

Hydraulic Summary

Job

Job Number
NC-1424
Job Name:
Douglas Corner
Address 1
Lot 1 B
Address 2
Lee's Summit, MO 64086
Address 3

System

Most Demanding Sprinkler Data
5.6 K-Factor 24.00 at 18.367
Hose Allowance At Source
250.00
Additional Hose Supplies
Node Flow(gpm)

Total Hose Streams
250.00
System Flow Demand
290.96
Maximum Pressure Unbalance In Loops
0.000
Maximum Velocity Above Ground
16.24 between nodes 3 and 38
Maximum Velocity Under Ground
3.01 between nodes 1 and 3
Volume capacity of Wet Pipes
334.65 gal

Supplies

Node	Name	Hose Flow (gpm)	Static (psi)	Residual (psi)	@	Flow (gpm)	Available (psi)	@	Total Demand (gpm)	Required (psi)	Safety Margin (psi)
1	Water Supply	250.00	80.000	71.000		2050.00	79.235		540.96	56.040	23.194

Contractor

Contractor Number
01
Name of Contractor:
Alliance Fire Protection
Address 1
130 W 9th Ave #101
Address 2
North Kansas City, MO 64116
City State Zip Code

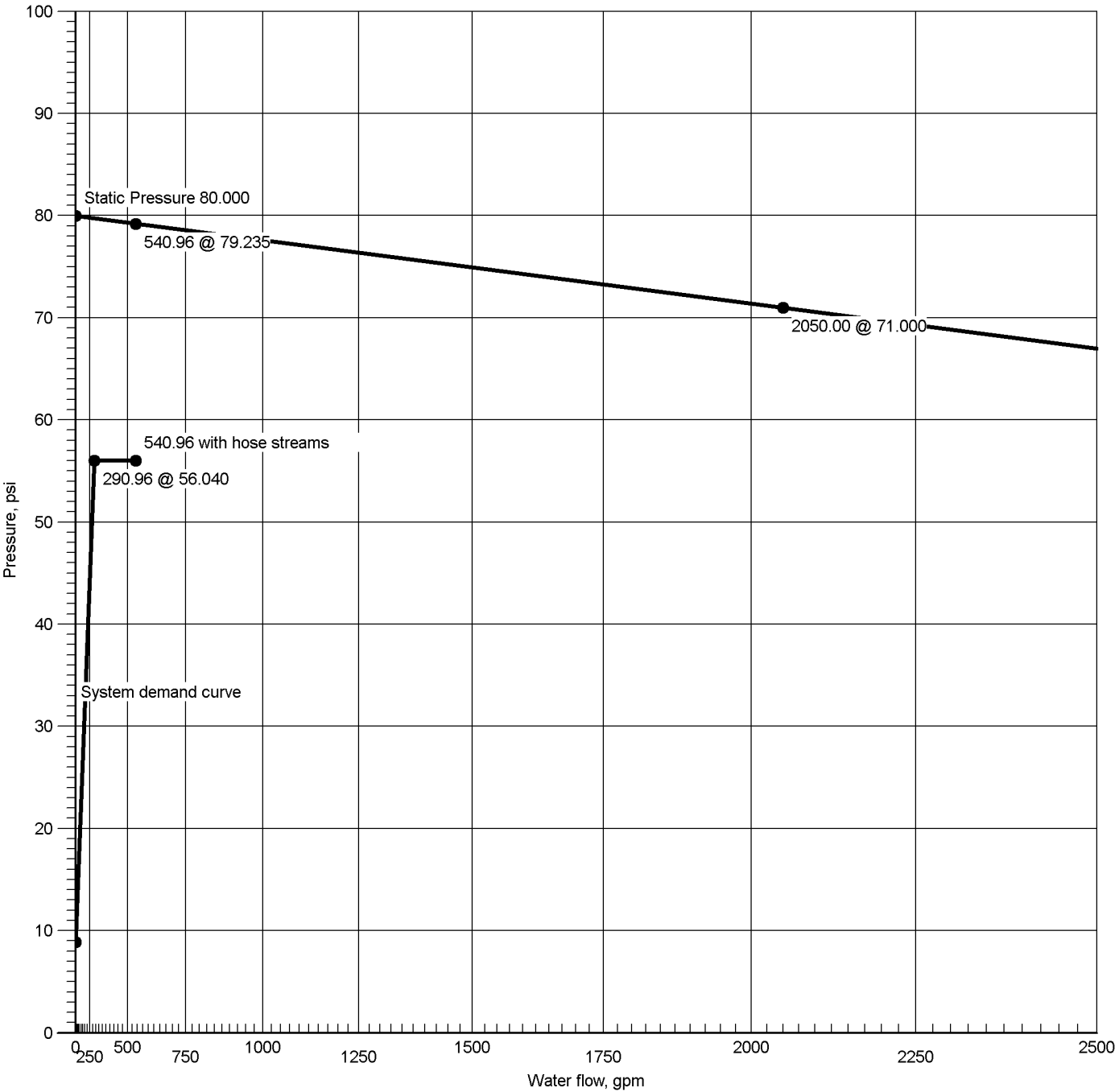
Designer
JJR
State Certification/License Number
AHJ
LS Codes
Job Site/Building
Ord II Haz - Shell
Drawing Name
DC-City-03-22-2024

