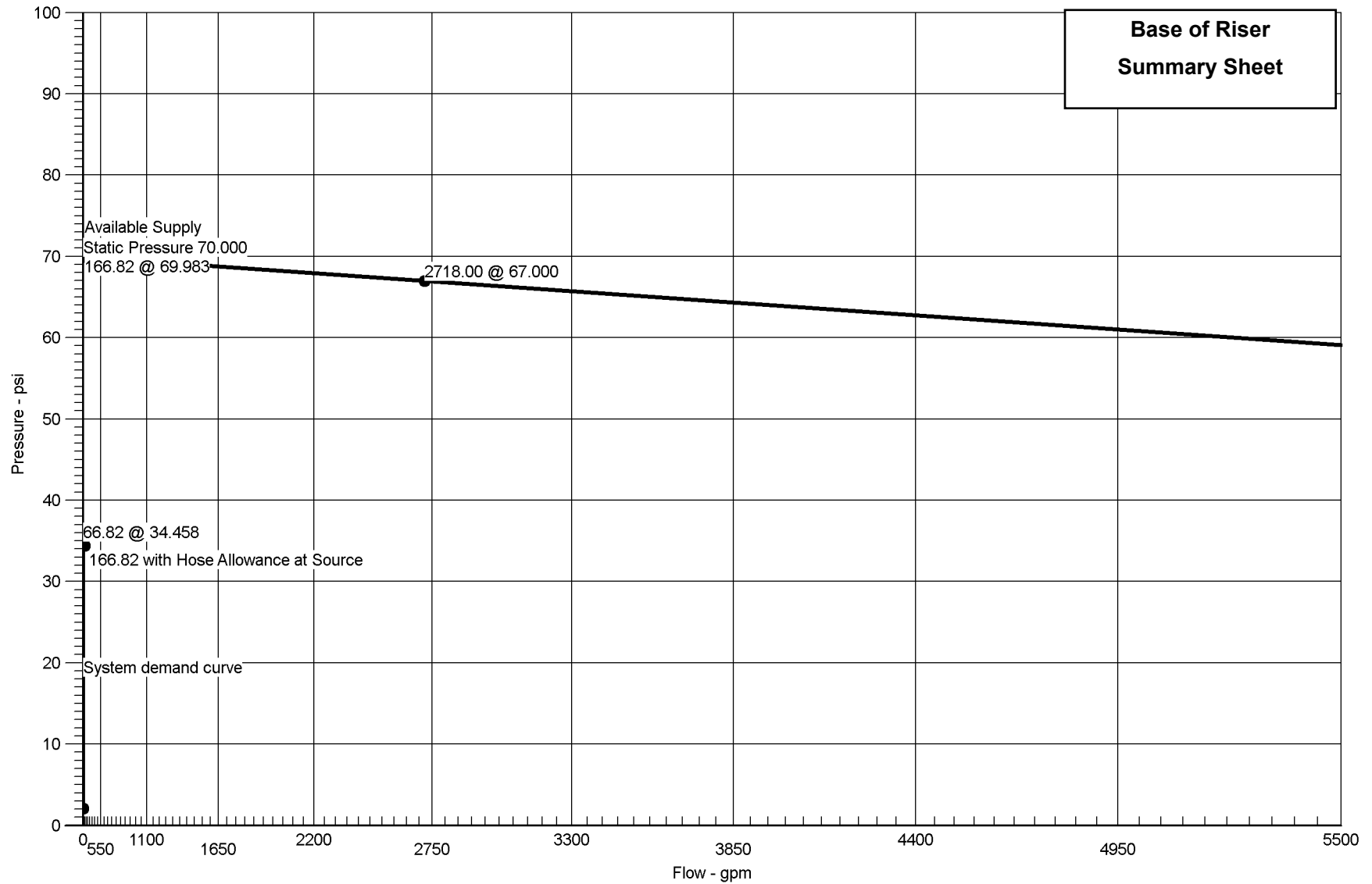


Hydraulic Graph

Job Name: Home2 Suites by Hilton
Remote Area Number: 4.1

N 1.85

Date: 12/20/2017



Supply Analysis

Node	Name	Static (psi)	Residual (psi) @	Flow (gpm)	Available (psi) @	Total Demand (gpm)	Required Pressure (psi)
1	Water Supply	70.000	67.000	2718.00	69.983	166.82	59.755

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
1	-3'-7½	Supply	59.755	66.82	
101	46'-0	Sprinkler	13.779	18.19	
102	46'-0	Sprinkler	12.136	17.07	
103	46'-0	Sprinkler	10.740	16.06	
104	46'-0	Sprinkler	10.006	15.50	
2	-3'-7½		59.752		
3	-3'-7½		54.468		
4	-3'-7½		54.465		
5	0'-10½		52.484		
6	1'-0½		52.411		
7	11'-8½		47.616		
8	41'-1		34.832		
9	41'-1	Supply	34.458		
10	43'-3		29.581		
11	45'-11½		28.326		
13	45'-11½		19.237		
14	46'-7½		17.609		
15	46'-7½		14.308		
16	46'-7½		12.159		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
17	46'-7½		10.890		
508	45'-11½		28.116		

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
						Total (Foot)		Friction(Pf)	
104	46'-0	4.9	15.50	1	(See Notes)	15'-0	150	10.006	••••• Route 1 ••••• Sprinkler, E(7'-0), T(5'-0)
17	46'-7½		15.50	1.1010		12'-0	0.042460	-0.262	
						27'-0		1.146	
17	46'-7½		16.06	1		8'-0	150	10.890	Flow (q) from Route 2
16	46'-7½		31.56	1.1010		8'-0	0.158207	1.269	
16	46'-7½		17.07	1		6'-1½	150	12.159	Flow (q) from Route 3
15	46'-7½		48.63	1.1010		6'-1½	0.352057	2.149	
15	46'-7½		18.19	1¼	(See Notes)	10'-5½	150	14.308	Flow (q) from Route 4 T(6'-0)
14	46'-7½		66.82	1.3940		6'-0	0.200842	0.000	
						16'-5½		3.301	
14	46'-7½			1¼	(See Notes)	0'-8	150	17.609	T(6'-0)
13	45'-11½		66.82	1.3940		6'-8	0.200842	1.339	
13	45'-11½			2	(See Notes)	247'-3½	150	19.237	T(10'-0), cplg(1'-0), LtE
508	45'-11½		66.82	2.0030		11'-0	0.034374		
						258'-3½		8.879	
508	45'-11½			2	(See Notes)	3'-5	120	28.116	LtE(3'-0)
11	45'-11½		66.82	2.2030		3'-0	0.032675		
						6'-5		0.210	
11	45'-11½			2		2'-8½	120	28.326	
10	43'-3		66.82	2.2030		2'-8½	0.032675	1.167	
								0.088	
10	43'-3			2	(See Notes)	1'-1	120	29.581	f(-0.000), f(-3.000), CV(13'-6½) , BV(7'-4½), LtE(3'-8½), Base of Riser
9	41'-1		66.82	2.1570		24'-7½	0.036212	0.946	
						25'-8½		3.931	
9	41'-1			2	(See Notes)	1'-5½	120	34.458	PO(10'-0)
8	41'-1		66.82	2.2030		10'-0	0.032675		
						11'-5½		0.374	
8	41'-1			4	(See Notes)	29'-4½	120	34.832	E(10'-0)
7	11'-8½		66.82	4.3100		10'-0	0.001244	12.735	
						39'-4½		0.049	

