



Submittal Review

Date: January 22, 2023

PKMR# 22.180

Project: DTLS Bank

We have reviewed the following items: ☒ Attached

Returned: ☒ Electronic

☐ Courier

☐ Mail/UPS

Copies Description

1 Fire Protection Design submittal - hydraulic calcs

PEARSON KENT MCKINLEY RAAF ENGINEERS, LLC ENGINEER'S SUBMITTAL REVIEW STAMP

- | | |
|--|---|
| ☒ REVIEWED – NO EXCEPTIONS TAKEN | ☐ REJECTED, RESUBMIT |
| ☐ FURNISH AS NOTED OR CORRECTED | ☐ SUBMIT THE SPECIFIED ITEM(S) |
| ☐ REVISE & RESUBMIT INDICATED ITEMS ONLY | ☒ REVIEWED FOR INFORMATION ONLY |
| ☐ REVISE & RESUBMIT ENTIRE SUBMITTAL | ☐ REFER / RESPOND TO ATTACHED COMMENTS |

Corrections or comments made on these submittals and/or shop drawings during this review do not relieve the contractor from compliance with the requirements of the contract documents, including the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents prepared by Pearson Kent McKinley Raaf Engineers, LLC. The contractor is still responsible for confirming and correlating all quantities and dimensions, selecting all fabrication processes and techniques of construction, coordinating their work with that of all other contractors, and performing their work in a safe and satisfactory manner.

Date 1/22/23 By: KJZ

GENERAL COMMENTS: (Fully review submittal for additional specific comments in document)

☒ Reviewed	☐ Revise & Resubmit for the Record Only
☐ Reviewed as Noted	☐ Rejected, Revise & Resubmit for Review
Submittal was reviewed for design conformity and general conformance with the Contract Documents. This does not relieve the Contractor of responsibility for conformance with drawings, specifications and applicable codes. The Contractor is responsible for coordinating dimensions, quantities, tolerances, clearances and means and methods of construction with all trades so that the work is performed in compliance with the Contract Documents.	
Submittal No. _____	
Date <u>1/23/23</u>	By <u>S.C.</u>
COLLINS WEBB ARCHITECTURE, LLC	

PROJECT: DOWNTOWN LEE'S SUMMIT BANK RENO

JOB # 625

DATE: 1/18/2023

☒ REVIEWED

DIV/SPEC: 15301-01

☐ REVIEWED AS NOTED

DEPT: _____

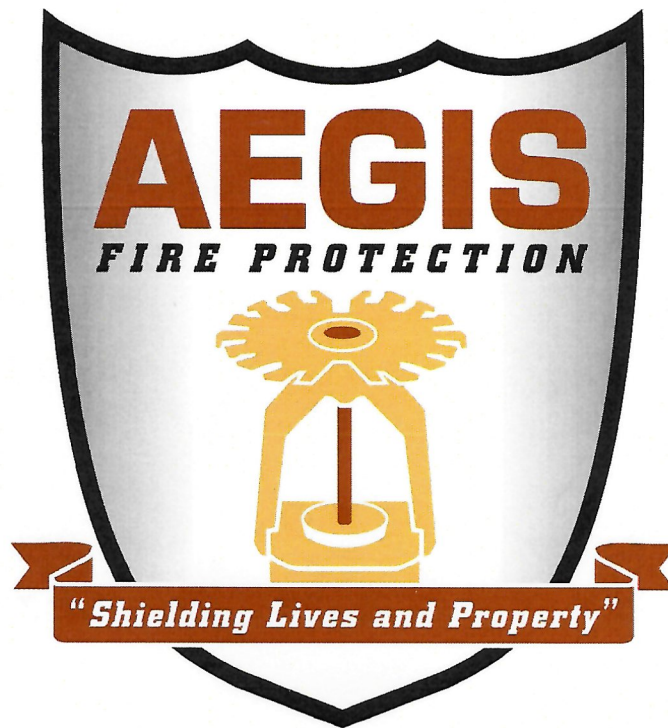
☐ REVISE AND RESUBMIT

CKD BY: Nik Torres

SUBMITTAL HAS BEEN REVIEWED BY JWM CONTRACTING, LLC IN RESPECT TO FIELD CONSTRUCTION CRITERIA AND COMPLIANCE WITH CONTRACT DOCUMENTS IN REVIEWING THIS SUBMITTAL. JWM CONTRACTING, LLC ASSUMES NO RESPONSIBILITY FOR DESIGN CRITERIA AND IN NO WAY RELIEVES SUBCONTRACTOR AND/OR CONTRACT VENDOR OF THEIR RESPONSIBILITY TO FULLY COMPLY WITH CONTRACT DOCUMENTS.