Remote Area(s)

Occupancy
Ordinary Group II
Density
0.20 gpm/ft²
Area of Application
990 ft² (Actual 1035 ft²)
Number Of Sprinklers Calculated
12
Number Of Nozzles Calculated
0
Coverage Per Sprinkler
120 ft²



Water Supply at Node 1



Hydraulic Graph

Water Supply at Node 1

Static: Pressure
80.000

Residual: Pressure
71.000 @ 2050.00

Available Pressure at {?blTestTime}
79.235 @ 540.96

System Demand
56.040 @ 290.96

System Demand (Including Hose Allowance at Source)
56.040 @ 540.96

Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)
Sprinkler	206	24.12	24.00	5.6	18.548
Sprinkler	207	24.05	24.00	5.6	18.447
Sprinkler	208	24.05	24.00	5.6	18.446
Sprinkler	209	24.12	24.00	5.6	18.554
Sprinkler	210	24.39	24.00	5.6	18.969
Sprinkler	211	24.96	24.00	5.6	19.872
Sprinkler	226	24.08	24.00	5.6	18.495
Sprinkler	227	24.00	24.00	5.6	18.372
➡ Sprinkler	228	24.00	24.00	5.6	18.367
Sprinkler	229	24.06	24.00	5.6	18.452
Sprinkler	230	24.29	24.00	5.6	18.820
Sprinkler	231	24.83	24.00	5.6	19.653

➡ Most Demanding Sprinkler Data

Node Analysis

Job Number: NC-1424
Report Description: Ordinary Group II (Ord II Haz - Retail Shell)

Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)
1	-6'-9½"	S	56.040	290.96
206	13'-9"	Spr(-18.548)	18.548	24.12
207	13'-9"	Spr(-18.447)	18.447	24.05
208	13'-9"	Spr(-18.446)	18.446	24.05
209	13'-9"	Spr(-18.554)	18.554	24.12
210	13'-9"	Spr(-18.969)	18.969	24.39
211	13'-9"	Spr(-19.872)	19.872	24.96
226	13'-9"	Spr(-18.495)	18.495	24.08
227	13'-9"	Spr(-18.372)	18.372	24.00
228	13'-9"	Spr(-18.367)	18.367	24.00
229	13'-9"	Spr(-18.452)	18.452	24.06
230	13'-9"	Spr(-18.820)	18.820	24.29
231	13'-9"	Spr(-19.653)	19.653	24.83
3	1'-2½"		52.208	
7	12'-2"	PO(6'-0)	23.366	
8	12'-2"		22.575	
15	12'-2"	PO(5'-0)	20.453	
17	12'-2"	PO(5'-0)	20.346	
18	12'-2"	PO(5'-0)	20.345	
20	12'-2"	PO(5'-0)	20.460	
21	12'-2"	PO(5'-0)	20.900	
23	12'-2"	PO(5'-0)	21.857	
36	12'-2"	PO(11'-3½")	36.775	
38	12'-2"	fT(16'-10)	37.401	
44	12'-2"	PO(8'-0)	23.611	
45	12'-2"		22.738	
52	12'-2"	PO(5'-0)	20.397	
54	12'-2"	PO(5'-0)	20.267	
55	12'-2"	PO(5'-0)	20.261	
57	12'-2"	PO(5'-0)	20.351	
58	12'-2"	PO(5'-0)	20.741	
60	12'-2"	PO(5'-0)	21.625	
73	12'-2"	PO(11'-3½")	35.650	
82	12'-2"	PO(8'-0)	24.540	
83	12'-2"		25.423	
111	12'-2"	PO(11'-3½")	35.308	
138	12'-2"	PO(8'-0)	24.791	
139	12'-2"		25.573	
154	12'-2"	PO(11'-3½")	35.186	