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
						Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Total (Foot)		Friction(Pf)	
7	11'-8½			4	(See Notes)	79'-5	120	47.616	2E(10'-0), BV(12'-0), T(20'-0), LtE(6'-0)
6	1'-0½		66.82	4.3100		58'-0	0.001244	4.624	
						137'-5		0.171	
6	1'-0½			6		0'-0	140	52.411	
5	0'-10½		66.82	6.2800			0.000150	0.072	
						0'-0		0.000	
5	0'-10½			6	(See Notes)	57'-7	140	52.484	2E(22'-1), CV(50'-5), PIV(4'-8½) , T(47'-3½)
4	-3'-7½		66.82	6.2800		146'-6½	0.000150	1.951	
						204'-2		0.031	
4	-3'-7½			8	(See Notes)	47'-0½	150	54.465	E(27'-2)
3	-3'-7½		66.82	7.9800		27'-2	0.000041		
						74'-2½		0.003	
3	-3'-7½			8	(See Notes)	17'-0½	140	54.468	3E(30'-6½), BFP(-5.280)
2	-3'-7½		66.82	8.3900		91'-7½	0.000036		
						108'-8		5.284	
2	-3'-7½			8	(See Notes)	24'-8	150	59.752	S
1	-3'-7½		66.82	7.9800		52'-10	0.000041		
						77'-5½		0.003	
			100.00					59.755	Hose Allowance At Source
1			166.82						Total(Pt) Route 1
103	46'-0	4.9	16.06	1	(See Notes)	2'-1	150	10.740	***** Route 2 ***** Sprinkler, E(7'-0)
17	46'-7½		16.06	1.1010		7'-0	0.045332	-0.262	
						9'-1		0.412	
								10.890	Total(Pt) Route 2
102	46'-0	4.9	17.07	1	(See Notes)	0'-7	150	12.136	***** Route 3 ***** Sprinkler, T(5'-0)
16	46'-7½		17.07	1.1010		5'-0	0.050758	-0.262	
						5'-7		0.284	
								12.159	Total(Pt) Route 3
101	46'-0	4.9	18.19	1	(See Notes)	1'-10	150	13.779	***** Route 4 ***** Sprinkler, E(7'-0), T(5'-0)
15	46'-7½		18.19	1.1010		12'-0	0.057082	-0.262	
						13'-10		0.791	
								14.308	Total(Pt) Route 4

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)

C Value Multiplier

$$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$$

Value Of C	100	130	140	150
Multiplying Factor	0.713	1.16	1.33	1.51

Fittings Legend

ALV	Alarm Valve	AngV	Angle Valve	b	Bushing
BaIV	Ball Valve	BFP	Backflow Preventer	BV	Butterfly Valve
C	Cross Flow Turn 90°	cplg	Coupling	Cr	Cross Run
CV	Check Valve	DelV	Deluge Valve	DPV	Dry Pipe Valve
E	90° Elbow	EE	45° Elbow	Ee1	11¼° Elbow
Ee2	22½° Elbow	f	Flow Device	fd	Flex Drop
FDC	Fire Department Connection	fE	90° FireLock(TM) Elbow	fEE	45° FireLock(TM) Elbow
flg	Flange	FN	Floating Node	fT	FireLock(TM) Tee
g	Gauge	GloV	Globe Valve	GV	Gate Valve
Ho	Hose	Hose	Hose	HV	Hose Valve
Hyd	Hydrant	LtE	Long Turn Elbow	mecT	Mechanical Tee
Noz	Nozzle	P1	Pump In	P2	Pump Out
PIV	Post Indicating Valve	PO	Pipe Outlet	PrV	Pressure Relief Valve
PRV	Pressure Reducing Valve	red	Reducer/Adapter	S	Supply
sCV	Swing Check Valve	SFx	Seismic Flex	Spr	Sprinkler
St	Strainer	T	Tee Flow Turn 90°	Tr	Tee Run
U	Union	WirF	Wirsbo	WMV	Water Meter Valve
Z	Cap				

Hydraulic Calculations

for

Project Name: Home2 Suites by Hilton

Location: 550 Gateway Boulevard, South San Francisco, CA,

Drawing Name: FLOOR 5&6.cad

Calculation Date: 12/20/2017

Design

Remote Area Number: 5.1
Remote Area Location: FIFTH FLOOR UNIT
Occupancy Classification: Residential
Commodity Classification: N/A

Density: 0.10gpm/ft²
Area of Application: 900ft² (Actual 432.58ft²)
Coverage per Sprinkler: 155ft²
Type of sprinklers calculated: Pendent
No. of sprinklers calculated: 4

In-rack Demand: N/A gpm at Node: N/A
Hose Streams: 100.00 at Node: 1 Type: Allowance at Source

Total Water Required (including Hose Streams where applicable):
From Water Supply at Node 1: 166.82 @ 58.184
Type of System: Wet
Volume of Dry or PreAction System: N/A

for Node: 1 Date: 6/9/2017
Location: 550 Gateway & Corporate Dr.
Source: ACKER

Name of Contractor: Aegis Fire Systems
Address: 500 Boulder Court - A, Pleasanton, CA 94566
Phone Number: (925) 417-5550
Name of designer: B. Williams
Authority Having Jurisdiction: San Francisco Fire Dept.