JWM CONTRACTING, LLC

Fire Protection Design- SD and PD



Main Street Building Improvements

**230 SW. Main Street
Lee's Summit, Missouri 64063**

Aegis Contract #18110

Fire Protection Hydraulic Calculations

**Remote Area 1 – Attic Space
Remote Area 2 – 1st Floor Tenant Space
Remote Area 3 – 1st Floor Tenant Space**

**Aegis Fire Protection, LLC 11936 W. 119th Street #262 Overland Park, KS 66213
Phone: 913-825-0343 Fax: 913-322-4475**



Aegis Fire Protection LLC.
13415 W. 98th Street
Lenexa, Kansas 66215
913-825-0343

Job Name : Main Street Building Improvments
Building : 230 SW Main Street
Location : Lee's Summit Missouri 64063
System : 1
Contract : 18110
Data File : AREA1 - ATTIC.WXF

Hydraulic Design Information Sheet

Name - Main Street Building Improvements Date - 1/16/23
Location - Lee's Summit Missouri 64063
Building - 230 SW Main Street System No. - 1
Contractor - Aegis Fire Protection LLC Contract No. - 18110
Calculated By - RKS Drawing No. - FP1
Construction: (x) Combustible () Non-Combustible Ceiling Height - Varies
Occupancy -

S (x) NFPA 13 (x) Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
Y () NFPA 231 () NFPA 231C () Figure Curve

S Other

T Specific Ruling Made By Date

E
M Area of Sprinkler Operation - 1592 System Type Sprinkler/Nozzle
Density - (x) Wet Make Viking
D Area Per Sprinkler - 130 () Dry Model VK696
E Elevation at Highest Outlet - 123.417 () Deluge Size 1/2"
S Hose Allowance - Inside - () Preaction K-Factor 4.2
I Rack Sprinkler Allowance - () Other Temp.Rat.200
G Hose Allowance - Outside - 100 Specific Application Attic Upright
N

Note

Calculation Flow Required - 292.3 Press Required - 60.1 8.25 Psi Safety
Summary C-Factor Used: 150 Overhead 150 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 1/6/23 Cap. -
T Time of Test - 9:50 Rated Cap.- Elev.-
E Static Press - 69 @ Press -
R Residual Press - 52 Elev. - Well
Flow - 1750 Proof Flow
S Elevation - 102

U
P Location -

P
L Source of Information - Lee's Summit Water Utilitis
Y

C Commodity Class Location
O Storage Ht. Area Aisle W.
M Storage Method: Solid Piled % Palletized % Rack
M
S R () Single Row () Conven. Pallet () Auto. Storage () Encap.
T A () Double Row () Slave Pallet () Solid Shelf () Non
O C () Mult. Row () Open Shelf

R K Flue Spacing Clearance:Storage to Ceiling
A Longitudinal Transverse
G

E Horizontal Barriers Provided:

Water Supply Curve C

Aegis Fire Protection LLC.
Main Street Building Improvements

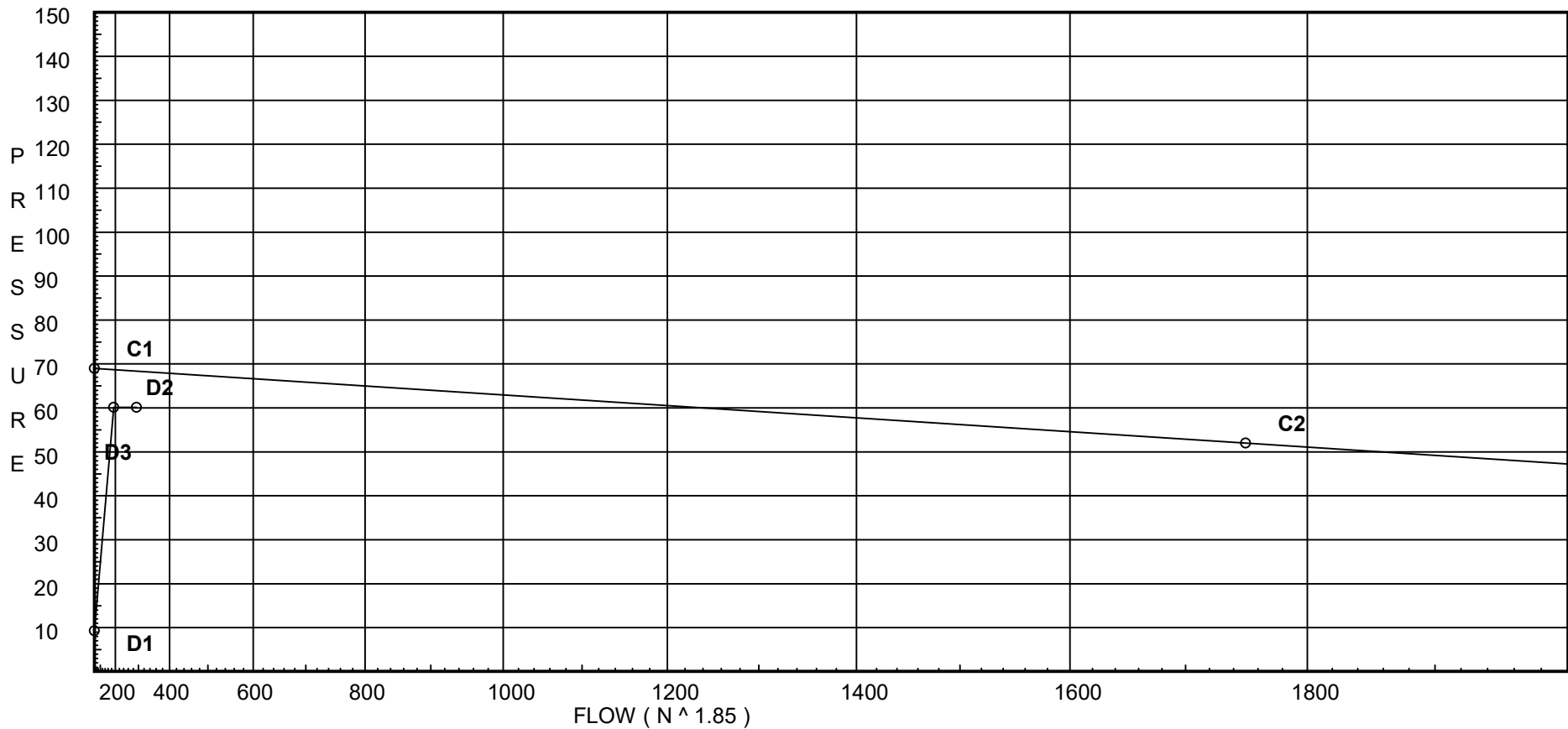
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City Water Supply:

