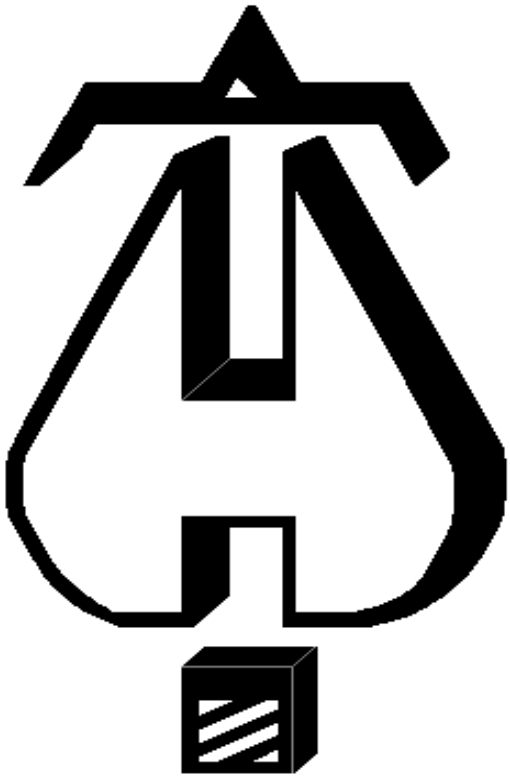
RELIABLE
FIRE PROTECTION, LLC
32 Partin Rd.
Dunn, North Carolina 28334
Phone (910) 980-1234
Fax (919) 980-1235
North Carolina State License #26806-FS Class I
South Carolina State License #1520

FIRE SPRINKLER
HYDRAULIC CALCULATIONS
For
ERWIN ELEMENTARY
At
ERWIN, NORTH CAROLINA



. . . Fire Protection by Computer Design

Reliable Fire Protection LLC
32 Partin Rd.
Dunn, NC 28334
Robert Lawley
NICET Level III #103122

Job Name	:	EE - 2ND FLR CLASSROOMS AREA 1
Building	:	FP1,2,3,4
Location	:	DENIM DR., ERWIN, NC 28339
System	:	1
Contract	:	2020-098
Data File	:	EE AREA 1 - PEAKED.WXF

HYDRAULIC CALCULATIONS
for

Project name: ERWIN ELEMENTARY SCHOOL
Location: DENIM DR., ERWIN, NC 28339
Drawing no: FP1,2,3,4
Date: 08-19-20

Design

Remote area number: 1
Remote area location: 2ND FLR CLASSROOMS
Occupancy classification: LIGHT HAZARD
Density: 0.10 - Gpm/SqFt
Area of application: 1,500 - SqFt
Coverage per sprinkler: 225 MAX - SqFt
Type of sprinklers calculated: STANDARD SPRAY PENDANT
No. of sprinklers calculated: 14
In-rack demand: N/A - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 315.529 - GPM @ 31.461 - Psi
Type of system: WET - GRID
Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 08-23-20
Location: DENIM DR.
Source: LKC ENGINEERING, LLC

Name of contractor: RELIABLE FIRE PROTECTION, LLC
Address: 32 PARTIN RD., DUNN, NC 28334
Phone number: 910-980-1234
Name of designer: ROBERT LAWLEY 26806-FS1
Authority having jurisdiction: HARNETT COUNTY
Notes: (Include peaking information or gridded systems here.)

Water Supply Curve C

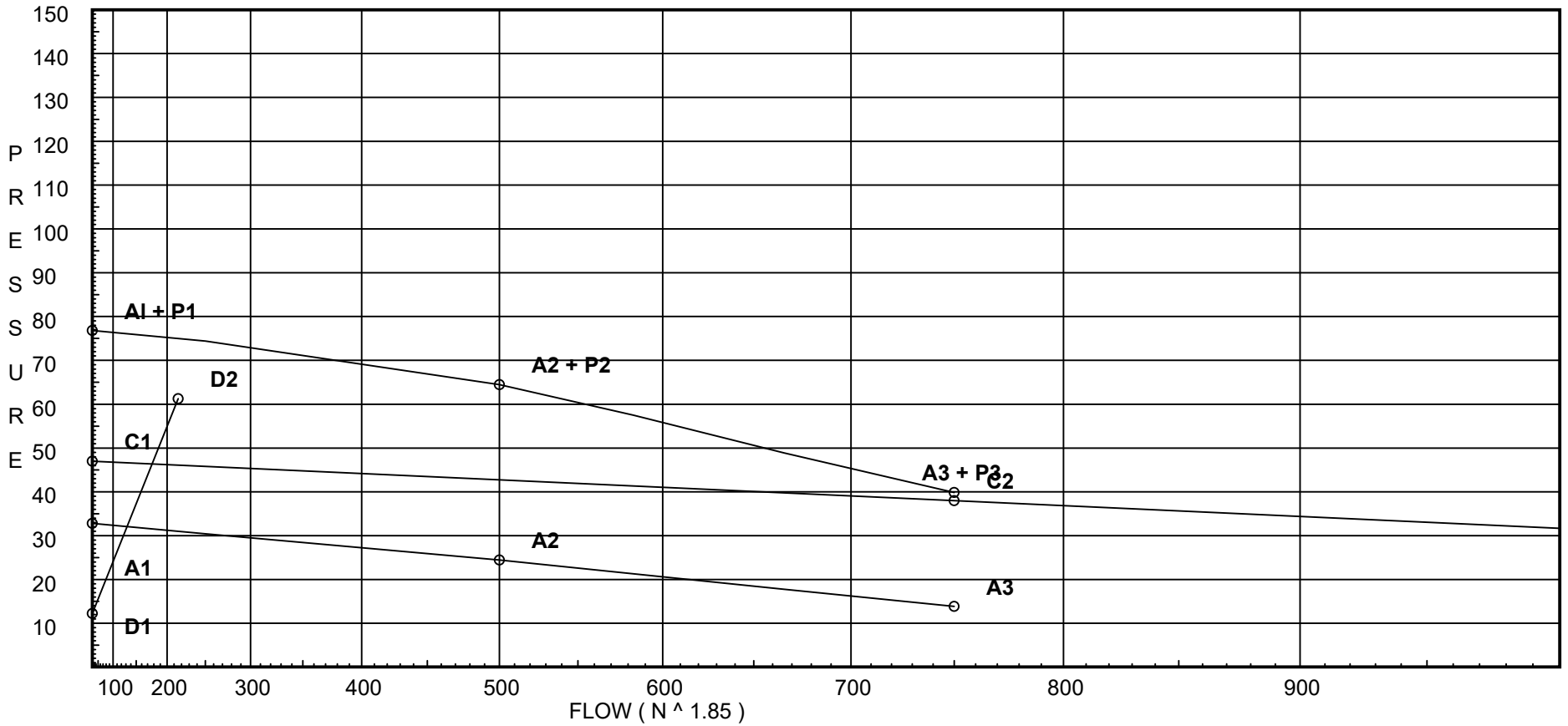
Reliable Fire Protection LLC
EE - 2ND FLR CLASSROOMS AREA 1

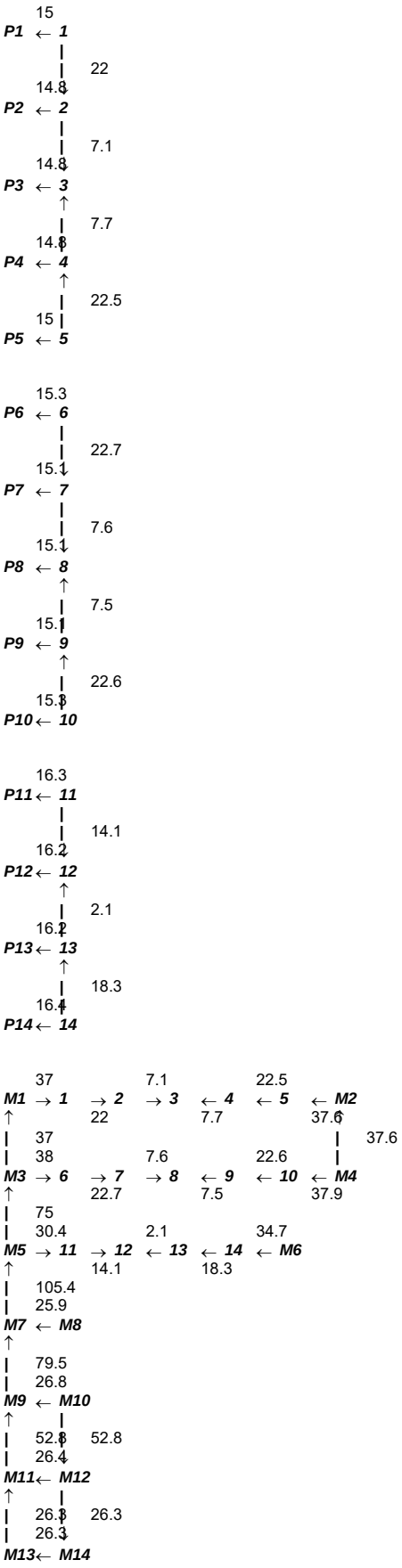
City Water Supply:
- C1 - Static Pressure : 47
- C2 - Residual Pressure: 38
- C2 - Residual Flow : 750