Notes:

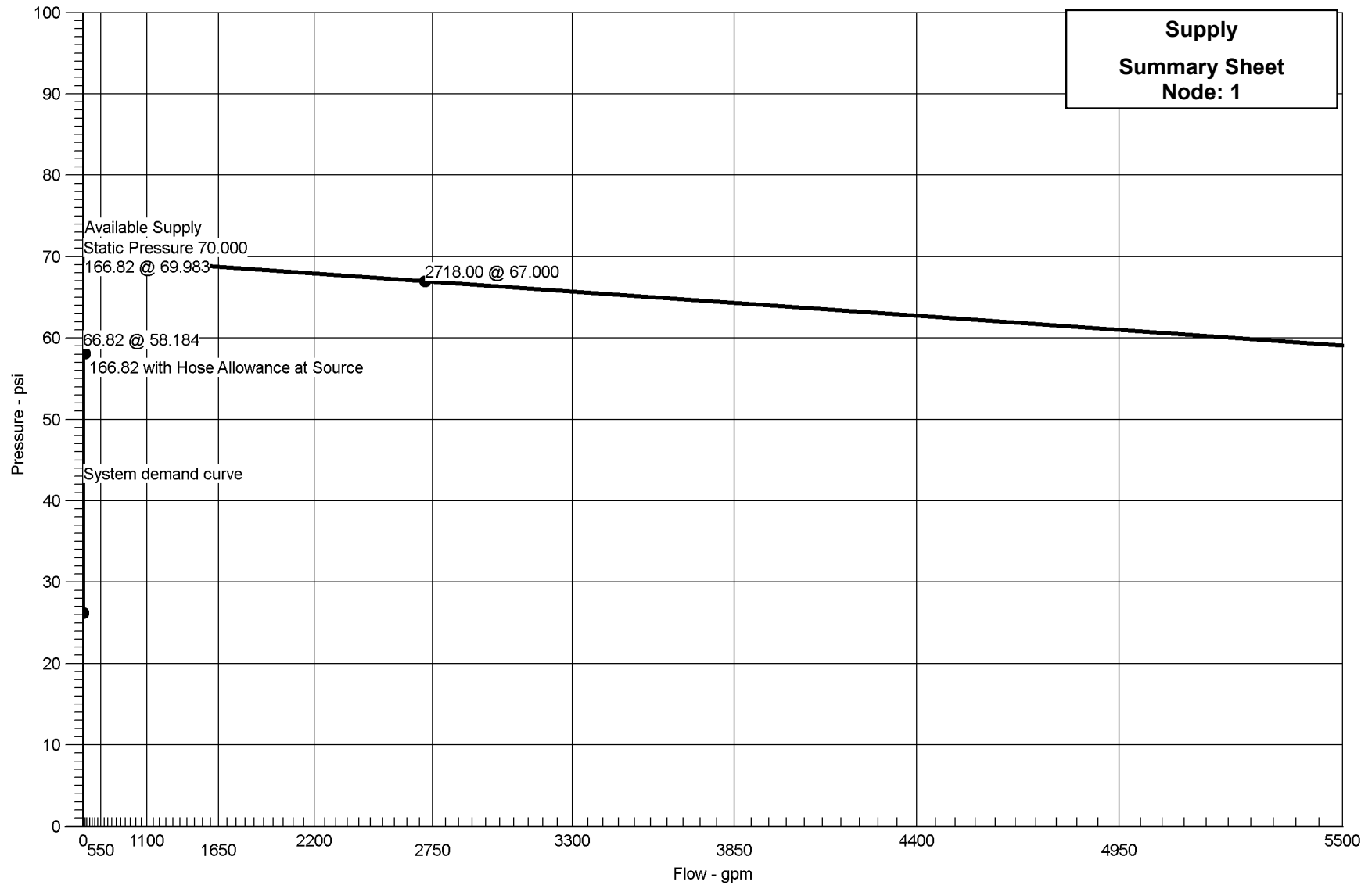
Automatic peaking results Left: 58.184 Right: 58.184

Hydraulic Graph

Job Name: Home2 Suites by Hilton
Remote Area Number: 5.1

N 1.85

Date: 12/20/2017



Supply Analysis

Node	Name	Static (psi)	Residual (psi) @	Flow (gpm)	Available (psi) @	Total Demand (gpm)	Required Pressure (psi)
1	Water Supply	70.000	67.000	2718.00	69.983	166.82	58.184

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
1	-3'-6	Supply	58.184	66.82	
101	57'-1	Sprinkler	13.779	18.19	
102	57'-1	Sprinkler	12.136	17.07	
103	57'-1	Sprinkler	10.740	16.06	
104	57'-1	Sprinkler	10.006	15.50	
2	-3'-6		58.181		
3	-3'-6		52.897		
4	-3'-6		52.894		
5	1'-0		50.913		
6	1'-2		50.841		
7	11'-10		46.045		
8	52'-2		28.497		
9	52'-2		28.335		
10	54'-6		26.809		
11	57'-0½		25.669		
12	57'-0½		24.144		
13	57'-0½		19.237		
14	57'-8½		17.609		
15	57'-8½		14.308		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
16	57'-8½		12.159		
17	57'-8½		10.890		

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
						Total (Foot)		Friction(Pf)	
104	57'-1	4.9	15.50	1	(See Notes)	15'-0	150	10.006	• • • • • Route 1 • • • • • Sprinkler, E(7'-0), T(5'-0)
17	57'-8½		15.50	1.1010		12'-0	0.042460	-0.262	
						27'-0		1.146	
17	57'-8½		16.06	1		8'-0	150	10.890	Flow (q) from Route 2
16	57'-8½		31.56	1.1010		8'-0	0.158207	1.269	
16	57'-8½		17.07	1		6'-1½	150	12.159	Flow (q) from Route 3
15	57'-8½		48.63	1.1010		6'-1½	0.352057	2.149	
15	57'-8½		18.19	1¼	(See Notes)	10'-5½	150	14.308	Flow (q) from Route 4 T(6'-0)
14	57'-8½		66.82	1.3940		6'-0	0.200842	0.000	
						16'-5½		3.301	
14	57'-8½			1¼	(See Notes)	0'-8	150	17.609	T(6'-0)
13	57'-0½		66.82	1.3940		6'-8	0.200842	1.339	
13	57'-0½			2	(See Notes)	131'-9	150	19.237	T(10'-0), cplg(1'-0)
12	57'-0½		66.82	2.0030		11'-0	0.034374		
						142'-9		4.906	
12	57'-0½			2½	(See Notes)	118'-11	120	24.144	2LtE(4'-0)
11	57'-0½		66.82	2.7050		8'-0	0.012024		
						126'-11		1.526	
11	57'-0½			2½		2'-6½	120	25.669	
10	54'-6		66.82	2.7050			0.012024	1.109	
						2'-6½		0.031	
10	54'-6			2½	(See Notes)	1'-1	120	26.809	f(-0.000), CV(19'-2½), BV(9'-7 ½), E(8'-3)
9	52'-2		66.82	2.6350		37'-1	0.013661	1.004	
						38'-2		0.521	
9	52'-2			2½	(See Notes)	1'-6	120	28.335	PO(12'-0)
8	52'-2		66.82	2.7050		12'-0	0.012024		
						13'-6		0.162	
8	52'-2			4	(See Notes)	40'-4	120	28.497	E(10'-0)
7	11'-10		66.82	4.3100		10'-0	0.001244	17.486	
						50'-4		0.063	