C1 - Static Pressure : 69
C2 - Residual Pressure: 52
C2 - Residual Flow : 1750

Demand:

D1 - Elevation : 9.276
D2 - System Flow : 192.336
D2 - System Pressure : 60.128
Hose (Demand) : 100
D3 - System Demand : 292.336
Safety Margin : 8.252



Fittings Used Summary

Aegis Fire Protection LLC.
Main Street Building Improvments

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Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
L	NFPA 13 Long Turn Elbow	0.5	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
N *	CPVC 90'Ell Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121

Unit Summary

Diameter Units Inches
Length Units Feet
Flow Units US Gallons per Minute
Pressure Units Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

Pressure / Flow Summary - STANDARD

Aegis Fire Protection LLC.
Main Street Building Improvments

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S001	0.0	4.2	8.16	na	12.0	0.1	120	7.0
S002	0.0	4.2	8.16	na	12.0	0.1	120	7.0
1	123.417	K = K @ EQ01	8.68	na	12.0			
2	123.417	K = K @ EQ01	8.97	na	12.2			
3	123.417	K = K @ EQ01	10.14	na	12.97			
4	123.417	K = K @ EQ01	12.64	na	14.49			
5	123.417	K = K @ EQ02	12.84	na	14.43			
6	123.417	K = K @ EQ02	13.29	na	14.68			
7	123.417	K = K @ EQ01	8.97	na	12.2			
8	123.417	K = K @ EQ01	9.27	na	12.41			
9	123.417	K = K @ EQ01	10.47	na	13.18			
10	123.417	K = K @ EQ01	13.06	na	14.72			
11	123.417	K = K @ EQ02	13.22	na	14.64			
12	123.417	K = K @ EQ02	13.68	na	14.89			
13	123.417	K = K @ EQ01	12.91	na	14.64			
14	123.417	K = K @ EQ01	13.34	na	14.88			
4A	123.417		15.32	na				
6A	123.417		15.33	na				
12A	123.417		15.77	na				
10A	123.417		15.81	na				
14A	123.417		17.6	na				
A	123.417		26.43	na				
B	123.417		37.07	na				
C	123.417		41.55	na				
D	111.917		48.87	na				
TOR	111.917		49.65	na				
BOR	101.0		60.44	na				
UND	96.0		62.62	na				
CONN	102.0		60.13	na	100.0			

The maximum velocity is 19.58 and it occurs in the pipe between nodes 14A and A

Final Calculations - Hazen-Williams - 2007

Aegis Fire Protection LLC.
Main Street Building Improvements

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
S001 to EQ01	12.00 12.0 0.0 12.00	0.874 150.0 0.0815	O	3.0 0.0 0.0	3.292 3.000 6.292	8.163 0.0 0.513			K Factor = 4.20 Vel = 6.42	
						8.676			K Factor = 4.07	
S002 to EQ02	12.00 12.0 0.0 12.00	0.874 150.0 0.0814	L O	2.013 3.0 0.0	3.792 5.013 8.805	8.163 0.0 0.717			K Factor = 4.20 Vel = 6.42	
						8.880			K Factor = 4.03	
1 to 2	12.00 12.0	1.101 150.0 0.0264		0.0 0.0 0.0	11.292 0.0 11.292	8.676 0.0 0.298			K Factor @ node EQ01 Vel = 4.04	
2 to 3	12.20 24.2	1.101 150.0 0.0968		0.0 0.0 0.0	12.000 0.0 12.000	8.974 0.0 1.162			K Factor @ node EQ01 Vel = 8.16	
3 to 4	12.98 37.18	1.101 150.0 0.2142		0.0 0.0 0.0	11.708 0.0 11.708	10.136 0.0 2.508			K Factor @ node EQ01 Vel = 12.53	
4 to 4A	14.48 51.66 0.0 51.66	1.101 150.0 0.3938	O	5.0 0.0 0.0	1.792 5.000 6.792	12.644 0.0 2.675			K Factor @ node EQ01 Vel = 17.41	
						15.319			K Factor = 13.20	
*P-01										
5 to 6	14.43 14.43	1.101 150.0 0.0372		0.0 0.0 0.0	12.000 0.0 12.000	12.844 0.0 0.447			K Factor @ node EQ02 Vel = 4.86	
6 to 6A	14.68 29.11 0.0 29.11	1.101 150.0 0.1363	O	5.0 0.0 0.0	9.958 5.000 14.958	13.291 0.0 2.039			K Factor @ node EQ02 Vel = 9.81	
						15.330			K Factor = 7.43	
*P-02										
7 to 8	12.20 12.2	1.101 150.0 0.0273		0.0 0.0 0.0	11.292 0.0 11.292	8.965 0.0 0.308			K Factor @ node EQ01 Vel = 4.11	
8 to 9	12.41 24.61	1.101 150.0 0.0998		0.0 0.0 0.0	12.000 0.0 12.000	9.273 0.0 1.198			K Factor @ node EQ01 Vel = 8.29	
9 to 10	13.18 37.79	1.101 150.0 0.2208		0.0 0.0 0.0	11.708 0.0 11.708	10.471 0.0 2.585			K Factor @ node EQ01 Vel = 12.73	
10 to 10A	14.72 52.51 0.0	1.101 150.0 0.4058	O	5.0 0.0 0.0	1.792 5.000 6.792	13.056 0.0 2.756			K Factor @ node EQ01 Vel = 17.70	