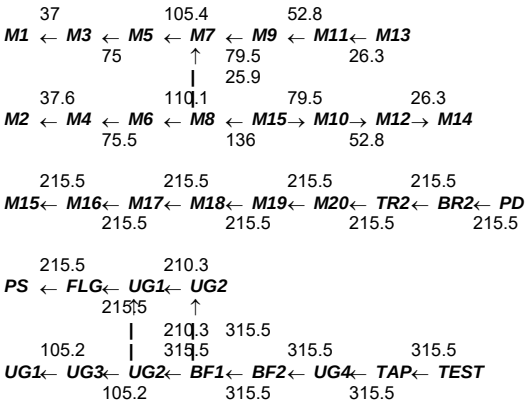
City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow
- A1 - Adjusted Static: 32.812
- A2 - Adj Resid : 24.456 @ 500
- A3 - Adj Resid : 13.864 @ 750

Pump Data:
- P1 - Pump Churn Pressure : 44
- P2 - Pump Rated Pressure : 40
- P2 - Pump Rated Flow : 500
- P3 - Pump Pressure @ Max Flow : 26
- P3 - Pump Max Flow : 750
- City Residual Flow @ 0 = 1832.70
- City Residual Flow @ 20 = 1358.20
- City Water @ 150% of Pump = 38.00

Demand:
- D1 - Elevation : 12.235
- D2 - System Flow : 215.529
- D2 - System Pressure : 61.243
- Hose (Demand) : _____
- D3 - System Demand : 215.529
- Hose (Adj City) : 100
- Safety Margin : 13.725




15
P1 ← 1
22
14.8
P2 ← 2
7.1
14.8
P3 ← 3
7.7
14.8
P4 ← 4
22.5
15
P5 ← 5
15.3
P6 ← 6
22.7
15.1
P7 ← 7
7.6
15.1
P8 ← 8
7.5
15.1
P9 ← 9
22.6
15.3
P10 ← 10
16.3
P11 ← 11
14.1
16.2
P12 ← 12
2.1
16.2
P13 ← 13
18.3
16.4
P14 ← 14
37
M1 → 1
22
37
38
M3 → 6
22.7
75
30.4
M5 → 11
14.1
105.4
25.9
M7 ← M8
79.5
26.8
M9 ← M10
52.8
52.8
26.4
M11 ← M12
26.3
26.3
26.3
M13 ← M14
7.1
→ 2
→ 3
7.7
7.6
→ 8
7.5
2.1
← 13
18.3
22.5
← 4
← 5
37.6
37.6
22.6
← 9
← 10
37.9
34.7
← 14
← M6
← M2
37.6
← M4


37
105.4
52.8
M1 ← M3 ← M5 ← M7 ← M9 ← M11 ← M13
75
79.5
26.3
25.9
37.6
110.1
79.5
26.3
M2 ← M4 ← M6 ← M8 ← M15 → M10 → M12 → M14
75.5
136
52.8
215.5
215.5
215.5
215.5
M15 ← M16 ← M17 ← M18 ← M19 ← M20 ← TR2 ← BR2 ← PD
215.5
215.5
215.5
215.5
215.5
210.3
PS ← FLG ← UG1 ← UG2
215.5
210.3
315.5
105.2
315.5
315.5
315.5
UG1 ← UG3 ← UG2 ← BF1 ← BF2 ← UG4 ← TAP ← TEST
105.2
315.5
315.5

Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
Aty	Alarm Tyco AV-1							14			23		24	23							
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
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
I	90' Grvd-Vic Elbow #10	0	0	2	3	4	3.5	6	5	8	7	8.5	10	13	17	20	23	25	33	36	40
J	90'Tee-Branch Grv Vic #20	0	0	4.5	6	8	8.5	10.8	13	17	16	21	25	33	41	50	65	78	88	98	120
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
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
Zai	Ames 4000SS	Fitting generates a Fixed Loss Based on Flow																			

Units 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

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
P1	28.25	5.6	7.2	na	15.03	0.1	140	7.0
P2	28.25	5.6	7.03	na	14.84	0.1	140	7.0
P3	28.25	5.6	7.0	na	14.82	0.1	140	7.0
P4	28.25	5.6	7.03	na	14.85	0.1	140	7.0
P5	28.25	5.6	7.21	na	15.04	0.1	140	7.0
P6	27.125	5.6	7.46	na	15.3	0.1	120	7.0
P7	27.125	5.6	7.28	na	15.11	0.1	120	7.0
P8	27.125	5.6	7.25	na	15.08	0.1	120	7.0
P9	27.125	5.6	7.28	na	15.1	0.1	120	7.0
P10	27.125	5.6	7.46	na	15.3	0.1	120	7.0
P11	25.958	5.6	8.46	na	16.29	0.1	120	7.0
P12	25.958	5.6	8.38	na	16.21	0.1	120	7.0
P13	25.958	5.6	8.38	na	16.22	0.1	120	7.0
P14	25.958	5.6	8.53	na	16.36	0.1	120	7.0
M1	30.333		13.36	na				
1	30.333		10.9	na				
2	30.333		10.62	na				
3	30.333		10.58	na				
4	30.333		10.63	na				
5	30.333		10.92	na				
M3	30.333		13.42	na				
6	30.333		10.83	na				
7	30.333		10.53	na				
8	30.333		10.49	na				
9	30.333		10.53	na				
10	30.333		10.82	na				
M5	30.333		13.62	na				
11	30.333		11.91	na				
12	30.333		11.78	na				
13	30.333		11.79	na				
14	30.333		12.02	na				
M7	30.333		14.02	na				
M9	30.333		14.21	na				
M11	30.333		14.31	na				
M13	30.333		14.34	na				
M2	30.333		21.61	na				
M4	30.333		21.67	na				
M6	30.333		21.87	na				
M8	30.333		22.31	na				
M15	30.333		23.17	na				
M10	30.333		23.02	na				
M12	30.333		22.92	na				
M16	30.333		26.1	na				
M17	13.208		36.55	na				
M18	13.208		38.97	na				
M19	13.208		50.15	na				
M20	13.208		52.13	na				
TR2	13.208		52.61	na				
BR2	2.5		61.14	na				
PD	2.5		61.24	na				
PS	2.5		30.98	na				
FLG	1.0		31.68	na				
UG1	0.0		32.28	na	100.0			
UG3	0.0		32.38	na				
UG2	0.0		32.42	na				
BF1	2.5		31.64	na				
BF2	0.0		44.28	na				
UG4	0.0		44.37	na				
TAP	0.0		44.64	na				
TEST	0.0		45.19	na				

The maximum velocity is 12.68 and it occurs in the pipe between nodes M15 and M16

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
P1	28.250	5.60	15.03	1	1T	5.0	55.000	120	7.201	
to						0.0	5.000		-0.902	
1	30.333		15.03	1.049		0.0	60.000	0.0767	4.601	Vel = 5.58
			0.0							
1			15.03						10.900	K Factor = 4.55
P2	28.250	5.60	14.84	1	1T	5.0	55.000	120	7.026	
to						0.0	5.000		-0.902	
2	30.333		14.84	1.049		0.0	60.000	0.0750	4.497	Vel = 5.51
			0.0							
2			14.84						10.621	K Factor = 4.55
P3	28.250	5.60	14.82	1	1T	5.0	55.000	120	7.000	
to						0.0	5.000		-0.902	
3	30.333		14.82	1.049		0.0	60.000	0.0747	4.482	Vel = 5.50
			0.0							
3			14.82						10.580	K Factor = 4.56
P4	28.250	5.60	14.85	1	1T	5.0	55.000	120	7.030	
to						0.0	5.000		-0.902	
4	30.333		14.85	1.049		0.0	60.000	0.0750	4.499	Vel = 5.51
			0.0							
4			14.85						10.627	K Factor = 4.56
P5	28.250	5.60	15.04	1	1T	5.0	55.000	120	7.214	
to						0.0	5.000		-0.902	
5	30.333		15.04	1.049		0.0	60.000	0.0768	4.608	Vel = 5.58
			0.0							
5			15.04						10.920	K Factor = 4.55
P6	27.125	5.60	15.30	1	1T	5.0	55.000	120	7.463	
to						0.0	5.000		-1.389	
6	30.333		15.3	1.049		0.0	60.000	0.0792	4.755	Vel = 5.68
			0.0							
6			15.30						10.829	K Factor = 4.65
P7	27.125	5.60	15.10	1	1T	5.0	55.000	120	7.276	
to						0.0	5.000		-1.389	
7	30.333		15.1	1.049		0.0	60.000	0.0774	4.645	Vel = 5.61
			0.0							
7			15.10						10.532	K Factor = 4.65
P8	27.125	5.60	15.08	1	1T	5.0	55.000	120	7.247	
to						0.0	5.000		-1.389	
8	30.333		15.08	1.049		0.0	60.000	0.0771	4.628	Vel = 5.60
			0.0							
8			15.08						10.486	K Factor = 4.66
P9	27.125	5.60	15.10	1	1T	5.0	55.000	120	7.275	
to						0.0	5.000		-1.389	
9	30.333		15.1	1.049		0.0	60.000	0.0774	4.644	Vel = 5.61
			0.0							
9			15.10						10.530	K Factor = 4.65
P10	27.125	5.60	15.30	1	1T	5.0	55.000	120	7.460	
to						0.0	5.000		-1.389	
10	30.333		15.3	1.049		0.0	60.000	0.0792	4.753	Vel = 5.68