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
						Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Total (Foot)		Friction(Pf)	
7	11'-10			4	(See Notes)	79'-5	120	46.045	2E(10'-0), BV(12'-0), T(20'-0), LtE(6'-0)
6	1'-2		66.82	4.3100		58'-0	0.001244	4.624	
						137'-5		0.171	
6	1'-2			6		0'-0	140	50.841	
5	1'-0		66.82	6.2800			0.000150	0.072	
						0'-0		0.000	
5	1'-0			6	(See Notes)	57'-7	140	50.913	2E(22'-1), CV(50'-5), PIV(4'-8½), T(47'-3½)
4	-3'-6		66.82	6.2800		146'-6½	0.000150	1.951	
						204'-2		0.031	
4	-3'-6			8	(See Notes)	47'-0½	150	52.894	E(27'-2)
3	-3'-6		66.82	7.9800		27'-2	0.000041		
						74'-2½		0.003	
3	-3'-6			8	(See Notes)	17'-0½	140	52.897	3E(30'-6½), BFP(-5.280)
2	-3'-6		66.82	8.3900		91'-7½	0.000036		
						108'-8		5.284	
2	-3'-6			8	(See Notes)	24'-8	150	58.181	S
1	-3'-6		66.82	7.9800		52'-10	0.000041		
						77'-5½		0.003	
			100.00					58.184	Hose Allowance At Source
1			166.82						Total(Pt) Route 1
103	57'-1	4.9	16.06	1	(See Notes)	2'-1	150	10.740	Route 2..... Sprinkler, E(7'-0)
17	57'-8½		16.06	1.1010		7'-0	0.045332	-0.262	
						9'-1		0.412	
								10.890	Total(Pt) Route 2
102	57'-1	4.9	17.07	1	(See Notes)	0'-7½	150	12.136	Route 3..... Sprinkler, T(5'-0)
16	57'-8½		17.07	1.1010		5'-0	0.050758	-0.262	
						5'-7½		0.284	
								12.159	Total(Pt) Route 3
101	57'-1	4.9	18.19	1	(See Notes)	1'-10	150	13.779	Route 4..... Sprinkler, E(7'-0), T(5'-0)
15	57'-8½		18.19	1.1010		12'-0	0.057082	-0.262	
						13'-10		0.791	
								14.308	Total(Pt) Route 4

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)

C Value Multiplier

$$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$$

Value Of C	100	130	140	150
Multiplying Factor	0.713	1.16	1.33	1.51

Fittings Legend

ALV	Alarm Valve	AngV	Angle Valve	b	Bushing
BaIV	Ball Valve	BFP	Backflow Preventer	BV	Butterfly Valve
C	Cross Flow Turn 90°	cplg	Coupling	Cr	Cross Run
CV	Check Valve	DelV	Deluge Valve	DPV	Dry Pipe Valve
E	90° Elbow	EE	45° Elbow	Ee1	11¼° Elbow
Ee2	22½° Elbow	f	Flow Device	fd	Flex Drop
FDC	Fire Department Connection	fE	90° FireLock(TM) Elbow	fEE	45° FireLock(TM) Elbow
flg	Flange	FN	Floating Node	fT	FireLock(TM) Tee
g	Gauge	GloV	Globe Valve	GV	Gate Valve
Ho	Hose	Hose	Hose	HV	Hose Valve
Hyd	Hydrant	LtE	Long Turn Elbow	mecT	Mechanical Tee
Noz	Nozzle	P1	Pump In	P2	Pump Out
PIV	Post Indicating Valve	PO	Pipe Outlet	PrV	Pressure Relief Valve
PRV	Pressure Reducing Valve	red	Reducer/Adapter	S	Supply
sCV	Swing Check Valve	SFx	Seismic Flex	Spr	Sprinkler
St	Strainer	T	Tee Flow Turn 90°	Tr	Tee Run
U	Union	WirF	Wirsbo	WMV	Water Meter Valve
Z	Cap				

Hydraulic Calculations

for

Project Name: Home2 Suites by Hilton

Location: 550 Gateway Boulevard, South San Francisco, CA,

Drawing Name: FLOOR 5&6.cad

Calculation Date: 12/20/2017

Design

Remote Area Number: 6.1
Remote Area Location: SIXTH FLOOR OFFICE SPACE
Occupancy Classification: Light Hazard
Commodity Classification: N/A

Density: 0.10gpm/ft²
Area of Application: 1500ft² (Actual 982.84ft²)
Coverage per Sprinkler: 150ft²
Type of sprinklers calculated: Pendent
No. of sprinklers calculated: 9

In-rack Demand: N/A gpm at Node: N/A
Hose Streams: 100.00 at Node: 1 Type: Allowance at Source

Total Water Required (including Hose Streams where applicable):
From Water Supply at Node 1: 239.54 @ 61.653
Type of System: Wet
Volume of Dry or PreAction System: N/A

for Node: 1 Date: 6/9/2017
Location: 550 Gateway & Corporate Dr.
Source: ACKER

Name of Contractor: Aegis Fire Systems
Address: 500 Boulder Court - A, Pleasanton, CA 94566
Phone Number: (925) 417-5550
Name of designer: B. Williams
Authority Having Jurisdiction: San Francisco Fire Dept.