Final Calculations - Hazen-Williams

Aegis Fire Protection LLC.
Main Street Building Improvments

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	52.51				15.812				K Factor = 13.21	
*P-03										
11	14.64	1.101		0.0	12.000	13.217			K Factor @ node EQ02	
to		150.0		0.0	0.0	0.0				
12	14.64	0.0382		0.0	12.000	0.459			Vel = 4.93	
12	14.89	1.101	O	5.0	9.958	13.676			K Factor @ node EQ02	
to		150.0		0.0	5.000	0.0				
12A	29.53	0.1399		0.0	14.958	2.093			Vel = 9.95	
	0.0									
	29.53				15.769				K Factor = 7.44	
*P-04										
13	14.64	1.101		0.0	11.292	12.909			K Factor @ node EQ01	
to		150.0		0.0	0.0	0.0				
14	14.64	0.0382		0.0	11.292	0.431			Vel = 4.93	
14	14.88	1.101	O	5.0	25.458	13.340			K Factor @ node EQ01	
to		150.0		0.0	5.000	0.0				
14A	29.52	0.1398		0.0	30.458	4.258			Vel = 9.95	
	0.0									
	29.52				17.598				K Factor = 7.04	
*P-05										
4A	51.66	2.003		0.0	0.500	15.319				
to		150.0		0.0	0.0	0.0				
6A	51.66	0.0220		0.0	0.500	0.011			Vel = 5.26	
6A	29.12	2.003		0.0	9.000	15.330				
to		150.0		0.0	0.0	0.0				
12A	80.78	0.0488		0.0	9.000	0.439			Vel = 8.22	
12A	29.53	2.003		0.0	0.500	15.769				
to		150.0		0.0	0.0	0.0				
10A	110.31	0.0860		0.0	0.500	0.043			Vel = 11.23	
10A	52.51	2.003		0.0	10.000	15.812				
to		150.0		0.0	0.0	0.0				
14A	162.82	0.1786		0.0	10.000	1.786			Vel = 16.58	
14A	29.52	2.003	O	10.0	26.333	17.598				
to		150.0		0.0	10.000	0.0				
A	192.34	0.2431		0.0	36.333	8.831			Vel = 19.58	
A	0.0	2.003	N	11.0	22.792	26.429				
to		150.0	O	10.0	21.000	0.0				
B	192.34	0.2430		0.0	43.792	10.643			Vel = 19.58	
B	0.0	2.003	O	10.0	8.417	37.072				
to		150.0		0.0	10.000	0.0				
C	192.34	0.2431		0.0	18.417	4.477			Vel = 19.58	
C	0.0	2.635	T	24.894	11.667	41.549				
to		150.0		0.0	24.894	4.981				
D	192.34	0.0639		0.0	36.561	2.337			Vel = 11.32	
D	0.0	2.635	L	8.298	4.000	48.867				
to		150.0		0.0	8.298	0.0				
TOR	192.34	0.0639		0.0	12.298	0.786			Vel = 11.32	

Final Calculations - Hazen-Williams

Aegis Fire Protection LLC.
Main Street Building Improvments

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
TOR	0.0	2.635		0.0	10.917	49.653				
to		120.0		0.0	0.0	9.728			* Fixed Loss = 5	
BOR	192.34	0.0966		0.0	10.917	1.055			Vel = 11.32	
BOR	0.0	6.16	L	12.911	5.000	60.436				
to		140.0		0.0	12.911	2.166				
UND	192.34	0.0011		0.0	17.911	0.020			Vel = 2.07	
UND	0.0	6.16	L	12.911	30.000	62.622				
to		140.0	T	43.037	60.252	-2.599				
CONN	192.34	0.0012	G	4.304	90.252	0.105			Vel = 2.07	
	100.00								Qa = 100.00	
	292.34					60.128			K Factor = 37.70	



Aegis Fire Protection LLC.
13415 W. 98th Street
Lenexa, Kansas 66215
913-825-0343

Job Name : Main Street Building Improvements
Building : 230 SW Main Street
Location : Lee's Summit Missouri 64063
System : 1 Area 2
Contract : 18110
Data File : AREA 2 - 1ST FLOOR.WXF

Hydraulic Design Information Sheet

Name - Main Street Building Improvements Date - 1/16/23
Location - Lee's Summit Missouri 64063
Building - 230 SW Main Street System No. - 1 Area 2
Contractor - Aegis Fire Protection LLC Contract No. - 18110
Calculated By - RKS Drawing No. - FP1
Construction: (x) Combustible () Non-Combustible Ceiling Height - Varies
Occupancy -

S (x) NFPA 13 (x) Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
Y () NFPA 231 () NFPA 231C () Figure Curve

S Other

T Specific Ruling Made By Date

E
M Area of Sprinkler Operation - 1113 System Type Sprinkler/Nozzle
Density - (x) Wet Make Viking
D Area Per Sprinkler - 400 () Dry Model VK606/VK532
E Elevation at Highest Outlet - 123.417 () Deluge Size 3/4"
S Hose Allowance - Inside - () Preaction K-Factor 8.0/ 11.2
I Rack Sprinkler Allowance - () Other Temp.Rat.175/200
G Hose Allowance - Outside - 100 QREC HSW & Upright
N