Hydraulic Analysis

Job Number: NC-1424

Report Description: Ordinary Group II (Ord II Haz - Retail Shell)

Pipe Type Downstream Upstream	Diameter Elevation	Flow Discharge	Velocity K-Factor	HWC Pt	Pn	Friction Loss Fittings	Length Eq. Length Total Length	Pressure Summary
***** Route 1 *****								
SP	1.0490	24.00	8.91	120		0.182334	1'-7	Pf 1.203
228	13'-9	24.00	5.6	18.367		Sprinkler,	5'-0	Pe 0.691
55	12'-2			20.261		PO(5'-0)	6'-7	Pv
BL	1.7280	19.75	2.70	120		0.011179	8'-0	Pf 0.089
55	12'-2			20.261				Pe
57	12'-2			20.351			8'-0	Pv
BL	1.7280	43.80	5.99	120		0.048814	8'-0	Pf 0.391
57	12'-2	24.06		20.351		Flow (q) from Route 5		Pe
58	12'-2			20.741			8'-0	Pv
BL	1.7280	68.09	9.32	120		0.110425	8'-0	Pf 0.883
58	12'-2	24.29		20.741		Flow (q) from Route 9		Pe
60	12'-2			21.625			8'-0	Pv
BL	1.7280	92.92	12.71	120		0.196253	60'-2	Pf 14.025
60	12'-2	24.83		21.625		Flow (q) from Route 11	11'-3½	Pe
73	12'-2			35.650		PO(11'-3½)	71'-5½	Pv
CM	2.7050	194.89	10.88	120		0.087116	3'-3	Pf 1.751
73	12'-2	101.97		35.650		Flow (q) from Route 2	16'-10	Pe
38	12'-2			37.401		FT(16'-10)	20'-1	Pv
FM	2.7050	290.96	16.24	120		0.182846	16'-11½	Pf 10.057
38	12'-2	96.07		37.401		Flow (q) from Route 3	13'-5	Pe 4.751
3	1'-2½			52.208		2fE(6'-8½), BFP(-4.500)	30'-4½	Pv
UG	6.2800	290.96	3.01	140		0.002274	138'-0	Pf 0.364
3	1'-2½			52.208			22'-1	Pe 3.468
1	-6'-9½			56.040		E(22'-1), S	160'-1	Pv
***** Route 2 *****								
SP	1.0490	24.00	8.91	120		0.182379	1'-7	Pf 1.203
227	13'-9	24.00	5.6	18.372		Sprinkler,	5'-0	Pe 0.691
54	12'-2			20.267		PO(5'-0)	6'-7	Pv
BL	1.7280	28.26	3.87	120		0.021698	6'-0	Pf 0.130
54	12'-2	4.25		20.267		Flow (q) from Route 14		Pe
52	12'-2			20.397			6'-0	Pv
BL	1.7280	52.34	7.16	120		0.067870	34'-6	Pf 2.342
52	12'-2	24.08		20.397		Flow (q) from Route 6		Pe
45	12'-2			22.738			34'-6	Pv
BL	1.6100	52.34	8.25	120		0.095779	1'-1½	Pf 0.873
45	12'-2			22.738			8'-0	Pe
44	12'-2			23.611		PO(8'-0)	9'-1½	Pv
CM	2.2030	101.97	8.58	120		0.071421	13'-0	Pf 0.928
44	12'-2	49.63		23.611		Flow (q) from Route 4		Pe
82	12'-2			24.540			13'-0	Pv
CM	2.2030	49.30	4.15	120		0.018616	13'-6	Pf 0.251
82	12'-2			24.540				Pe
138	12'-2			24.791			13'-6	Pv
BL	1.6100	49.30	7.77	120		0.085728	1'-1½	Pf 0.782
138	12'-2			24.791		PO(8'-0)	8'-0	Pe
139	12'-2			25.573			9'-1½	Pv
BL	1.7280	49.30	6.74	120		0.060747	135'-8	Pf 9.614
139	12'-2			25.573			22'-7	Pe
154	12'-2			35.186		4LtE(2'-10), PO(11'-3½)	158'-3	Pv
CM	2.7050	49.30	2.75	120		0.006850	13'-6	Pf 0.122
154	12'-2			35.186			4'-3½	Pe
111	12'-2			35.308		Tr(4'-3½)	17'-9½	Pv
CM	2.7050	101.97	5.69	120		0.026282	13'-0	Pf 0.342
111	12'-2	52.67		35.308		Flow (q) from Route 13		Pe
73	12'-2			35.650			13'-0	Pv
***** Route 3 *****								
SP	1.0490	24.05	8.93	120		0.183058	1'-7	Pf 1.207
208	13'-9	24.05	5.6	18.446		Sprinkler,	5'-0	Pe 0.691
18	12'-2			20.345		PO(5'-0)	6'-7	Pv
BL	1.7280	22.60	3.09	120		0.014347	8'-0	Pf 0.115
18	12'-2			20.345				Pe
20	12'-2			20.460			8'-0	Pv
BL	1.7280	46.72	6.39	120		0.054998	8'-0	Pf 0.440
20	12'-2	24.12		20.460		Flow (q) from Route 8		Pe
21	12'-2			20.900			8'-0	Pv