Notes:

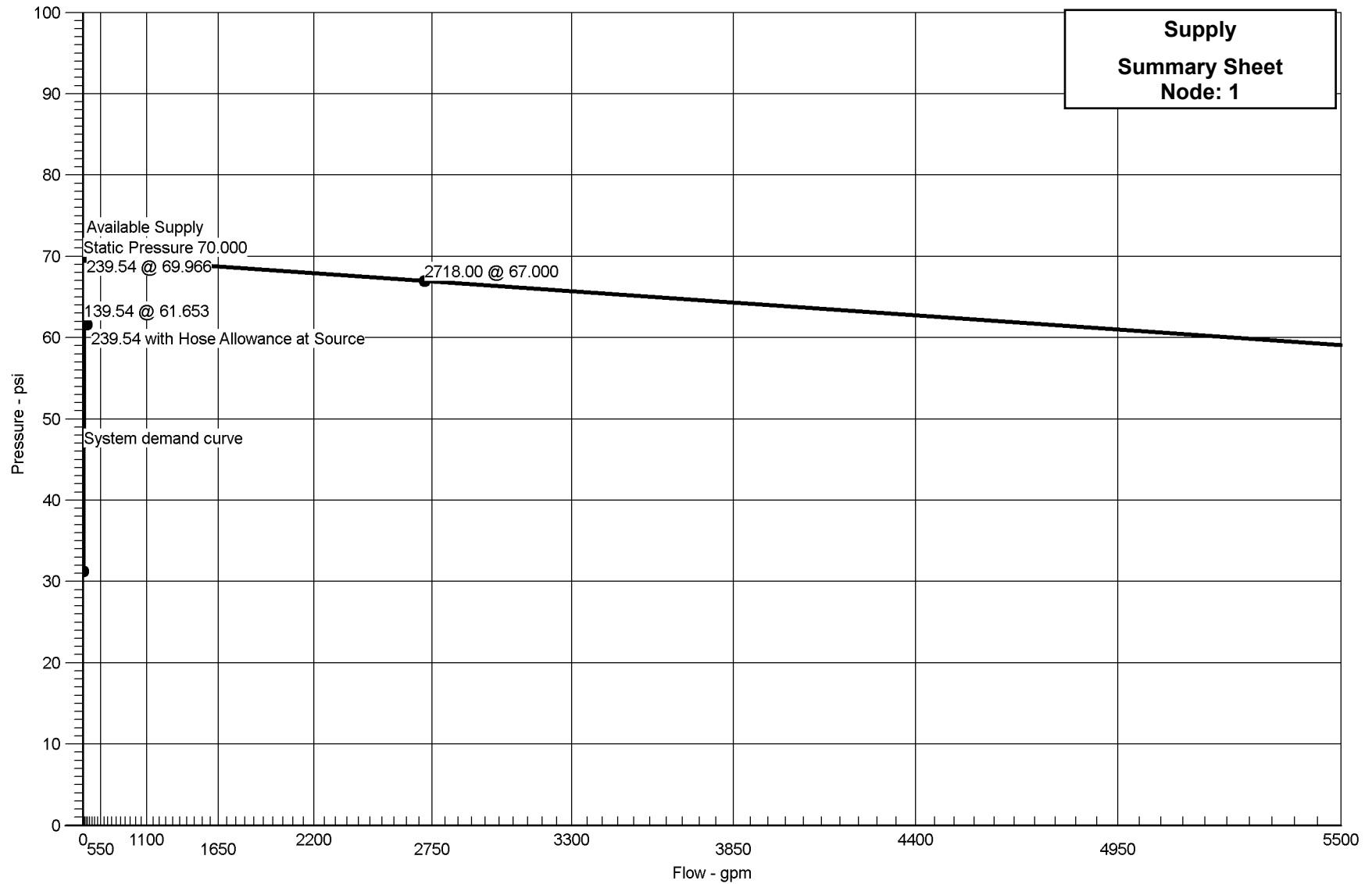
Automatic peaking results Left: N/A Right: N/A

Hydraulic Graph

Job Name: Home2 Suites by Hilton
Remote Area Number: 6.1

N 1.85

Date: 12/20/2017



Supply Analysis

Node	Name	Static (psi)	Residual (psi)	@ Flow (gpm)	Available (psi)	@ Total Demand (gpm)	Required Pressure (psi)
1	Water Supply	70.000	67.000	2718.00	69.966	239.54	61.653

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
1	-3'-6	Supply	61.653	139.54	
105	68'-9½	Sprinkler	7.292	15.12	
106	68'-9½	Sprinkler	7.175	15.00	
107	68'-9½	Sprinkler	7.404	15.24	
108	68'-9½	Sprinkler	7.916	15.76	
109	68'-9½	Sprinkler	7.285	15.11	
110	68'-9½	Sprinkler	7.799	15.64	
111	68'-9½	Sprinkler	8.050	15.89	
112	68'-9½	Sprinkler	7.991	15.83	
1252	68'-9½	Sprinkler	8.120	15.96	
2	-3'-6		61.640		
3	-3'-6		55.531		
4	-3'-6		55.519		
5	1'-0		53.449		
6	1'-2		53.377		
7	11'-10		48.085		
8	52'-2		30.355		
9	52'-2		29.721		
10	54'-6		26.681		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
11	57'-0½		25.452		
18	69'-3		7.853		
19	69'-3		8.400		
20	69'-3		8.521		
21	69'-3		7.725		
22	69'-3		8.727		
23	69'-3		8.793		
24	69'-3		12.311		
25	57'-0½		18.357		
845	69'-3		8.557		

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
						Total (Foot)		Friction(Pf)	
106	68'-9½"	5.6	15.00	1	(See Notes)	6'-6"	150	7.175	••••• Route 1 ••••• Sprinkler, E(7'-0"), T(5'-0")
21	69'-3"		15.00	1.1010		12'-0"	0.039961	-0.190	
						18'-6"		0.739	
21	69'-3"		15.11	1¼"	(See Notes)	8'-8½"	150	7.725	Flow (q) from Route 2 PO(6'-0")
						6'-0"	0.045978		
19	69'-3"		30.11	1.3940		14'-8½"		0.676	
19	69'-3"		30.36	2½"		12'-1"	120	8.400	Flow (q) from Route 3
							0.009998		
20	69'-3"		60.47	2.7050		12'-1"		0.121	
20	69'-3"		15.64 + 15.76	2½"		1'-8"	120	8.521	Flow (q) from Route 5 and 6
							0.021670		
845	69'-3"		91.87	2.7050		1'-8"		0.036	
845	69'-3"		15.96	2½"		5'-10"	120	8.557	Flow (q) from Route 9
							0.029143		
22	69'-3"		107.83	2.7050		5'-10"		0.170	
22	69'-3"		15.89	2½"		1'-9"	120	8.727	Flow (q) from Route 8
							0.037582		
23	69'-3"		123.71	2.7050		1'-9"		0.066	
23	69'-3"		15.83	2½"	(See Notes)	58'-11"	120	8.793	Flow (q) from Route 7 4LtE(4'-0")
						16'-0"	0.046959		
24	69'-3"		139.54	2.7050		74'-11"		3.518	
24	69'-3"			2½"	(See Notes)	12'-2½"	120	12.311	LtE(4'-0")
						4'-0"	0.046959	5.285	
25	57'-0½"		139.54	2.7050		16'-2½"		0.760	
25	57'-0½"			2½"	(See Notes)	127'-1"	120	18.357	3LtE(4'-0"), T(12'-0")
						24'-0"	0.046959	0.000	
11	57'-0½"		139.54	2.7050		151'-1"		7.095	
11	57'-0½"			2½"		2'-6½"	120	25.452	
							0.046959	1.109	
10	54'-6"		139.54	2.7050		2'-6½"		0.120	
10	54'-6"			2½"	(See Notes)	1'-1"	120	26.681	f(-0.000), CV(19'-2½"), BV(9'-7 ½"), E(8'-3")
						37'-1"	0.053354	1.004	
9	52'-2"		139.54	2.6350		38'-2"		2.035	