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
			0.0							
10			15.30						10.824	K Factor = 4.65
P11	25.958	5.60	16.29	1	1T	5.0	55.000	120	8.460	
to						0.0	5.000		-1.895	
11	30.333		16.29	1.049		0.0	60.000	0.0890	5.341	Vel = 6.05
			0.0							
11			16.29						11.906	K Factor = 4.72
P12	25.958	5.60	16.21	1	1T	5.0	55.000	120	8.382	
to						0.0	5.000		-1.895	
12	30.333		16.21	1.049		0.0	60.000	0.0882	5.295	Vel = 6.02
			0.0							
12			16.21						11.782	K Factor = 4.72
P13	25.958	5.60	16.22	1	1T	5.0	55.000	120	8.385	
to						0.0	5.000		-1.895	
13	30.333		16.22	1.049		0.0	60.000	0.0883	5.297	Vel = 6.02
			0.0							
13			16.22						11.787	K Factor = 4.72
P14	25.958	5.60	16.36	1	1T	5.0	55.000	120	8.533	
to						0.0	5.000		-1.895	
14	30.333		16.36	1.049		0.0	60.000	0.0897	5.383	Vel = 6.07
			0.0							
14			16.36						12.021	K Factor = 4.72
*										
M1	30.333		-36.99	1.25	1T	7.432	21.125	120	13.362	
to						0.0	7.432		0.0	
1	30.333		-36.99	1.442		0.0	28.557	-0.0862	-2.462	Vel = 7.27
1	30.333		15.02	1.25		0.0	8.500	120	10.900	
to						0.0	0.0		0.0	
2	30.333		-21.97	1.442		0.0	8.500	-0.0328	-0.279	Vel = 4.32
2	30.333		14.85	1.25		0.0	10.000	120	10.621	
to						0.0	0.0		0.0	
3	30.333		-7.12	1.442		0.0	10.000	-0.0041	-0.041	Vel = 1.40
3	30.333		14.81	1.25		0.0	10.000	120	10.580	
to						0.0	0.0		0.0	
4	30.333		7.69	1.442		0.0	10.000	0.0047	0.047	Vel = 1.51
4	30.333		14.85	1.25		0.0	8.500	120	10.627	
to						0.0	0.0		0.0	
5	30.333		22.54	1.442		0.0	8.500	0.0345	0.293	Vel = 4.43
5	30.333		15.04	1.25	1T	7.432	113.000	120	10.920	
to						0.0	7.432		0.0	
M2	30.333		37.58	1.442		0.0	120.432	0.0888	10.689	Vel = 7.38
			0.0							
M2			37.58						21.609	K Factor = 8.08
*										
M3	30.333		-38.01	1.25	1T	7.432	21.125	120	13.417	
to						0.0	7.432		0.0	
6	30.333		-38.01	1.442		0.0	28.557	-0.0906	-2.588	Vel = 7.47

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
6	30.333		15.30	1.25		0.0	8.500	120	10.829	
to						0.0	0.0		0.0	
7	30.333		-22.71	1.442		0.0	8.500	-0.0349	-0.297	Vel = 4.46
7	30.333		15.11	1.25		0.0	10.000	120	10.532	
to						0.0	0.0		0.0	
8	30.333		-7.6	1.442		0.0	10.000	-0.0046	-0.046	Vel = 1.49
8	30.333		15.07	1.25		0.0	10.000	120	10.486	
to						0.0	0.0		0.0	
9	30.333		7.47	1.442		0.0	10.000	0.0044	0.044	Vel = 1.47
9	30.333		15.11	1.25		0.0	8.500	120	10.530	
to						0.0	0.0		0.0	
10	30.333		22.58	1.442		0.0	8.500	0.0346	0.294	Vel = 4.44
10	30.333		15.29	1.25	1T	7.432	113.000	120	10.824	
to						0.0	7.432		0.0	
M4	30.333		37.87	1.442		0.0	120.432	0.0900	10.842	Vel = 7.44
			0.0							
M4			37.87						21.666	K Factor = 8.14
*										
M5	30.333		-30.42	1.25	1T	7.432	21.125	120	13.620	
to						0.0	7.432		0.0	
11	30.333		-30.42	1.442		0.0	28.557	-0.0600	-1.714	Vel = 5.98
11	30.333		16.29	1.25		0.0	8.500	120	11.906	
to						0.0	0.0		0.0	
12	30.333		-14.13	1.442		0.0	8.500	-0.0146	-0.124	Vel = 2.78
12	30.333		16.21	1.25		0.0	10.000	120	11.782	
to						0.0	0.0		0.0	
13	30.333		2.08	1.442		0.0	10.000	0.0005	0.005	Vel = 0.41
13	30.333		16.22	1.25		0.0	10.000	120	11.787	
to						0.0	0.0		0.0	
14	30.333		18.3	1.442		0.0	10.000	0.0234	0.234	Vel = 3.60
14	30.333		16.36	1.25	1T	7.432	121.500	120	12.021	
to						0.0	7.432		0.0	
M6	30.333		34.66	1.442		0.0	128.932	0.0764	9.850	Vel = 6.81
			0.0							
M6			34.66						21.871	K Factor = 7.41
*										
M7	30.333		25.89	1.25	2T	14.864	171.083	120	14.025	
to						0.0	14.864		0.0	
M8	30.333		25.89	1.442		0.0	185.947	0.0446	8.285	Vel = 5.09
			0.0							
M8			25.89						22.310	K Factor = 5.48
M9	30.333		26.78	1.25	2T	14.864	171.083	120	14.207	
to						0.0	14.864		0.0	
M10	30.333		26.78	1.442		0.0	185.947	0.0474	8.814	Vel = 5.26
			0.0							
M10			26.78						23.021	K Factor = 5.58
M11	30.333		26.42	1.25	2T	14.864	171.083	120	14.313	
to						0.0	14.864		0.0	
M12	30.333		26.42	1.442		0.0	185.947	0.0463	8.603	Vel = 5.19

Node1 / to / Node2	Elev1 / Elev2	K / Fact	Qa / Qt	Nom / Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact / Pf/Ft	Pt / Pe / Pf	******* Notes ******
			0.0							
M12			26.42						22.916	K Factor = 5.52
M13	30.333		26.33	1.25	2T	14.864	171.083	120	14.342	
to						0.0	14.864		13.137	
M14	0		26.33	1.442		0.0	185.947	0.0459	8.544	Vel = 5.17
			0.0							
M14			26.33						36.023	K Factor = 4.39
*										
M1	30.333		36.99	2.5		0.0	12.000	120	13.362	
to						0.0	0.0		0.0	
M3	30.333		36.99	2.635		0.0	12.000	0.0046	0.055	Vel = 2.18
M3	30.333		38.01	2.5		0.0	12.000	120	13.417	
to						0.0	0.0		0.0	
M5	30.333		75.0	2.635		0.0	12.000	0.0169	0.203	Vel = 4.41
M5	30.333		30.42	2.5		0.0	12.750	120	13.620	
to						0.0	0.0		0.0	
M7	30.333		105.42	2.635		0.0	12.750	0.0318	0.405	Vel = 6.20
M7	30.333		-25.89	2.5		0.0	9.667	120	14.025	
to						0.0	0.0		0.0	
M9	30.333		79.53	2.635		0.0	9.667	0.0188	0.182	Vel = 4.68
M9	30.333		-26.78	2.5		0.0	12.000	120	14.207	
to						0.0	0.0		0.0	
M11	30.333		52.75	2.635		0.0	12.000	0.0088	0.106	Vel = 3.10
M11	30.333		-26.42	2.5		0.0	12.000	120	14.313	
to						0.0	0.0		0.0	
M13	30.333		26.33	2.635		0.0	12.000	0.0024	0.029	Vel = 1.55
			0.0							
M13			26.33						14.342	K Factor = 6.95
*										
M2	30.333		37.58	2.5		0.0	12.000	120	21.609	
to						0.0	0.0		0.0	
M4	30.333		37.58	2.635		0.0	12.000	0.0048	0.057	Vel = 2.21
M4	30.333		37.87	2.5		0.0	12.000	120	21.666	
to						0.0	0.0		0.0	
M6	30.333		75.45	2.635		0.0	12.000	0.0171	0.205	Vel = 4.44
M6	30.333		34.66	2.5		0.0	12.750	120	21.871	
to						0.0	0.0		0.0	
M8	30.333		110.11	2.635		0.0	12.750	0.0344	0.439	Vel = 6.48
M8	30.333		25.89	2.5	1J	14.827	2.000	120	22.310	
to						0.0	14.827		0.0	
M15	30.333		136.0	2.635		0.0	16.827	0.0509	0.856	Vel = 8.00
M15	30.333		-215.53	2.5		0.0	7.667	120	23.166	
to						0.0	0.0		0.0	
M10	30.333		-79.53	2.635		0.0	7.667	-0.0189	-0.145	Vel = 4.68
M10	30.333		26.78	2.5		0.0	12.000	120	23.021	
to						0.0	0.0		0.0	
M12	30.333		-52.75	2.635		0.0	12.000	-0.0087	-0.105	Vel = 3.10
M12	30.333		26.42	2.5		0.0	12.000	120	22.916	
to						0.0	0.0		13.137	
M14	0		-26.33	2.635		0.0	12.000	-0.0025	-0.030	Vel = 1.55

