Hydraulic Summary

Job Number: NC-1461
Report Description: Ordinary Group II

Job

Job Number
NC-1461

Job Name:
Flex Spaces

Address 1
60 SE Thompson Dr

Address 2
Lee's Summit, MO 64081

Address 3

Designer

State Certification/License Number

AHJ
LS Codes

Job Site/Building
Ord II Haz - Shell

Drawing Name
FlexSpace-B-City-QR-REV-02-27-2025

System

Most Demanding Sprinkler Data
5.6 K-Factor 23.60 at 17.760

Hose Allowance At Source
0.00

Additional Hose Supplies

Node	Flow(gpm)
Hydrant At Node 12	250.00

Remote Area(s)

Occupancy
Ordinary Group II

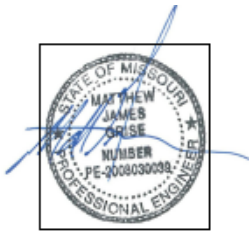
Density
0.20gpm/ft²

Area of Application
1069ft² (Actual 1173ft²)

Number Of Sprinklers Calculated
10

Number Of Nozzles Calculated
0

Coverage Per Sprinkler
120ft²



Total Hose Streams
250.00

System Flow Demand
500.98

Total Water Required (Including Hose Allowance)
500.98

Maximum Pressure Unbalance In Loops
0.000

Maximum Velocity Above Ground
19.43 between nodes 381 and 383

Maximum Velocity Under Ground
5.19 between nodes 1 and 8

Volume capacity of Wet Pipes
537.07gal

Volume capacity of Dry Pipes

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		82.000	40.000		1250.00	74.262		500.98	55.661	18.601