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
						Total (Foot)		Friction(Pf)	
9	52'-2			2½	(See Notes)	1'-6	120	29.721	PO(12'-0)
8	52'-2		139.54	2.7050		12'-0	0.046959		
						13'-6		0.634	
8	52'-2			4	(See Notes)	40'-4	120	30.355	E(10'-0)
7	11'-10		139.54	4.3100		10'-0	0.004858	17.486	
						50'-4		0.245	
7	11'-10			4	(See Notes)	79'-5	120	48.085	2E(10'-0), BV(12'-0), T(20'-0), LtE(6'-0)
6	1'-2		139.54	4.3100		58'-0	0.004858	4.624	
						137'-5		0.667	
6	1'-2			6		0'-0	140	53.377	
								0.072	
5	1'-0		139.54	6.2800		0'-0	0.000584	0.000	
5	1'-0			6	(See Notes)	57'-7	140	53.449	2E(22'-1), CV(50'-5), PIV(4'-8½) , T(47'-3½)
4	-3'-6		139.54	6.2800		146'-6½	0.000584	1.951	
						204'-2		0.119	
4	-3'-6			8	(See Notes)	47'-0½	150	55.519	E(27'-2)
3	-3'-6		139.54	7.9800		27'-2	0.000160		
						74'-2½		0.012	
3	-3'-6			8	(See Notes)	17'-0½	140	55.531	3E(30'-6½), BFP(-6.094)
2	-3'-6		139.54	8.3900		91'-7½	0.000142		
						108'-8		6.109	
2	-3'-6			8	(See Notes)	24'-8	150	61.640	S
1	-3'-6		139.54	7.9800		52'-10	0.000160		
						77'-5½		0.012	
			100.00					61.653	Hose Allowance At Source
1			239.54						Total(Pt) Route 1
109	68'-9½	5.6	15.11	1	(See Notes)	3'-6½	150	7.285	 Route 2 Sprinkler, E(7'-0), T(5'-0)
						12'-0	0.040528	-0.190	
21	69'-3		15.11	1.1010		15'-6½		0.629	
								7.725	Total(Pt) Route 2

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
						Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Total (Foot)		Friction(Pf)	
105	68'-9½	5.6	15.12	1	(See Notes)	6'-6	150	7.292	***** Route 3 ***** Sprinkler, E(7'-0), T(5'-0)
18	69'-3		15.12	1.1010		12'-0	0.040565	-0.190	
						18'-6		0.751	
18	69'-3		15.24	1¼	(See Notes)	5'-8½	150	7.853	Flow (q) from Route 4 PO(6'-0)
19	69'-3		30.36	1.3940		6'-0	0.046673		
						11'-8½		0.547	
								8.400	Total(Pt) Route 3
107	68'-9½	5.6	15.24	1	(See Notes)	3'-6½	150	7.404	***** Route 4 ***** Sprinkler, E(7'-0), T(5'-0)
18	69'-3		15.24	1.1010		12'-0	0.041140	-0.190	
						15'-6½		0.639	
								7.853	Total(Pt) Route 4
110	68'-9½	5.6	15.64	1	(See Notes)	9'-1½	150	7.799	***** Route 5 ***** Sprinkler, E(7'-0), PO(5'-0)
20	69'-3		15.64	1.1010		12'-0	0.043165	-0.190	
						21'-1½		0.912	
								8.521	Total(Pt) Route 5
108	68'-9½	5.6	15.76	1	(See Notes)	6'-2	150	7.916	***** Route 6 ***** Sprinkler, E(7'-0), PO(5'-0)
20	69'-3		15.76	1.1010		12'-0	0.043765	-0.190	
						18'-2		0.795	
								8.521	Total(Pt) Route 6
112	68'-9½	5.6	15.83	1	(See Notes)	10'-6	150	7.991	***** Route 7 ***** Sprinkler, E(7'-0), PO(5'-0)
23	69'-3		15.83	1.1010		12'-0	0.044146	-0.190	
						22'-6		0.992	
								8.793	Total(Pt) Route 7
111	68'-9½	5.6	15.89	1	(See Notes)	7'-6	150	8.050	***** Route 8 ***** Sprinkler, E(7'-0), PO(5'-0)
22	69'-3		15.89	1.1010		12'-0	0.044448	-0.190	
						19'-6		0.867	
								8.727	Total(Pt) Route 8
1252	68'-9½	5.6	15.96	1	(See Notes)	2'-0	150	8.120	***** Route 9 ***** Sprinkler, E(7'-0), PO(5'-0)
845	69'-3		15.96	1.1010		12'-0	0.044808	-0.190	
						14'-0		0.627	
								8.557	Total(Pt) Route 9

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)