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
			0.0							
M14			-26.33						36.023	K Factor = -4.39
*										
M15	30.333		215.53	2.5	2I	16.474	8.167	120	23.166	
to						0.0	16.474		0.0	
M16	30.333		215.53	2.635		0.0	24.641	0.1192	2.938	Vel = 12.68
M16	30.333		0.0	2.5	1I	8.237	17.167	120	26.104	
to						0.0	8.237		7.417	
M17	13.208		215.53	2.635		0.0	25.404	0.1192	3.029	Vel = 12.68
M17	13.208		0.0	2.5	1J	14.827	5.500	120	36.550	
to						0.0	14.827		0.0	
M18	13.208		215.53	2.635		0.0	20.327	0.1193	2.424	Vel = 12.68
M18	13.208		0.0	3	1I	6.72	257.542	120	38.974	
to						0.0	6.720		0.0	
M19	13.208		215.53	3.26		0.0	264.262	0.0423	11.177	Vel = 8.28
M19	13.208		0.0	3	1I	6.72	40.000	120	50.151	
to						0.0	6.720		0.0	
M20	13.208		215.53	3.26		0.0	46.720	0.0423	1.975	Vel = 8.28
M20	13.208		0.0	3	1I	6.72	4.667	120	52.126	
to						0.0	6.720		0.0	
TR2	13.208		215.53	3.26		0.0	11.387	0.0423	0.482	Vel = 8.28
			0.0							
TR2			215.53						52.608	K Factor = 29.72
*										
TR2	13.208		215.53	4	1B	15.8	10.708	120	52.608	
to					1Fsp	0.0	67.151		7.638	* * Fixed Loss = 3
BR2	2.500		215.53	4.26	1Aty	30.284	77.859	0.0115	0.894	Vel = 4.85
					1J	21.067				
			0.0							
BR2			215.53						61.140	K Factor = 27.56
*										
BR2	2.500		215.53	6	1B	12.573	10.000	120	61.140	
to					1S	40.235	52.808		0.0	
PD	2.500		215.53	6.357		0.0	62.808	0.0016	0.103	Vel = 2.18
			0.0							
PD			215.53						61.243	K Factor = 27.54
System Demand Pressure									61.243	
Safety Margin									13.725	
Continuation Pressure									74.968	
Pressure @ Pump Outlet									74.968	
Pressure From Pump Curve									-43.992	
Pressure @ Pump Inlet									30.976	
*										
PS	2.5		0.0	6	1G	3.772	10.500	120	30.976	
to					1E	17.603	21.375		0.650	
FLG	1		215.53	6.357		0.0	31.875	0.0016	0.052	Vel = 2.18
			0.0							

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
FLG			215.53						31.678	K Factor = 38.29
*										
FLG	1		215.53	6	1E	20.084	50.000	140	31.678	
to					1G	4.304	67.425		0.433	
UG1	0		215.53	6.16	1T	43.037	117.425	0.0014	0.168	Vel = 2.32
			0.0							
UG1			215.53						32.279	K Factor = 37.94
*										
UG1	0	H100	210.32	8	2F	28.468	394.000	140	32.279	
to						0.0	28.468		0.0	
UG2	0		210.32	8.27		0.0	422.468	0.0003	0.138	Vel = 1.26
			0.0							
UG2			210.32						32.417	K Factor = 36.94
UG1	0		105.20	8	5F	71.17	988.000	140	32.279	
to					3E	85.404	181.879		0.0	
UG3	0		105.2	8.27	4G	25.305	1169.879	0.0001	0.106	Vel = 0.63
UG3	0		0.0	8	3F	42.702	303.000	140	32.385	
to					1G	6.326	49.028		0.0	
UG2	0		105.2	8.27		0.0	352.028	0.0001	0.032	Vel = 0.63
			0.0							
UG2			105.20						32.417	K Factor = 18.48
*										
UG2	0		315.53	8	2E	56.936	381.000	140	32.417	
to						0.0	56.936		-1.083	
BF1	2.500		315.53	8.27		0.0	437.936	0.0007	0.303	Vel = 1.88
BF1	2.500		0.0	8	1Zai	0.0	6.000	120	31.637	
to						0.0	0.0		12.632	* * Fixed Loss = 11.549
BF2	0		315.53	8.249		0.0	6.000	0.0010	0.006	Vel = 1.89
BF2	0		0.0	8	2E	56.936	26.000	140	44.275	
to					1T	55.354	112.290		0.0	
UG4	0		315.53	8.27		0.0	138.290	0.0007	0.095	Vel = 1.88
UG4	0		0.0	8	1T	55.354	321.000	140	44.370	
to					1G	6.326	61.680		0.0	
TAP	0		315.53	8.27		0.0	382.680	0.0007	0.265	Vel = 1.88
TAP	0		0.0	8	1Eql	297.332	500.000	140	44.635	
to						0.0	297.332		0.0	
TEST	0		315.53	8.27		0.0	797.332	0.0007	0.551	Vel = 1.88
			0.0							
TEST			315.53						45.186	K Factor = 46.94

Auto Peaking Summary - List of Pipes for Area Calculated

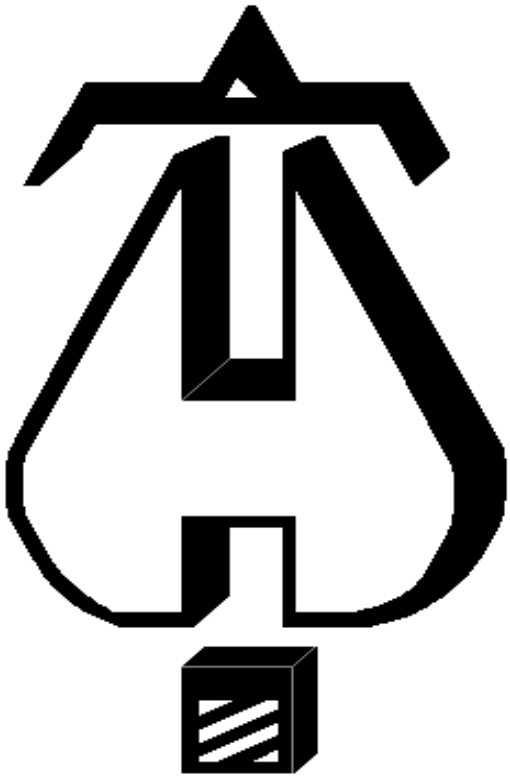
Left Side			Right Side		
From	To	Length	From	To	Length
5	M2	113.000	M1	1	21.125
10	M4	113.000	M3	6	21.125
14	M6	121.500	M5	11	21.125
5	M2	113.000	M1	1	21.125
10	M4	113.000	M3	6	21.125
14	M6	121.500	M5	11	21.125

			Flow Required	Safety Margin	Pressure Differential
Left	10.000	|	315.719	13.730	-0.005
Area Calculated		|	315.529	13.725	0.000
Right	10.000	|	315.282	13.832	-0.107

Typical Distance Between Heads = 10.000

Split Point Used in Worst Area Peaked = P3

Split Point Used in Area Calculated = P3



. . . Fire Protection by Computer Design

Reliable Fire Protection LLC
32 Partin Rd.
Dunn, NC 28334
Robert Lawley
NICET Level III #103122

Job Name	:	EE - MECHANICAL PLATFORM AREA 2
Building	:	FP1,2,3,4
Location	:	DENIM DR., ERWIN, NC 28339
System	:	2
Contract	:	2020-098
Data File	:	EE AREA 2.WXF

HYDRAULIC CALCULATIONS
for

Project name: ERWIN ELEMENTARY SCHOOL
Location: DENIM DR., ERWIN, NC 28339
Drawing no: FP1,2,3,4
Date: 08-19-20

Design

Remote area number: 2
Remote area location: MECHANICAL PLATFORM
Occupancy classification: ORDINARY HAZARD GROUP II
Density: 0.20 - Gpm/SqFt
Area of application: 1,500 - SqFt
Coverage per sprinkler: 130 MAX - SqFt
Type of sprinklers calculated: STANDARD SPRAY PENDANT
No. of sprinklers calculated: 16
In-rack demand: N/A - GPM
Hose streams: 250 - GPM
Total water required (including hose streams): 644.359 - GPM @ 26.636 - Psi
Type of system: WET - TREE
Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 08-23-20
Location: DENIM DR.
Source: LKC ENGINEERING, LLC

Name of contractor: RELIABLE FIRE PROTECTION, LLC
Address: 32 PARTIN RD., DUNN, NC 28334
Phone number: 910-980-1234
Name of designer: ROBERT LAWLEY 26806-FS1
Authority having jurisdiction: HARNETT COUNTY
Notes: (Include peaking information or gridded systems here.)