Contractor

Contractor Number
01

Contact Name

Contact Title

Name of Contractor:
Alliance Fire Protection

Phone
913-888-0647

Extension

Address 1
130 W 9th Ave #101

FAX
913-888-0618

Address 2
North Kansas City, MO 64116

E-mail

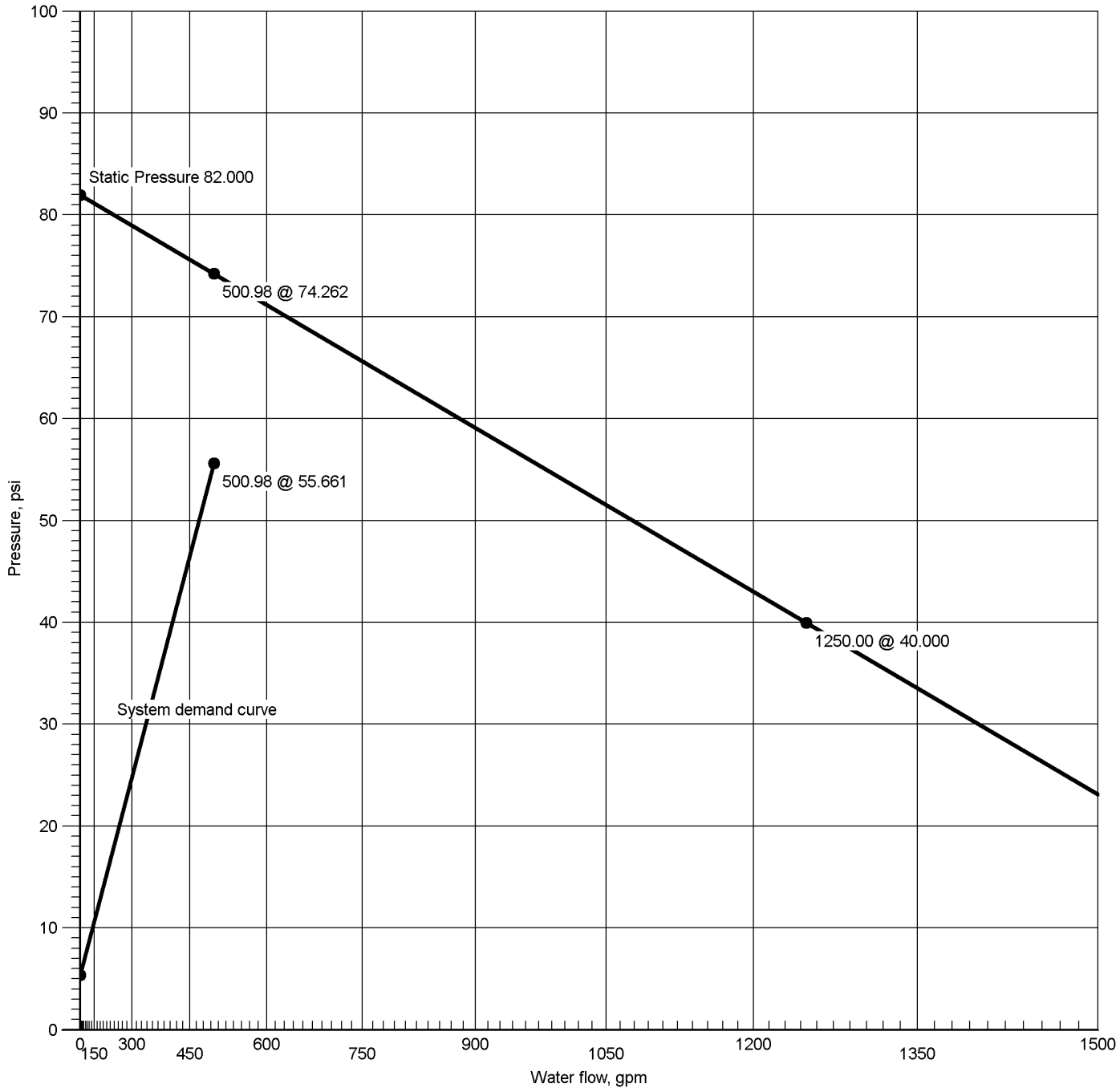
City

State

Zip Code

Web-Site

Water Supply at Node 1



Hydraulic Graph
Water Supply at Node 1

Static: Pressure
82.000

Residual: Pressure
40.000 @ 1250.00

Available Pressure at {?lblTestTime}
74.262 @ 500.98

System Demand
55.661 @ 500.98

System Demand (Including Hose Allowance at Source)
55.661 @ 500.98

Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)
Hydrant	12	250.00	250.00	0	52.547
Sprinkler	623	26.62	23.60	5.6	22.595
Sprinkler	624	26.56	23.60	5.6	22.494
Sprinkler	656	24.74	23.60	5.6	19.524
Sprinkler	657	24.69	23.60	5.6	19.436
Sprinkler	679	26.82	24.00	5.6	22.945
Sprinkler	680	23.89	23.60	5.6	18.204
Sprinkler	681	23.84	23.60	5.6	18.121
Sprinkler	711	26.56	24.00	5.6	22.496
Sprinkler	712	23.65	23.60	5.6	17.841
Sprinkler	**713**	**23.60**	**23.60**	**5.6**	**17.760**

Most Demanding Sprinkler Data

Node Analysis

Job Number: NC-1461
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Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)
1	4'-0	S	55.661	500.98
12	4'-0	Hyd	52.547	250.00
623	16'-6	Spr(-22.595)	22.595	26.62
624	16'-6	Spr(-22.494)	22.494	26.56
656	16'-6	Spr(-19.524)	19.524	24.74
657	16'-6	Spr(-19.436)	19.436	24.69
679	16'-6	Spr(-22.945)	22.945	26.82
680	16'-6	Spr(-18.204)	18.204	23.89
681	16'-6	Spr(-18.121)	18.121	23.84
711	16'-6	Spr(-22.496)	22.496	26.56
712	16'-6	Spr(-17.841)	17.841	23.65
713	16'-6	Spr(-17.760)	17.760	23.60
8	-5'-0	T(47'-3½)	56.600	
203	1'-2		53.850	
377	15'-6	PO(7'-5)	28.527	
381	15'-6	PO(7'-5)	28.086	
383	16'-6	PO(7'-5)	23.169	
384	15'-6	PO(7'-5)	27.964	
386	16'-6	PO(7'-5)	23.066	