Note

Calculation Flow Required - 271.8 Press Required - 57.1 11.4 Psi Safety
Summary C-Factor Used: 150 Overhead 150 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 1/6/23 Cap. -
T Time of Test - 9:50 Rated Cap.- Elev.-
E Static Press - 69 @ Press -
R Residual Press - 52 Elev. - Well
Flow - 1750 Proof Flow
S Elevation - 102
U
P Location -
P
L Source of Information - Lee's Summit Water Utilitis
Y

C Commodity Class Location
O Storage Ht. Area Aisle W.
M Storage Method: Solid Piled % Palletized % Rack
M
S () Single Row () Conven. Pallet () Auto. Storage () Encap.
R () Double Row () Slave Pallet () Solid Shelf () Non
T A () Mult. Row () Open Shelf
O C
R K Flue Spacing Clearance:Storage to Ceiling
A Longitudinal Transverse
G
E Horizontal Barriers Provided:

Water Supply Curve C

Aegis Fire Protection LLC.
Main Street Building Improvements

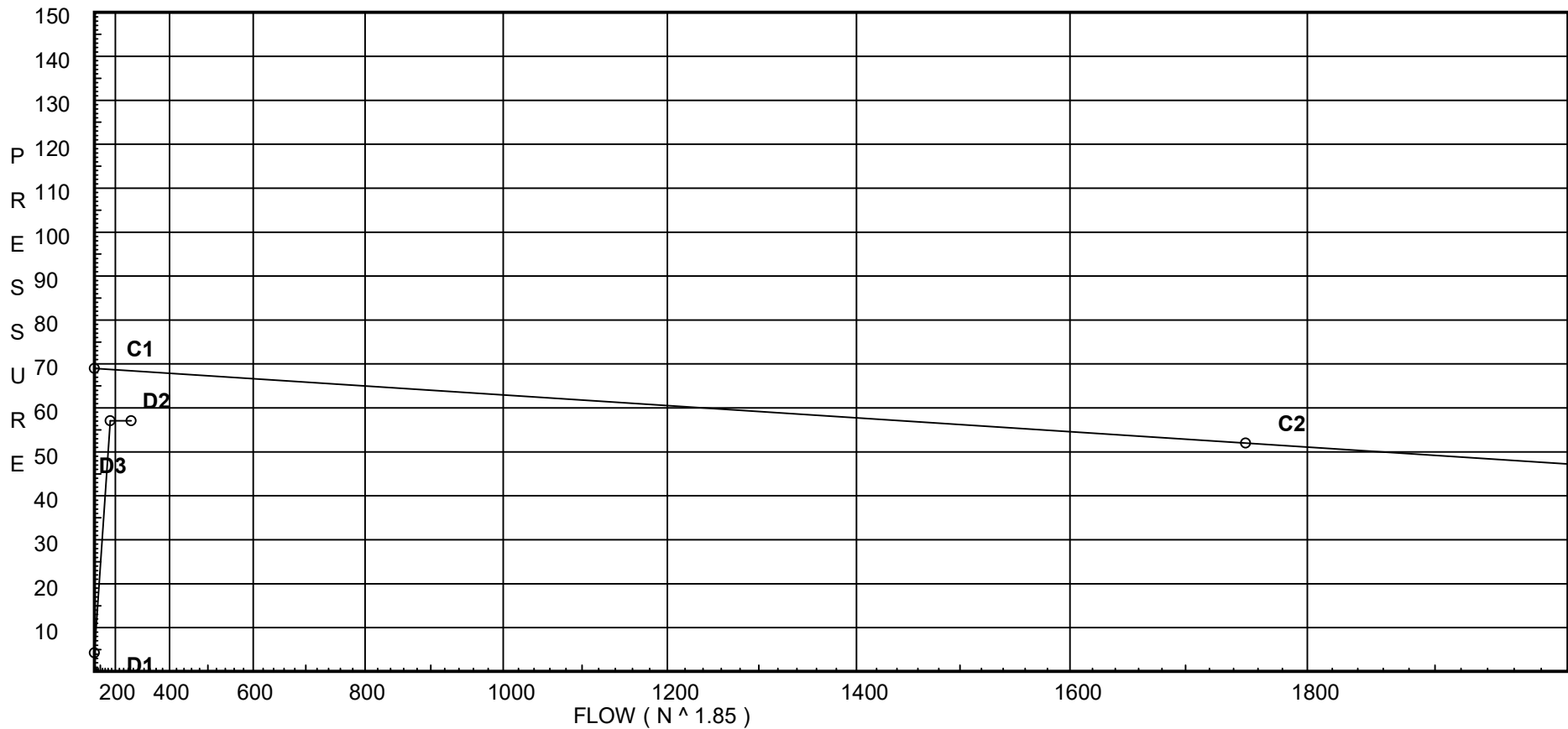
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City Water Supply:

C1 - Static Pressure : 69
C2 - Residual Pressure: 52
C2 - Residual Flow : 1750

Demand:

D1 - Elevation : 4.295
D2 - System Flow : 171.762
D2 - System Pressure : 57.105
Hose (Demand) : 100
D3 - System Demand : 271.762
Safety Margin : 11.353



Fittings Used Summary

Aegis Fire Protection LLC.
Main Street Building Improvements

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Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
L	NFPA 13 Long Turn Elbow	0.5	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
N *	CPVC 90' Ell Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121