Water Supply Curve C

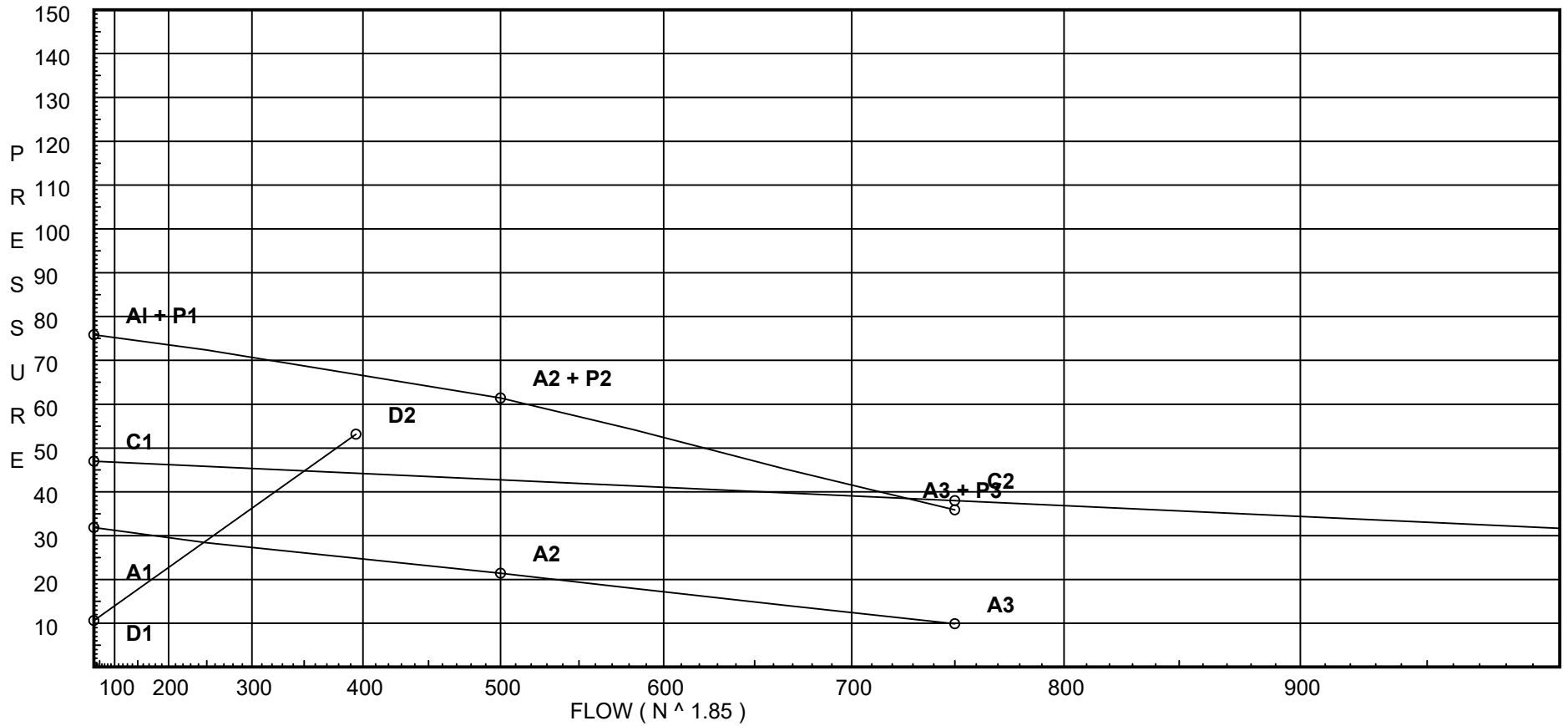
Reliable Fire Protection LLC
EE - MECHANICAL PLATFORM AREA 2

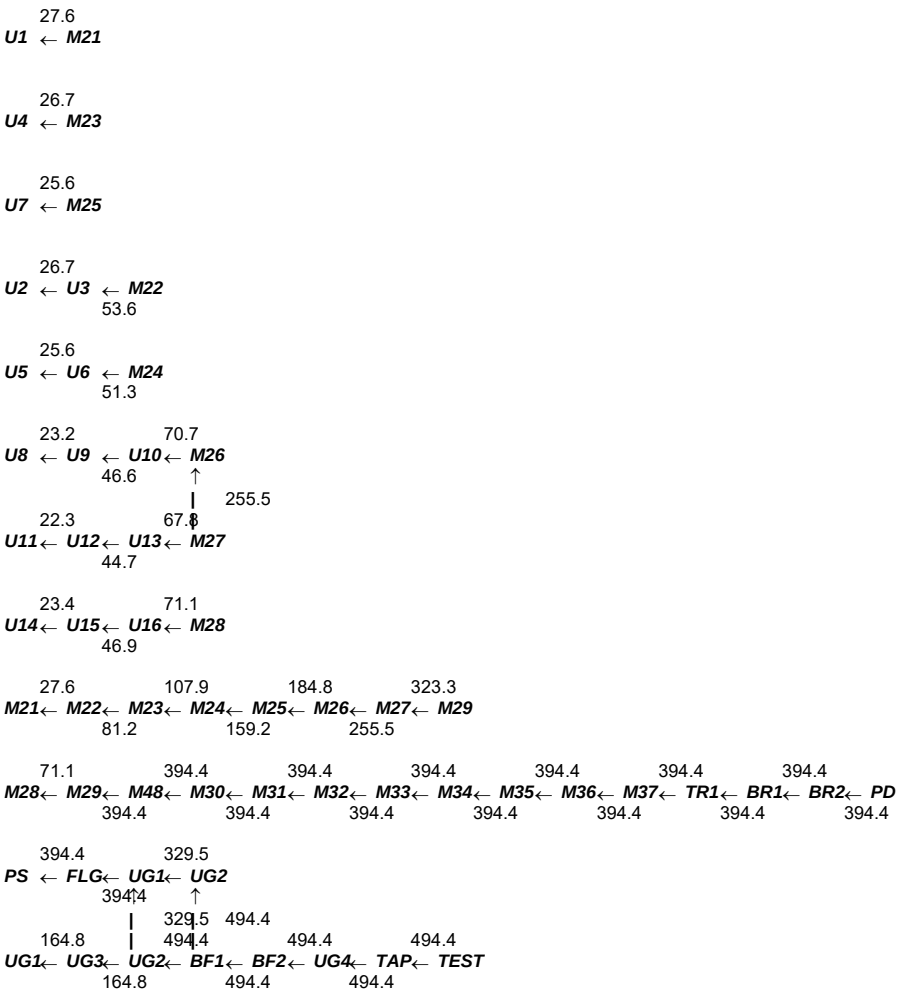
City Water Supply:
- C1 - Static Pressure : 47
- C2 - Residual Pressure: 38
- C2 - Residual Flow : 750

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow
- A1 - Adjusted Static: 31.849
- A2 - Adj Resid : 21.412 @ 500
- A3 - Adj Resid : 9.885 @ 750

Pump Data:
- P1 - Pump Churn Pressure : 44
- P2 - Pump Rated Pressure : 40
- P2 - Pump Rated Flow : 500
- P3 - Pump Pressure @ Max Flow : 26
- P3 - Pump Max Flow : 750
- City Residual Flow @ 0 = 1832.70
- City Residual Flow @ 20 = 1358.20
- City Water @ 150% of Pump = 38.00

Demand:
- D1 - Elevation : 10.629
- D2 - System Flow : 394.359
- D2 - System Pressure : 53.146
- Hose (Demand) : _____
- D3 - System Demand : 394.359
- Hose (Adj City) : 250
- Safety Margin : 13.568