Hydraulic Analysis

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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 • • • • •								
BL	1.4420	23.60	4.64	120		0.037530	9'-7½ **Pf**	0.361
713	16'-6	23.60	5.6	17.760		Sprinkler	**Pe**	
681	16'-6			18.121			9'-7½ **Pv**	
BL	1.4420	47.44	9.32	120		0.136565	9'-7½ **Pf**	1.314
681	16'-6	23.84	5.6	18.121		Sprinkler	**Pe**	
657	16'-6			19.436			9'-7½ **Pv**	
BL	1.4420	72.13	14.17	120		0.296465	4'-10 **Pf**	3.630
657	16'-6	24.69	5.6	19.436		Sprinkler,	7'-5 **Pe**	
386	16'-6			23.066		PO(7'-5)	12'-3 **Pv**	
RN	1.4420	98.69	19.39	120		0.529506	1'-0 **Pf**	4.465
386	16'-6	26.56		23.066		Flow (q) from Route 4	7'-5 **Pe**	0.434
384	15'-6			27.964		PO(7'-5)	8'-5 **Pv**	
CM	3.2600	98.69	3.79	120		0.009969	12'-3 **Pf**	0.122
384	15'-6			27.964			**Pe**	
381	15'-6			28.086			12'-3 **Pv**	
CM	3.2600	197.60	7.60	120		0.036014	12'-3 **Pf**	0.441
381	15'-6	98.91		28.086		Flow (q) from Route 2	**Pe**	
377	15'-6			28.527			12'-3 **Pv**	
CM	3.2600	250.98	9.65	120		0.056056	287'-3 **Pf**	19.115
377	15'-6	53.39		28.527		Flow (q) from Route 3	53'-9 **Pe**	6.207
203	1'-2			53.850		2E(9'-5), f(-0.000), BV(13'-5½), sCV(21'-6)	341'-0 **Pv**	
UG	6.2800	250.98	2.60	140		0.001730	18'-5½ **Pf**	0.070
203	1'-2			53.850			22'-1 **Pe**	2.681
8	-5'-0			56.600		E(22'-1)	40'-6½ **Pv**	
UG	6.2800	500.98	5.19	140		0.006215	55'-8 **Pf**	2.953
8	-5'-0	250.00		56.600		Flow (q) from Route 6	22'-1 **Pe**	-3.893
1	4'-0			55.661		BFP(-2.470), E(22'-1), S	77'-8½ **Pv**	
• • • • • Route 2 • • • • •								
BL	1.4420	23.65	4.65	120		0.037688	9'-7½ **Pf**	0.363
712	16'-6	23.65	5.6	17.841		Sprinkler	**Pe**	
680	16'-6			18.204			9'-7½ **Pv**	
BL	1.4420	47.55	9.34	120		0.137141	9'-7½ **Pf**	1.320
680	16'-6	23.89	5.6	18.204		Sprinkler	**Pe**	
656	16'-6			19.524			9'-7½ **Pv**	
BL	1.4420	72.29	14.20	120		0.297713	4'-10 **Pf**	3.645
656	16'-6	24.74	5.6	19.524		Sprinkler,	7'-5 **Pe**	
383	16'-6			23.169		PO(7'-5)	12'-3 **Pv**	
RN	1.4420	98.91	19.43	120		0.531727	1'-0 **Pf**	4.483
383	16'-6	26.62		23.169		Flow (q) from Route 5	7'-5 **Pe**	0.434
381	15'-6			28.086		PO(7'-5)	8'-5 **Pv**	
• • • • • Route 3 • • • • •								
BL	1.4420	26.56	5.22	120		0.046702	9'-7½ **Pf**	0.450
711	16'-6	26.56	5.6	22.496		Sprinkler	**Pe**	
679	16'-6			22.945			9'-7½ **Pv**	
BL	1.4420	53.39	10.49	120		0.169912	15'-5½ **Pf**	5.149
679	16'-6	26.82	5.6	22.945		Sprinkler,	14'-10½ **Pe**	0.434
377	15'-6			28.527		2PO(7'-5)	30'-3½ **Pv**	
• • • • • Route 4 • • • • •								
BL	1.4420	26.56	5.22	120		0.046699	4'-10 **Pf**	0.572
624	16'-6	26.56	5.6	22.494		Sprinkler,	7'-5 **Pe**	
386	16'-6			23.066		PO(7'-5)	12'-3 **Pv**	
• • • • • Route 5 • • • • •								
BL	1.4420	26.62	5.23	120		0.046893	4'-10 **Pf**	0.574
623	16'-6	26.62	5.6	22.595		Sprinkler,	7'-5 **Pe**	
383	16'-6			23.169		PO(7'-5)	12'-3 **Pv**	
• • • • • Route 6 • • • • •								
UG	6.2800	250.00	2.59	140		0.001718	19'-0 **Pf**	0.152
12	4'-0	250.00		52.547		Hydrant,	69'-4 **Pe**	3.902
8	-5'-0			56.600		E(22'-1), T(47'-3½)	88'-4 **Pv**	

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

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

C Value Multiplier

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

Pipe Type	Diameter	Flow	Velocity	HWC		Friction Loss	Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	

Pipe Type Legend

AO	Arm-Over
BL	Branch Line
CM	Cross Main
DN	Drain
DR	Drop
DY	Dynamic
FM	Feed Main
FR	Feed Riser
MS	Miscellaneous
OR	Outrigger
RN	Riser Nipple
SN	Swing Nipple
SP	Sprig
ST	Stand Pipe
UG	Underground

Units Legend

Diameter	Inch
Elevation	Foot
Flow	gpm
Discharge	gpm
Velocity	fps
Pressure	psi
Length	Foot
Friction Loss	psi/Foot
HWC	Hazen-Williams Constant
Pt	Total pressure at a point in a pipe
Pn	Normal pressure at a point in a pipe
Pf	Pressure loss due to friction between points
Pe	Pressure due to elevation difference between indicated points
Pv	Velocity pressure at a point in a pipe

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

Flow Diagram (Current View)