C Value Multiplier

$$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$$

Value Of C	100	130	140	150
Multiplying Factor	0.713	1.16	1.33	1.51

Fittings Legend

ALV	Alarm Valve	AngV	Angle Valve	b	Bushing
BaIV	Ball Valve	BFP	Backflow Preventer	BV	Butterfly Valve
C	Cross Flow Turn 90°	cplg	Coupling	Cr	Cross Run
CV	Check Valve	DelV	Deluge Valve	DPV	Dry Pipe Valve
E	90° Elbow	EE	45° Elbow	Ee1	11¼° Elbow
Ee2	22½° Elbow	f	Flow Device	fd	Flex Drop
FDC	Fire Department Connection	fE	90° FireLock(TM) Elbow	fEE	45° FireLock(TM) Elbow
flg	Flange	FN	Floating Node	fT	FireLock(TM) Tee
g	Gauge	GloV	Globe Valve	GV	Gate Valve
Ho	Hose	Hose	Hose	HV	Hose Valve
Hyd	Hydrant	LtE	Long Turn Elbow	mecT	Mechanical Tee
Noz	Nozzle	P1	Pump In	P2	Pump Out
PIV	Post Indicating Valve	PO	Pipe Outlet	PrV	Pressure Relief Valve
PRV	Pressure Reducing Valve	red	Reducer/Adapter	S	Supply
sCV	Swing Check Valve	SFx	Seismic Flex	Spr	Sprinkler
St	Strainer	T	Tee Flow Turn 90°	Tr	Tee Run
U	Union	WirF	Wirsbo	WMV	Water Meter Valve
Z	Cap				

Hydraulic Calculations

for

Project Name: Home2 Suites by Hilton

Location: 550 Gateway Boulevard, South San Francisco, CA,

Drawing Name: SP CALC

Calculation Date: 12/20/2017

Design

Remote Area Number:

Occupancy Classification: Standpipes

Commodity Classification: N/A

Density: N/A

Area of Application: N/A

Coverage per Sprinkler: N/A

Type of sprinklers calculated: N/A

No. of sprinklers calculated: 0

In-rack Demand: N/A gpm at Node: N/A

Hose Streams: 0.0 gpm at Node: 9000 Type: Allowance at Source

250.00 at Node: 9004 Type: Hose

250.00 at Node: 9008 Type: Hose

250.00 at Node: 9012 Type: Hose

250.00 at Node: 9013 Type: Hose

Total Water Required (including Hose Streams where applicable):

From FDC Supply at Node 9000: 1000.00 @ 170.034

Type of System: Class I Manual Wet

Volume of Dry or PreAction System: N/A

Name of Contractor: Aegis Fire Systems

Address: 500 Boulder Court - A, Pleasanton, CA

Phone Number: 94566 (925) 417-5550

Name of designer: B. Williams

Authority Having Jurisdiction: San Francisco Fire Dept.

Notes:

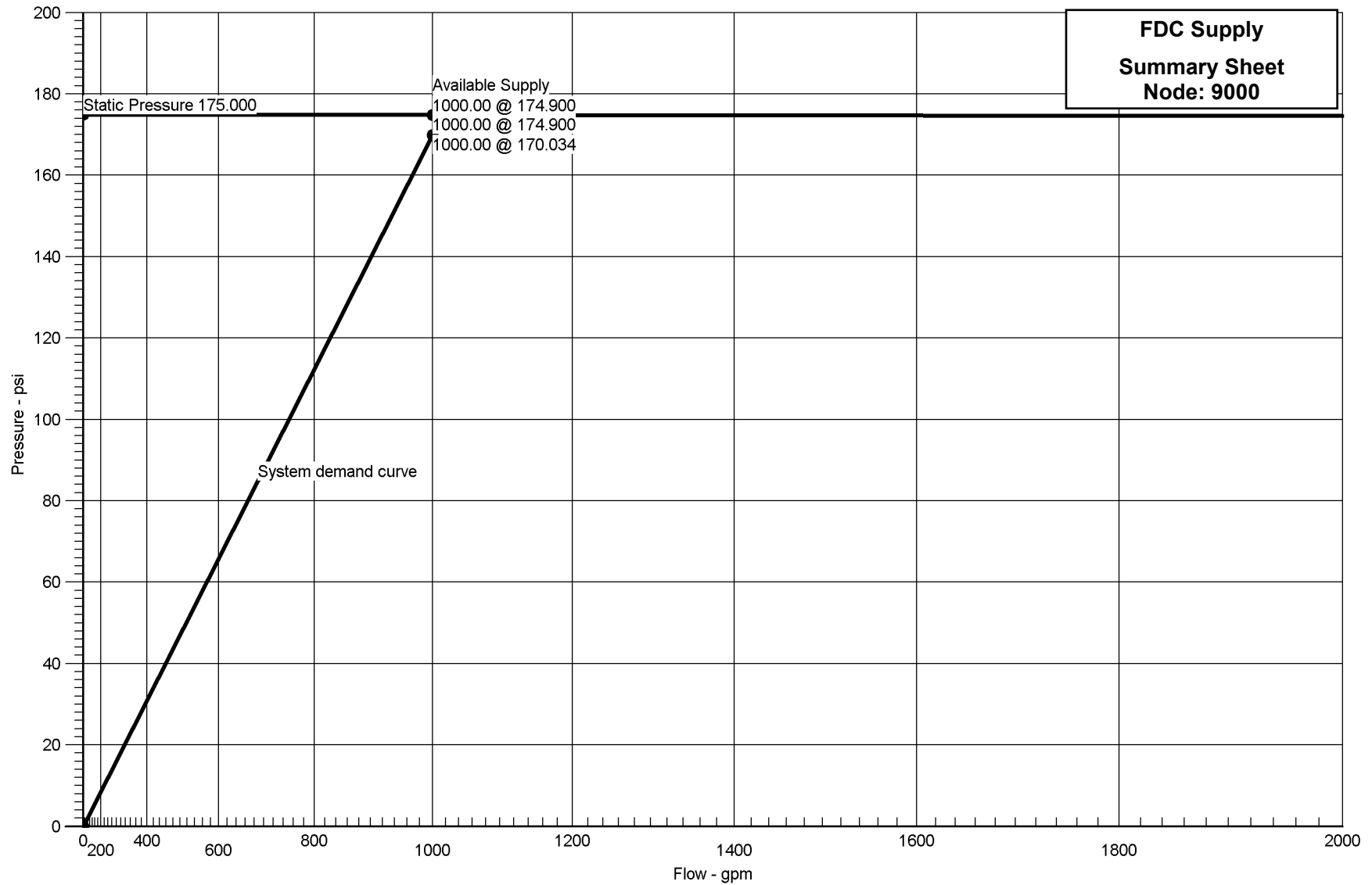
Automatic peaking results Left: N/A Right: N/A

Hydraulic Graph

Job Name: Home2 Suites by Hilton
Remote Area Number:

N 1.85

Date: 12/20/2017



Supply Analysis

Node	Name	Static (psi)	Residual (psi) @	Flow (gpm)	Available (psi) @	Total Demand (gpm)	Required Pressure (psi)
9000	FDC Supply	175.000	174.900	1000.00	174.900	1000.00	170.034