27.6
U1 ← M21
26.7
U4 ← M23
25.6
U7 ← M25
26.7
U2 ← U3 ← M22
53.6
25.6
U5 ← U6 ← M24
51.3
23.2 70.7
U8 ← U9 ← U10 ← M26
46.6
255.5
22.3 67.8
U11 ← U12 ← U13 ← M27
44.7
23.4 71.1
U14 ← U15 ← U16 ← M28
46.9
27.6 107.9 184.8 323.3
M21 ← M22 ← M23 ← M24 ← M25 ← M26 ← M27 ← M29
81.2 159.2 255.5
71.1 394.4 394.4 394.4 394.4 394.4 394.4
M28 ← M29 ← M48 ← M30 ← M31 ← M32 ← M33 ← M34 ← M35 ← M36 ← M37 ← TR1 ← BR1 ← BR2 ← PD
394.4 394.4 394.4 394.4 394.4 394.4 394.4
394.4 329.5
PS ← FLG ← UG1 ← UG2
394.4
329.5 494.4
164.8 494.4 494.4 494.4
UG1 ← UG3 ← UG2 ← BF1 ← BF2 ← UG4 ← TAP ← TEST
164.8 494.4 494.4

Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
Aty	Alarm Tyco AV-1							14			23		24	23							
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
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
I	90' Grvd-Vic Elbow #10	0	0	2	3	4	3.5	6	5	8	7	8.5	10	13	17	20	23	25	33	36	40
J	90'Tee-Branch Grv Vic #20	0	0	4.5	6	8	8.5	10.8	13	17	16	21	25	33	41	50	65	78	88	98	120
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
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
Zai	Ames 4000SS	Fitting generates a Fixed Loss Based on Flow																			

Units 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

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
U1	21.833	8	11.91	na	27.61	0.2	94	7.0
U4	23.667	8	11.12	na	26.68	0.2	94	7.0
U7	25.5	8	10.26	na	25.63	0.2	94	7.0
U2	22.167	8	11.12	na	26.68	0.2	127	10.2
U3	22.167	8	11.32	na	26.92	0.2	127	10.2
U5	24.542	8	10.2	na	25.55	0.2	127	10.2
U6	24.542	8	10.38	na	25.78	0.2	127	10.2
U8	25.917	8	8.43	na	23.22	0.2	107	7.3
U9	25.917	8	8.56	na	23.4	0.2	107	7.3
U10	25.917	8	9.02	na	24.03	0.2	107	7.3
U11	29.333	8	7.76	na	22.28	0.2	107	7.3
U12	29.333	8	7.88	na	22.45	0.2	107	7.3
U13	29.333	8	8.31	na	23.06	0.2	107	7.3
U14	31.583	8	8.53	na	23.36	0.2	107	7.3
U15	31.583	8	8.66	na	23.54	0.2	107	7.3
U16	31.583	8	9.13	na	24.17	0.2	107	7.3
M21	21.833		13.37	na				
M22	21.833		13.37	na				
M23	21.833		13.43	na				
M24	21.833		13.49	na				
M25	21.833		13.63	na				
M26	21.833		13.9	na				
M27	21.833		14.73	na				
M28	21.833		17.13	na				
M29	21.833		17.25	na				
M48	20.5		20.26	na				
M30	20.5		26.42	na				
M31	20.5		30.08	na				
M32	20.5		31.88	na				
M33	20.5		32.71	na				
M34	13.208		36.44	na				
M35	13.208		37.45	na				
M36	13.208		40.28	na				
M37	13.208		41.94	na				
TR1	13.208		42.39	na				
BR1	2.5		52.76	na				
BR2	2.5		52.83	na				
PD	2.5		53.15	na				
PS	2.5		24.75	na				
FLG	1.0		25.56	na				
UG1	0.0		26.51	na	100.0			
UG3	0.0		26.75	na				
UG2	0.0		26.83	na				
BF1	2.5		26.44	na				
BF2	0.0		38.11	na				
UG4	0.0		38.33	na				
TAP	0.0		38.94	na				
TEST	0.0		40.2	na	150.0			

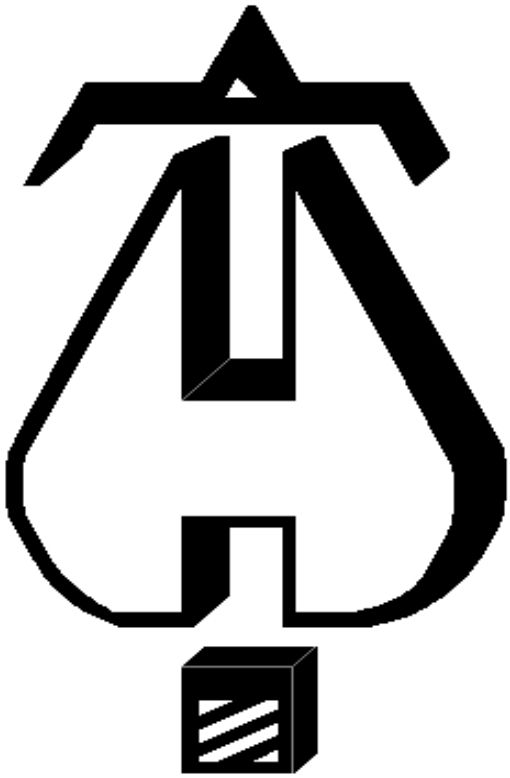
The maximum velocity is 15.16 and it occurs in the pipe between nodes M29 and M48

Node1 / to / Node2	Elev1 / Elev2	K / Fact	Qa / Qt	Nom / Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact / Pf/Ft	Pt Pe Pf	******* Notes ******
U1	21.833	8.00	27.61	1	1T	5.0	1.167	120	11.912	
to						0.0	5.000		0.0	
M21	21.833		27.61	1.049		0.0	6.167	0.2363	1.457	Vel = 10.25
			0.0							
M21			27.61						13.369	K Factor = 7.55
U4	23.667	8.00	26.68	1	1T	5.0	1.833	120	11.124	
to						0.0	5.000		0.794	
M23	21.833		26.68	1.049		0.0	6.833	0.2219	1.516	Vel = 9.90
			0.0							
M23			26.68						13.434	K Factor = 7.28
U7	25.500	8.00	25.63	1	1T	5.0	3.667	120	10.261	
to						0.0	5.000		1.588	
M25	21.833		25.63	1.049		0.0	8.667	0.2058	1.784	Vel = 9.51
			0.0							
M25			25.63						13.633	K Factor = 6.94
U2	22.167	8.00	26.68	1.5		0.0	8.875	120	11.123	
to						0.0	0.0		0.0	
U3	22.167		26.68	1.682		0.0	8.875	0.0223	0.198	Vel = 3.85
U3	22.167	8.00	26.92	1.5	1I	4.95	8.708	120	11.321	
to					1T	9.9	14.850		0.145	
M22	21.833		53.6	1.682		0.0	23.558	0.0809	1.905	Vel = 7.74
			0.0							
M22			53.60						13.371	K Factor = 14.66
U5	24.542	8.00	25.55	1.5		0.0	8.875	120	10.200	
to						0.0	0.0		0.0	
U6	24.542		25.55	1.682		0.0	8.875	0.0205	0.182	Vel = 3.69
U6	24.542	8.00	25.78	1.5	1I	4.95	11.125	120	10.382	
to					1T	9.9	14.850		1.173	
M24	21.833		51.33	1.682		0.0	25.975	0.0746	1.939	Vel = 7.41
			0.0							
M24			51.33						13.494	K Factor = 13.97
U8	25.917	8.00	23.22	1.5		0.0	7.458	120	8.428	
to						0.0	0.0		0.0	
U9	25.917		23.22	1.682		0.0	7.458	0.0172	0.128	Vel = 3.35
U9	25.917	8.00	23.40	1.5		0.0	7.458	120	8.556	
to						0.0	0.0		0.0	
U10	25.917		46.62	1.682		0.0	7.458	0.0625	0.466	Vel = 6.73
U10	25.917	8.00	24.03	1.5	1I	4.95	8.250	120	9.022	
to					1T	9.9	14.850		1.769	
M26	21.833		70.65	1.682		0.0	23.100	0.1348	3.114	Vel = 10.20
			0.0							
M26			70.65						13.905	K Factor = 18.95
U11	29.333	8.00	22.28	1.5		0.0	7.458	120	7.758	
to						0.0	0.0		0.0	
U12	29.333		22.28	1.682		0.0	7.458	0.0160	0.119	Vel = 3.22
U12	29.333	8.00	22.46	1.5		0.0	7.458	120	7.877	
to						0.0	0.0		0.0	
U13	29.333		44.74	1.682		0.0	7.458	0.0578	0.431	Vel = 6.46