Hydraulic Analysis

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Report Description: Ordinary Group II (Ord II Haz - Retail Shell)

Pipe Type Downstream Upstream	Diameter Elevation	Flow Discharge	Velocity K-Factor	HWC Pt	Pn	Friction Loss Fittings	Length Eq. Length Total Length	Pressure Summary
BL 21 23	1.7280 12'-2 12'-2	71.11 24.39	9.73	120 20.900 21.857		0.119634 Flow (q) from Route 10	8'-0 8'-0	Pf 0.957 Pe Pv
BL 23 36	1.7280 12'-2 12'-2	96.07 24.96	13.14	120 21.857 36.775		0.208742 Flow (q) from Route 12 PO(11'-3½)	60'-2 11'-3½ 71'-5½	Pf 14.918 Pe Pv
CM 36 38	2.7050 12'-2 12'-2	96.07	5.36	120 36.775 37.401		0.023539 ft(16'-10)	9'-9 16'-10 26'-7	Pf 0.626 Pe Pv
***** Route 4 *****								
SP 207 17	1.0490 13'-9 12'-2	24.05 24.05	8.93 5.6	120 18.447 20.346		0.183064 Sprinkler, PO(5'-0)	1'-7 5'-0 6'-7	Pf 1.207 Pe 0.691 Pv
BL 17 15	1.7280 12'-2 12'-2	25.51 1.46	3.49	120 20.346 20.453		0.017954 Flow (q) from Route 15	6'-0 6'-0	Pf 0.108 Pe Pv
BL 15 8	1.7280 12'-2 12'-2	49.63 24.12	6.79	120 20.453 22.575		0.061501 Flow (q) from Route 7	34'-6 34'-6	Pf 2.122 Pe Pv
BL 8 7	1.6100 12'-2 12'-2	49.63	7.82	120 22.575 23.366		0.086791 PO(8'-0)	1'-1½ 8'-0 9'-1½	Pf 0.791 Pe Pv
CM 7 44	2.2030 12'-2 12'-2	49.63	4.18	120 23.366 23.611		0.018847	13'-0 13'-0	Pf 0.245 Pe Pv
***** Route 5 *****								
SP 229 57	1.0490 13'-9 12'-2	24.06 24.06	8.93 5.6	120 18.452 20.351		0.183108 Sprinkler, PO(5'-0)	1'-7 5'-0 6'-7	Pf 1.208 Pe 0.691 Pv
***** Route 6 *****								
SP 226 52	1.0490 13'-9 12'-2	24.08 24.08	8.94 5.6	120 18.495 20.397		0.183506 Sprinkler, PO(5'-0)	1'-7 5'-0 6'-7	Pf 1.210 Pe 0.691 Pv
***** Route 7 *****								
SP 206 15	1.0490 13'-9 12'-2	24.12 24.12	8.95 5.6	120 18.548 20.453		0.183996 Sprinkler, PO(5'-0)	1'-7 5'-0 6'-7	Pf 1.213 Pe 0.691 Pv
***** Route 8 *****								
SP 209 20	1.0490 13'-9 12'-2	24.12 24.12	8.95 5.6	120 18.554 20.460		0.184051 Sprinkler, PO(5'-0)	1'-7 5'-0 6'-7	Pf 1.214 Pe 0.691 Pv
***** Route 9 *****								
SP 230 58	1.0490 13'-9 12'-2	24.29 24.29	9.02 5.6	120 18.820 20.741		0.186486 Sprinkler, PO(5'-0)	1'-7 5'-0 6'-7	Pf 1.230 Pe 0.691 Pv