Unit Summary

Diameter Units Inches
Length Units Feet
Flow Units US Gallons per Minute
Pressure Units Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

Pressure / Flow Summary - STANDARD

Aegis Fire Protection LLC.
Main Street Building Improvements

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	111.917	11.2	13.0	na	40.39	0.1	400	12.8
1A	111.917		17.21	na				
2	111.917	8	16.0	na	32.0	0.1	320	16.0
3	111.917	8	16.82	na	32.81	0.1	320	16.0
1B	111.917		18.67	na				
5	111.917	8	20.86	na	36.54	0.1	320	16.0
5A	111.917		28.59	na				
6	111.917	5.6	28.75	na	30.03	0.1	112	7.0
6A	111.917		29.22	na				
6B	111.917		32.52	na				
TOR	111.917		46.85	na				
BOR	101.0		57.44	na				
UND	96.0		59.62	na				
CONN	102.0		57.1	na	100.0			

The maximum velocity is 22.67 and it occurs in the pipe between nodes 5 and 5A

Final Calculations - Hazen-Williams - 2007

Aegis Fire Protection LLC.
Main Street Building Improvements

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
1 to 1A	40.39	1.101 150.0 0.2497	O	5.0 0.0 0.0	11.833 5.000 16.833	13.002 0.0 4.204			K Factor = 11.20 Vel = 13.61	
1A to 1B	0.0	1.394 150.0 0.0791	O	6.0 0.0 0.0	12.458 6.000 18.458	17.206 0.0 1.460			Vel = 8.49	
	0.0 40.39					18.666			K Factor = 9.35	
*P-01										
2 to 3	32.00	1.394 150.0 0.0514		0.0 0.0 0.0	16.000 0.0 16.000	16.000 0.0 0.823			K Factor = 8.00 Vel = 6.73	
3 to 1B	32.81	1.394 150.0 0.1898	N	8.0 0.0 0.0	1.708 8.000 9.708	16.823 0.0 1.843			K Factor = 8.00 Vel = 13.62	
1B to 5	40.39	1.598 150.0 0.2391	O	8.0 0.0 0.0	1.167 8.000 9.167	18.666 0.0 2.192			Vel = 16.83	
5 to 5A	36.54	1.598 150.0 0.4151	N	9.0 0.0 0.0	9.625 9.000 18.625	20.858 0.0 7.732			K Factor = 8.00 Vel = 22.67	
5A to 6A	0.0	2.003 150.0 0.1383		0.0 0.0 0.0	4.542 0.0 4.542	28.590 0.0 0.628			Vel = 14.43	
	0.0 141.74					29.218			K Factor = 26.22	
*P-02										
6 to 6A	30.03	1.394 150.0 0.0458	O	6.0 0.0 0.0	4.250 6.000 10.250	28.749 0.0 0.469			K Factor = 5.60 Vel = 6.31	
6A to 6B	141.73	2.003 150.0 0.1971		0.0 0.0 0.0	16.750 0.0 16.750	29.218 0.0 3.302			Vel = 17.49	
6B to TOR	0.0	2.157 120.0 0.2077	3L T	11.076 12.307 0.0	45.625 23.383 69.008	32.520 0.0 14.332			Vel = 15.08	
TOR to BOR	0.0	2.635 120.0 0.0784		0.0 0.0 0.0	10.917 0.0 10.917	46.852 9.728 0.856			* Fixed Loss = 5 Vel = 10.11	
BOR to UND	0.0	6.16 140.0 0.0009	L	12.911 0.0 0.0	5.000 12.911 17.911	57.436 2.166 0.016			Vel = 1.85	
UND to CONN	0.0	6.16 140.0 0.0010	L T G	12.911 43.037 4.304	30.000 60.252 90.252	59.618 -2.599 0.086			Vel = 1.85	
	100.00 271.76					57.105			Qa = 100.00 K Factor = 35.96	

Final Calculations - Hazen-Williams

Aegis Fire Protection LLC.
Main Street Building Improvements

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
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Aegis Fire Protection LLC.
13415 W. 98th Street
Lenexa, Kansas 66215
913-825-0343

Job Name : Main Street Building Improvements
Building : 230 SW Main Street
Location : Lee's Summit Missouri 64063
System : 1 Area 3
Contract : 18110
Data File : AREA 3 - 1ST FLOOR.WXF

Hydraulic Design Information Sheet

Name - Main Street Building Improvements Date - 1/16/23
Location - Lee's Summit Missouri 64063
Building - 230 SW Main Street System No. - 1 Area 3
Contractor - Aegis Fire Protection LLC Contract No. - 18110
Calculated By - RKS Drawing No. - FP1
Construction: (x) Combustible () Non-Combustible Ceiling Height - Varies
Occupancy -

S (x) NFPA 13 (x) Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
Y () NFPA 231 () NFPA 231C () Figure Curve

S Other

T Specific Ruling Made By Date

M	Area of Sprinkler Operation	- 1011	System Type	Sprinkler/Nozzle
	Density	-	(x) Wet	Make Viking
D	Area Per Sprinkler	- 130	() Dry	Model VK3001
E	Elevation at Highest Outlet	- 123.417	() Deluge	Size 1/2"
S	Hose Allowance - Inside	-	() Preaction	K-Factor 5.6
I	Rack Sprinkler Allowance	-	() Other	Temp.Rat.175/200
G	Hose Allowance - Outside	- 100	QRSC Upright	