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
U13	29.333	8.00	23.05	1.5	1I	4.95	10.583	120	8.308	
to					1T	9.9	14.850		3.248	
M27	21.833		67.79	1.682		0.0	25.433	0.1249	3.177	Vel = 9.79
			0.0							
M27			67.79						14.733	K Factor = 17.66
U14	31.583	8.00	23.36	1.5		0.0	7.458	120	8.526	
to						0.0	0.0		0.0	
U15	31.583		23.36	1.682		0.0	7.458	0.0174	0.130	Vel = 3.37
U15	31.583	8.00	23.54	1.5		0.0	7.458	120	8.656	
to						0.0	0.0		0.0	
U16	31.583		46.9	1.682		0.0	7.458	0.0632	0.471	Vel = 6.77
U16	31.583	8.00	24.17	1.5	1I	4.95	12.917	120	9.127	
to					1T	9.9	14.850		4.223	
M28	21.833		71.07	1.682		0.0	27.767	0.1363	3.784	Vel = 10.26
			0.0							
M28			71.07						17.134	K Factor = 17.17
*										
M21	21.833		27.61	3		0.0	1.708	120	13.369	
to						0.0	0.0		0.0	
M22	21.833		27.61	3.26		0.0	1.708	0.0012	0.002	Vel = 1.06
M22	21.833		53.60	3		0.0	9.167	120	13.371	
to						0.0	0.0		0.0	
M23	21.833		81.21	3.26		0.0	9.167	0.0069	0.063	Vel = 3.12
M23	21.833		26.68	3		0.0	5.125	120	13.434	
to						0.0	0.0		0.0	
M24	21.833		107.89	3.26		0.0	5.125	0.0117	0.060	Vel = 4.15
M24	21.833		51.33	3		0.0	5.750	120	13.494	
to						0.0	0.0		0.0	
M25	21.833		159.22	3.26		0.0	5.750	0.0242	0.139	Vel = 6.12
M25	21.833		25.62	3		0.0	8.542	120	13.633	
to						0.0	0.0		0.0	
M26	21.833		184.84	3.26		0.0	8.542	0.0318	0.272	Vel = 7.10
M26	21.833		70.66	3		0.0	14.292	120	13.905	
to						0.0	0.0		0.0	
M27	21.833		255.5	3.26		0.0	14.292	0.0579	0.828	Vel = 9.82
M27	21.833		67.79	3	1J	17.471	10.625	120	14.733	
to						0.0	17.471		0.0	
M29	21.833		323.29	3.26		0.0	28.096	0.0896	2.516	Vel = 12.43
			0.0							
M29			323.29						17.249	K Factor = 77.84
M28	21.833		71.07	3	1J	17.471	3.708	120	17.134	
to						0.0	17.471		0.0	
M29	21.833		71.07	3.26		0.0	21.179	0.0054	0.115	Vel = 2.73
M29	21.833		323.29	3	1J	17.471	1.333	120	17.249	
to						0.0	17.471		0.577	
M48	20.500		394.36	3.26		0.0	18.804	0.1293	2.432	Vel = 15.16
M48	20.500		0.0	3		0.0	47.625	120	20.258	
to						0.0	0.0		0.0	
M30	20.500		394.36	3.26		0.0	47.625	0.1293	6.160	Vel = 15.16

Node1 / to / Node2	Elev1 / Elev2	K / Fact	Qa / Qt	Nom / Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact / Pf/Ft	Pt / Pe / Pf	******* Notes ******
M30	20.500		0.0	4	1J	21.067	83.042	120	26.418	
to						0.0	21.067		0.0	
M31	20.500		394.36	4.26		0.0	104.109	0.0351	3.658	Vel = 8.88
M31	20.500		0.0	4	1J	21.067	30.208	120	30.076	
to						0.0	21.067		0.0	
M32	20.500		394.36	4.26		0.0	51.275	0.0351	1.802	Vel = 8.88
M32	20.500		0.0	4	1J	21.067	2.500	120	31.878	
to						0.0	21.067		0.0	
M33	20.500		394.36	4.26		0.0	23.567	0.0351	0.828	Vel = 8.88
M33	20.500		0.0	4	1I	9.217	7.292	120	32.706	
to						0.0	9.217		3.158	
M34	13.208		394.36	4.26		0.0	16.509	0.0351	0.580	Vel = 8.88
M34	13.208		0.0	4	1J	21.067	7.500	120	36.444	
to						0.0	21.067		0.0	
M35	13.208		394.36	4.26		0.0	28.567	0.0351	1.004	Vel = 8.88
M35	13.208		0.0	4	1I	9.217	71.250	120	37.448	
to						0.0	9.217		0.0	
M36	13.208		394.36	4.26		0.0	80.467	0.0351	2.828	Vel = 8.88
M36	13.208		0.0	4	1I	9.217	38.000	120	40.276	
to						0.0	9.217		0.0	
M37	13.208		394.36	4.26		0.0	47.217	0.0352	1.660	Vel = 8.88
M37	13.208		0.0	4	1I	9.217	3.667	120	41.936	
to						0.0	9.217		0.0	
TR1	13.208		394.36	4.26		0.0	12.884	0.0351	0.452	Vel = 8.88
			0.0							
TR1			394.36						42.388	K Factor = 60.57
*										
TR1	13.208		394.36	4	1B	15.8	10.708	120	42.388	
to					1Fsp	0.0	67.151		7.638	* * Fixed Loss = 3
BR1	2.500		394.36	4.26	1Aty	30.284	77.859	0.0351	2.736	Vel = 8.88
					1J	21.067				
BR1	2.500		0.0	4		0.0	2.000	120	52.762	
to						0.0	0.0		0.0	
BR2	2.500		394.36	4.26		0.0	2.000	0.0350	0.070	Vel = 8.88
			0.0							
BR2			394.36						52.832	K Factor = 54.26
*										
BR2	2.500		394.36	6	1B	12.573	10.000	120	52.832	
to					1S	40.235	52.808		0.0	
PD	2.500		394.36	6.357		0.0	62.808	0.0050	0.314	Vel = 3.99
			0.0							
PD			394.36						53.146	K Factor = 54.10
System Demand Pressure									53.146	
Safety Margin									13.568	
Continuation Pressure									66.714	
Pressure @ Pump Outlet									66.714	
Pressure From Pump Curve									-41.962	
Pressure @ Pump Inlet									24.752	

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
*										
PS	2.5		0.0	6	1G	3.772	10.500	120	24.752	
to					1E	17.603	21.375		0.650	
FLG	1		394.36	6.357		0.0	31.875	0.0050	0.159	Vel = 3.99
			0.0							
FLG			394.36						25.561	K Factor = 78.00
*										
FLG	1		394.36	6	1E	20.084	50.000	140	25.561	
to					1G	4.304	67.425		0.433	
UG1	0		394.36	6.16	1T	43.037	117.425	0.0044	0.515	Vel = 4.25
			0.0							
UG1			394.36						26.509	K Factor = 76.59
*										
UG1	0	H100	329.53	8	2F	28.468	394.000	140	26.509	
to						0.0	28.468		0.0	
UG2	0		329.53	8.27		0.0	422.468	0.0008	0.317	Vel = 1.97
			0.0							
UG2			329.53						26.826	K Factor = 63.62
UG1	0		164.83	8	5F	71.17	988.000	140	26.509	
to					3E	85.404	181.879		0.0	
UG3	0		164.83	8.27	4G	25.305	1169.879	0.0002	0.244	Vel = 0.98
UG3	0		0.0	8	3F	42.702	303.000	140	26.753	
to					1G	6.326	49.028		0.0	
UG2	0		164.83	8.27		0.0	352.028	0.0002	0.073	Vel = 0.98
			0.0							
UG2			164.83						26.826	K Factor = 31.82
*										
UG2	0		494.36	8	2E	56.936	381.000	140	26.826	
to						0.0	56.936		-1.083	
BF1	2.500		494.36	8.27		0.0	437.936	0.0016	0.695	Vel = 2.95
BF1	2.500		0.0	8	1Zai	0.0	6.000	120	26.438	
to						0.0	0.0		11.661	* * Fixed Loss = 10.578
BF2	0		494.36	8.249		0.0	6.000	0.0022	0.013	Vel = 2.97
BF2	0		0.0	8	2E	56.936	26.000	140	38.112	
to					1T	55.354	112.290		0.0	
UG4	0		494.36	8.27		0.0	138.290	0.0016	0.219	Vel = 2.95
UG4	0		0.0	8	1T	55.354	321.000	140	38.331	
to					1G	6.326	61.680		0.0	
TAP	0		494.36	8.27		0.0	382.680	0.0016	0.607	Vel = 2.95
TAP	0		0.0	8	1Eql	297.332	500.000	140	38.938	
to						0.0	297.332		0.0	
TEST	0		494.36	8.27		0.0	797.332	0.0016	1.266	Vel = 2.95
			150.00							Qa = 150.00
TEST			644.36						40.204	K Factor = 101.62



. . . Fire Protection by Computer Design

Reliable Fire Protection LLC
32 Partin Rd.
Dunn, NC 28334
Robert Lawley
NICET Level III #103122