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
9000	0'-0	Supply	170.034	1000.00	
9004	57'-9	Hose	124.365	250.00	Hos
9008	58'-9	Hose	108.485	250.00	Hos
9012	59'-3	Hose	100.000	250.00	Hos
9013	59'-3	Hose	100.000	250.00	Hos
5	-3'-0		167.056		
6	-2'-10		166.984		
7	7'-10		152.581		
238	59'-3		104.488		
9001	-3'-2		171.295		
9002	7'-10		153.892		
9003	57'-9		130.084		
9005	7'-10		138.179		
9006	7'-10		137.677		
9007	58'-9		114.205		
9009	7'-10		130.457		
9010	59'-3		103.830		
9011	59'-3		103.000		

Pipe Information

Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Fitting (Foot) Total (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe) Friction(Pf)	
Node 2									
9013	59'-3		250.00	2½	(See Notes)	0'-0	120	100.000	***** Route 1 ***** Hose(-100.000)(-3.000) FDC
9011	59'-3		250.00	2.4690			0.215409		
						0'-0		3.000	
9011	59'-3		250.00	4	(See Notes)	1'-6½	120	103.000	Flow (q) from Route 2 E(10'-0)
						10'-0	0.071781		
9010	59'-3		500.00	4.0260		11'-6½		0.830	
9010	59'-3			4	(See Notes)	2'-9½	120	103.830	E(10'-0)
						10'-0	0.051504		
238	59'-3		500.00	4.3100		12'-9½		0.659	
238	59'-3			4	(See Notes)	51'-5	120	104.488	T(20'-0)
						20'-0	0.051504	22.291	
9009	7'-10		500.00	4.3100		71'-5		3.678	
9009	7'-10			4	(See Notes)	117'-11	120	130.457	2E(10'-0), BV(12'-0)
						32'-0	0.051504	-0.000	
9005	7'-10		500.00	4.3100		149'-11		7.722	
9005	7'-10		250.00	4	(See Notes)	118'-1	120	138.179	Flow (q) from Route 3 LtE(6'-0), T(20'-0)
						26'-0	0.109047	0.000	
9002	7'-10		750.00	4.3100		144'-1		15.713	
9002	7'-10		250.00	4	(See Notes)	39'-7½	120	153.892	Flow (q) from Route 4 LtE(6'-0)
						6'-0	0.185673	4.624	
6	-2'-10		1000.00	4.3100		45'-7½		8.467	
6	-2'-10			6		0'-0	140	166.984	
							0.022322	0.072	
5	-3'-0		1000.00	6.2800		0'-0		0.000	
5	-3'-0			6	(See Notes)	44'-10	140	167.056	2E(22'-1), T(47'-3½), CV(50'-5)
						141'-10	0.022322	0.072	
9001	-3'-2		1000.00	6.2800		186'-8		4.167	
9001	-3'-2			6	(See Notes)	3'-2	120	171.295	S, FDC
							0.035178	-1.373	
9000	0'-0		1000.00	6.0650		3'-2		0.111	
			0.00					170.034	Hose Allowance At Source
9000			1000.00						Total(Pt) Route 1

Pipe Information

Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.	
	Node 2		Elev 2 (Foot)	Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)		Elev(Pe)
			Total (Foot)				Friction(Pf)			
9012	59'-3		250.00	2½	(See Notes)	0'-0	120	100.000	***** Route 2 ***** Hose(-100.000)(-3.000) FDC	
9011	59'-3		250.00	2.4690			0'-0	0.215409		
										3.000
									103.000	Total(Pt) Route 2
9008	58'-9		250.00	2½	(See Notes)	0'-7½	120	108.485	***** Route 3 ***** Hose(-100.000)(-3.000) PO(12'-0)	
9007	58'-9		250.00	2.4690		12'-0	0.215409			
						12'-7½		5.720		
9007	58'-9			4	(See Notes)	57'-11	120	114.205	4E(10'-0)	
9006	7'-10		250.00	4.3100		40'-0	0.014287	22.074		
						97'-11		1.399		
9006	7'-10			4	(See Notes)	3'-1	120	137.677	BV(12'-0), T(20'-0)	
9005	7'-10		250.00	4.3100		32'-0	0.014287			
						35'-1		0.502		
									138.179	Total(Pt) Route 3
9004	57'-9		250.00	2½	(See Notes)	0'-7½	120	124.365	***** Route 4 ***** Hose(-100.000)(-3.000) PO(12'-0)	
9003	57'-9		250.00	2.4690		12'-0	0.215409			
						12'-7½		5.720		
9003	57'-9			4	(See Notes)	49'-11	120	130.084	E(10'-0)	
7	7'-10		250.00	4.3100		10'-0	0.014287	21.640		
						59'-11		0.856		
7	7'-10		288.90	4	(See Notes)	39'-9½	120	152.581	Flow (q) from Route 1 2E(10'-0), BV(12'-0), T(20'-0)	
9002	7'-10		250.00	4.3100		52'-0	0.014287			
						91'-9½		1.311		
									153.892	Total(Pt) Route 4

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)

C Value Multiplier

$$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$$

Value Of C	100	130	140	150
Multiplying Factor	0.713	1.16	1.33	1.51

Fittings Legend

ALV	Alarm Valve	AngV	Angle Valve	b	Bushing
BaIV	Ball Valve	BFP	Backflow Preventer	BV	Butterfly Valve
C	Cross Flow Turn 90°	cplg	Coupling	Cr	Cross Run
CV	Check Valve	DelV	Deluge Valve	DPV	Dry Pipe Valve
E	90° Elbow	EE	45° Elbow	Ee1	11¼° Elbow
Ee2	22½° Elbow	f	Flow Device	fd	Flex Drop
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flg	Flange	FN	Floating Node	fT	FireLock(TM) Tee
g	Gauge	GloV	Globe Valve	GV	Gate Valve
Ho	Hose	Hose	Hose	HV	Hose Valve
Hyd	Hydrant	LtE	Long Turn Elbow	mecT	Mechanical Tee
Noz	Nozzle	P1	Pump In	P2	Pump Out
PIV	Post Indicating Valve	PO	Pipe Outlet	PrV	Pressure Relief Valve
PRV	Pressure Reducing Valve	red	Reducer/Adapter	S	Supply
sCV	Swing Check Valve	SFx	Seismic Flex	Spr	Sprinkler
St	Strainer	T	Tee Flow Turn 90°	Tr	Tee Run
U	Union	WirF	Wirsbo	WMV	Water Meter Valve
Z	Cap				