N Note

Calculation Flow Required - 269.6 Press Required - 59.8 8.7 Psi Safety
Summary C-Factor Used: 150 Overhead 150 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 1/6/23		Cap. -
T	Time of Test - 9:50	Rated Cap.-	Elev.-
E	Static Press - 69	@ Press -	
R	Residual Press - 52	Elev. -	Well
	Flow - 1750		Proof Flow
S	Elevation - 102		

U Location -

P Source of Information - Lee's Summit Water Utilitis

C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method:	%	Palletized % Rack
M	() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S	() Double Row	() Slave Pallet	() Solid Shelf () Non
T	() Mult. Row		() Open Shelf

R	K	Flue Spacing	Clearance:Storage to Ceiling
A		Longitudinal	Transverse

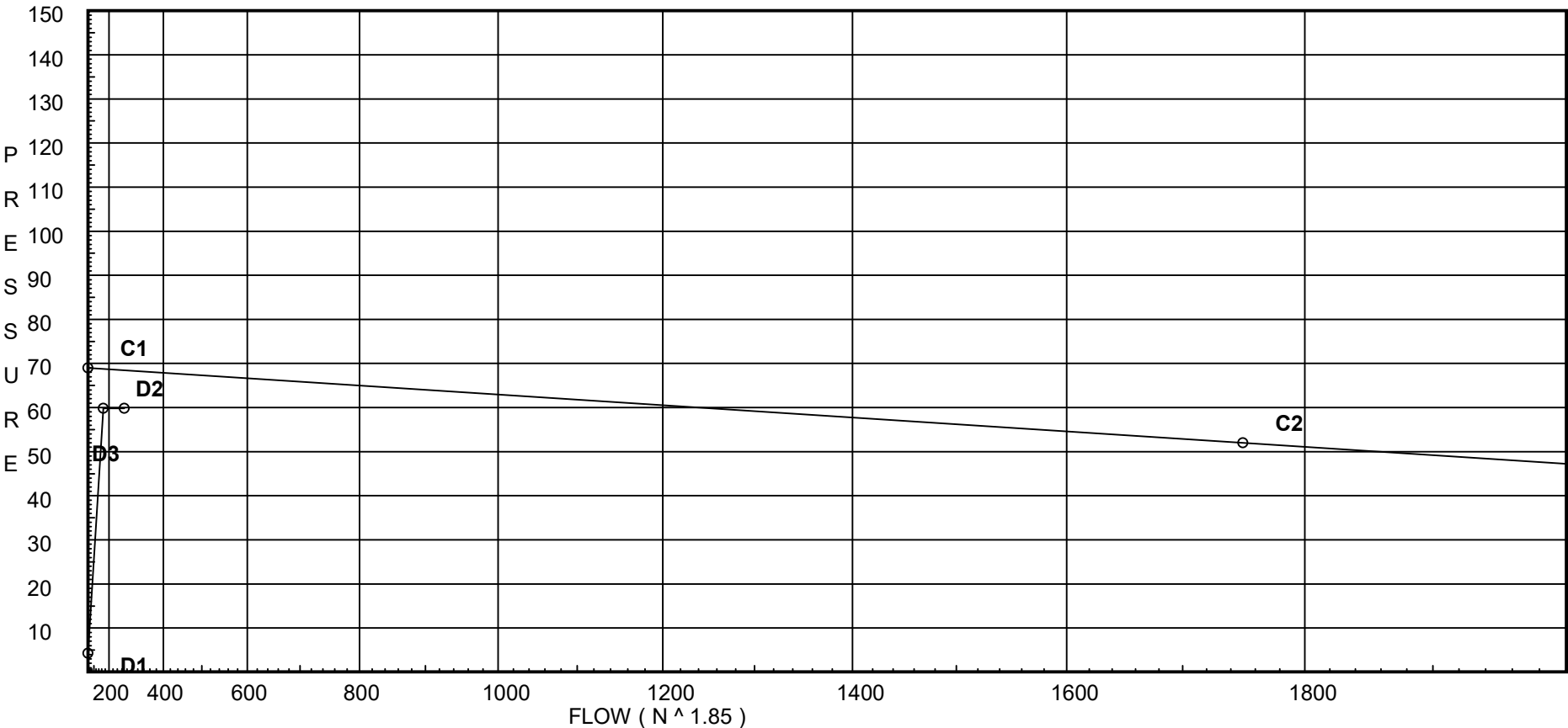
E Horizontal Barriers Provided:

Water Supply Curve C

Aegis Fire Protection LLC.
Main Street Building Improvements

City Water Supply:
C1 - Static Pressure : 69
C2 - Residual Pressure: 52
C2 - Residual Flow : 1750

Demand:
D1 - Elevation : 4.295
D2 - System Flow : 169.625
D2 - System Pressure : 59.799
Hose (Demand) : 100
D3 - System Demand : 269.625
Safety Margin : 8.667



Fittings Used Summary

Aegis Fire Protection LLC.
Main Street Building Improvements

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Date 1/16/23

Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
L	NFPA 13 Long Turn Elbow	0.5	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121

Unit Summary

Diameter Units	Inches
Length Units	Feet
Flow Units	US Gallons per Minute
Pressure Units	Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