***** Route 10 *****								
SP 210 21	1.0490 13'-9 12'-2	24.39 24.39	9.05 5.6	120 18.969 20.900		0.187855 Sprinkler, PO(5'-0)	1'-7 5'-0 6'-7	Pf 1.239 Pe 0.691 Pv
***** Route 11 *****								
SP 231 60	1.0490 13'-9 12'-2	24.83 24.83	9.22 5.6	120 19.653 21.625		0.194110 Sprinkler, PO(5'-0)	1'-7 5'-0 6'-7	Pf 1.280 Pe 0.691 Pv
***** Route 12 *****								
SP 211 23	1.0490 13'-9 12'-2	24.96 24.96	9.27 5.6	120 19.872 21.857		0.196109 Sprinkler, PO(5'-0)	1'-7 5'-0 6'-7	Pf 1.293 Pe 0.691 Pv
***** Route 13 *****								
BL 82 83	1.6100 12'-2 12'-2	52.67	8.30	120 24.540 25.423		0.096898 PO(8'-0)	1'-1½ 8'-0 9'-1½	Pf 0.883 Pe Pv
BL 83 111	1.7280 12'-2 12'-2	52.67	7.21	120 25.423 35.308		0.068662 PO(11'-3½)	132'-8 11'-3½ 143'-11½	Pf 9.885 Pe Pv
***** Route 14 *****								
BL 55 54	1.7280 12'-2 12'-2	4.25 19.75	0.58	120 20.261 20.267		0.000653 Flow (q) from Route 1	8'-0 8'-0	Pf 0.005 Pe Pv

Hydraulic Analysis

Job Number: NC-1424

Report Description: Ordinary Group II (Ord II Haz - Retail Shell)

Pipe Type Downstream Upstream	Diameter Elevation	Flow Discharge	Velocity K-Factor	HWC Pt	Pn	Friction Loss Fittings	Length Eq. Length Total Length	Pressure Summary
.....Route 15.....								
BL	1.7280	1.46	0.20	120		0.000090		8'-0 Pf 0.001
18	12'-2	22.60		20.345		Flow (q) from Route 3		Pe
17	12'-2			20.346				8'-0 Pv

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

Pipe Type Legend

AO	Arm-Over	Diameter	Inch
BL	Branch Line	Elevation	Foot
CM	Cross Main	Flow	gpm
DN	Drain	Discharge	gpm
DR	Drop	Velocity	fps
DY	Dynamic	Pressure	psi
FM	Feed Main	Length	Foot
FR	Feed Riser	Friction Loss	psi/Foot
MS	Miscellaneous	HWC	Hazen-Williams Constant
OR	Outrigger	Pt	Total pressure at a point in a pipe
RN	Riser Nipple	Pn	Normal pressure at a point in a pipe
SN	Swing Nipple	Pf	Pressure loss due to friction between points
SP	Sprig	Pe	Pressure due to elevation difference between indicated points
ST	Stand Pipe	Pv	Velocity pressure at a point in a pipe
UG	Underground		

Units Legend

Fittings Legend

ALV	Alarm Valve
AngV	Angle Valve
b	Bushing
BalV	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