Pressure / Flow Summary - STANDARD

Aegis Fire Protection LLC.
Main Street Building Improvements

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	111.917	5.6	7.86	na	15.7	0.1	110	7.0
2	111.917	5.6	7.95	na	15.79	0.1	110	7.0
3	111.917	5.6	8.28	na	16.11	0.1	110	7.0
4	111.917	5.6	7.0	na	14.82	0.1	110	7.0
5	111.917	5.6	7.12	na	14.94	0.1	110	7.0
6	111.917	5.6	7.41	na	15.25	0.1	110	7.0
7	111.917	5.6	8.06	na	15.9	0.1	110	7.0
8	111.917	5.6	9.48	na	17.25	0.1	110	7.0
3A	0.0		57.75	na				
7A	0.0		58.11	na				
9	111.917	5.6	11.61	na	19.08	0.1	110	7.0
9A	111.917		11.79	na				
10	111.917	5.6	19.62	na	24.81	0.1	110	7.0
10A	111.917		36.22	na				
10B	111.917		47.8	na				
TOR	111.917		49.57	na				
BOR	101.0		60.13	na				
UND	96.0		62.31	na				
CONN	102.0		59.8	na	100.0			

The maximum velocity is 24.49 and it occurs in the pipe between nodes 10 and 10A

Final Calculations - Hazen-Williams - 2007

Aegis Fire Protection LLC.
Main Street Building Improvements

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Date 1/16/23

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
1 to 2	15.70 15.7	1.682 120.0 0.0084		0.0 0.0 0.0	11.000 0.0 11.000	7.855 0.0 0.092			K Factor = 5.60 Vel = 2.27	
2 to 3	15.78 31.48	1.682 120.0 0.0302		0.0 0.0 0.0	11.000 0.0 11.000	7.947 0.0 0.332			K Factor = 5.60 Vel = 4.55	
3 to 3A	16.12 47.6	1.682 120.0 0.0649	T	9.9 0.0 0.0	5.500 9.900 15.400	8.279 48.471 1.000			K Factor = 5.60 Vel = 6.87	
	0.0 47.60					57.750			K Factor = 6.26	
*P-01										
4 to 5	14.82 14.82	1.682 120.0 0.0075	T	9.9 0.0 0.0	5.500 9.900 15.400	7.000 0.0 0.115			K Factor = 5.60 Vel = 2.14	
	0.0 14.82					7.115			K Factor = 5.56	
*P-02										
5 to 6	29.75 29.75	1.682 120.0 0.0273		0.0 0.0 0.0	11.000 0.0 11.000	7.115 0.0 0.300			K Factor = 5.60 Vel = 4.30	
6 to 7	15.25 45.0	1.682 120.0 0.0585		0.0 0.0 0.0	11.000 0.0 11.000	7.415 0.0 0.644			K Factor = 5.60 Vel = 6.50	
7 to 7A	15.90 60.9	1.682 120.0 0.1024	T	9.9 0.0 0.0	5.500 9.900 15.400	8.059 48.471 1.577			K Factor = 5.60 Vel = 8.79	
	0.0 60.90					58.107			K Factor = 7.99	
*P-03										
8 to 7A	17.25 17.25	1.682 120.0 0.0099	T	9.9 0.0 0.0	5.500 9.900 15.400	9.483 48.471 0.153			K Factor = 5.60 Vel = 2.49	
	0.0 17.25					58.107			K Factor = 2.26	
*P-04										
3A to 7A	47.60 47.6	1.682 120.0 0.0649		0.0 0.0 0.0	0.0 5.500 5.500	57.750 0.0 0.357			Vel = 6.87	
7A to 9A	78.14 125.74	1.682 120.0 0.3916		0.0 0.0 0.0	0.0 5.500 5.500	58.107 -48.471 2.154			Vel = 18.16	
	0.0 125.74					11.790			K Factor = 36.62	
*P-05										
9 to 9A	19.08 19.08	1.682 120.0 0.0119	T	9.9 0.0 0.0	5.500 9.900 15.400	11.606 0.0 0.184			K Factor = 5.60 Vel = 2.75	

Final Calculations - Hazen-Williams

Aegis Fire Protection LLC.
Main Street Building Improvements

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 19.08					11.790		K Factor =	5.56	
*P-06										
9A to 10	144.82 144.82	1.682 120.0 0.5086	T	9.9 0.0 0.0	5.500 9.900 15.400	11.790 0.0 7.833		Vel =	20.91	
10 to 10A	24.80 169.62	1.682 120.0 0.6815	T	9.9 0.0 0.0	14.458 9.900 24.358	19.623 0.0 16.599		K Factor =	5.60	
								Vel =	24.49	
10A to 10B	0.0 169.62	1.682 120.0 0.6815	T	9.9 0.0 0.0	7.084 9.900 16.984	36.222 0.0 11.574		Vel =	24.49	
10B to TOR	0.0 169.62	2.157 120.0 0.2029	L	3.692 0.0 0.0	5.042 3.692 8.734	47.796 0.0 1.772		Vel =	14.89	
TOR to BOR	0.0 169.62	2.635 120.0 0.0766		0.0 0.0 0.0	10.917 0.0 10.917	49.568 9.728 0.836		* Fixed Loss =	5	
								Vel =	9.98	
BOR to UND	0.0 169.62	6.16 140.0 0.0009	L	12.911 0.0 0.0	5.000 12.911 17.911	60.132 2.166 0.016		Vel =	1.83	
UND to CONN	0.0 169.62	6.16 140.0 0.0009	L T G	12.911 43.037 4.304	30.000 60.252 90.252	62.314 -2.599 0.084		Vel =	1.83	
	100.00 269.62					59.799		Qa =	100.00	
								K Factor =	34.87	