Job Name	:	EE - GYM AREA 3
Building	:	FP1,2,3,4
Location	:	DENIM DR., ERWIN, NC 28339
System	:	3
Contract	:	2020-098
Data File	:	EE AREA 3.WXF

HYDRAULIC CALCULATIONS
for

Project name: ERWIN ELEMENTARY SCHOOL
Location: DENIM DR., ERWIN, NC 28339
Drawing no: FP1,2,3,4
Date: 08-19-20

Design

Remote area number: 3
Remote area location: GYMNASIUM
Occupancy classification: LIGHT HAZARD
Density: 0.10 - Gpm/SqFt
Area of application: 1,500 - SqFt
Coverage per sprinkler: 225 MAX - SqFt
Type of sprinklers calculated: STANDARD SPRAY PENDANT
No. of sprinklers calculated: 8
In-rack demand: N/A - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 262.480 - GPM @ 21.814 - Psi
Type of system: WET - TREE
Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 08-23-20
Location: DENIM DR.
Source: LKC ENGINEERING, LLC

Name of contractor: RELIABLE FIRE PROTECTION, LLC
Address: 32 PARTIN RD., DUNN, NC 28334
Phone number: 910-980-1234
Name of designer: ROBERT LAWLEY 26806-FS1
Authority having jurisdiction: HARNETT COUNTY
Notes: (Include peaking information or gridded systems here.)

Water Supply Curve C

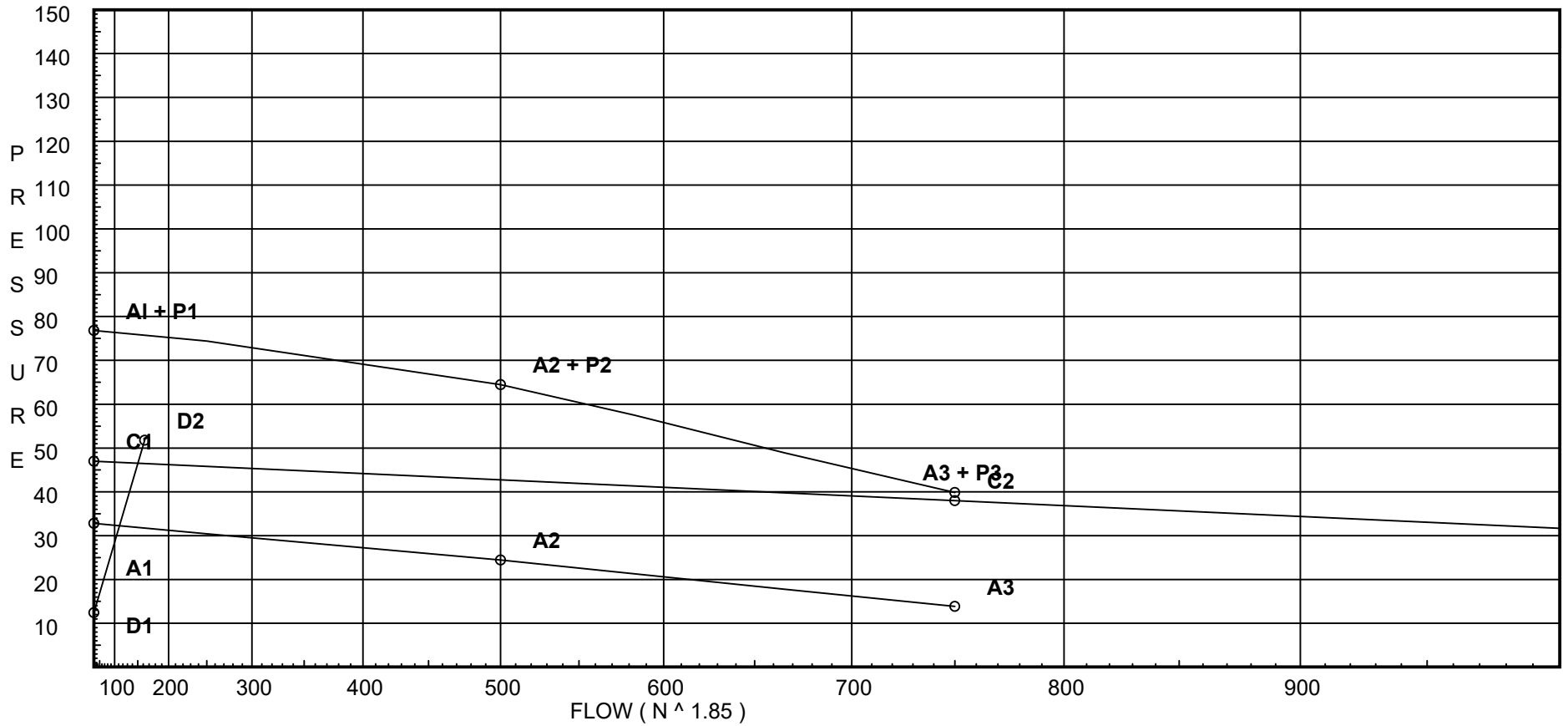
Reliable Fire Protection LLC
EE - GYM AREA 3

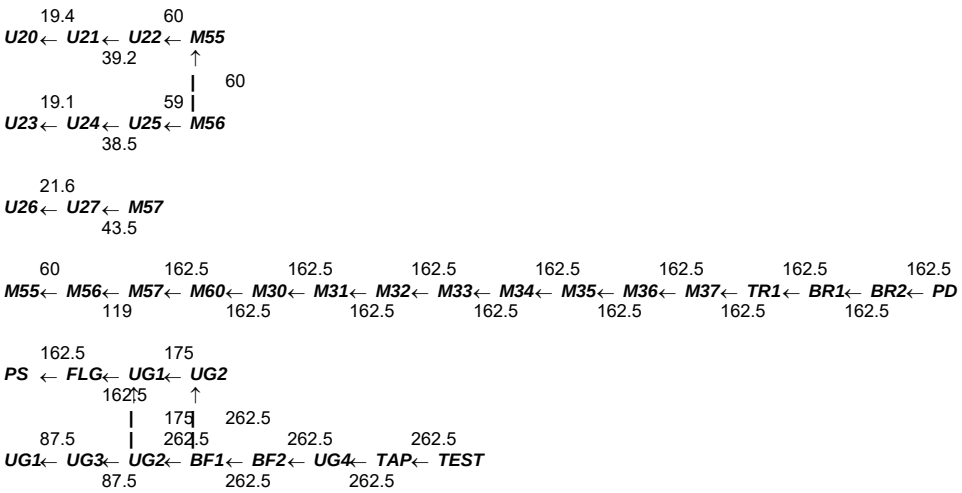
City Water Supply:
- C1 - Static Pressure : 47
- C2 - Residual Pressure: 38
- C2 - Residual Flow : 750

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow
- A1 - Adjusted Static: 32.812
- A2 - Adj Resid : 24.456 @ 500
- A3 - Adj Resid : 13.864 @ 750

Pump Data:
- P1 - Pump Churn Pressure : 44
- P2 - Pump Rated Pressure : 40
- P2 - Pump Rated Flow : 500
- P3 - Pump Pressure @ Max Flow : 26
- P3 - Pump Max Flow : 750
- City Residual Flow @ 0 = 1832.70
- City Residual Flow @ 20 = 1358.20
- City Water @ 150% of Pump = 38.00

Demand:
- D1 - Elevation : 12.416
- D2 - System Flow : 162.48
- D2 - System Pressure : 51.786
- Hose (Demand) : _____
- D3 - System Demand : 162.48
- Hose (Adj City) : 100
- Safety Margin : 23.896




19.4
60
U20 ← U21 ← U22 ← M55
39.2
60
19.1
59
U23 ← U24 ← U25 ← M56
38.5
21.6
U26 ← U27 ← M57
43.5
60
162.5
162.5
162.5
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162.5
162.5
162.5
M55 ← M56 ← M57 ← M60 ← M30 ← M31 ← M32 ← M33 ← M34 ← M35 ← M36 ← M37 ← TR1 ← BR1 ← BR2 ← PD
119
162.5
162.5
162.5
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162.5
162.5
175
PS ← FLG ← UG1 ← UG2
162.5
175
262.5
87.5
262.5
262.5
262.5
UG1 ← UG3 ← UG2 ← BF1 ← BF2 ← UG4 ← TAP ← TEST
87.5
262.5
262.5

Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
Aty	Alarm Tyco AV-1							14			23		24	23							
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
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
I	90' Grvd-Vic Elbow #10	0	0	2	3	4	3.5	6	5	8	7	8.5	10	13	17	20	23	25	33	36	40
J	90'Tee-Branch Grv Vic #20	0	0	4.5	6	8	8.5	10.8	13	17	16	21	25	33	41	50	65	78	88	98	120
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
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
Zai	Ames 4000SS	Fitting generates a Fixed Loss Based on Flow																			

Units 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

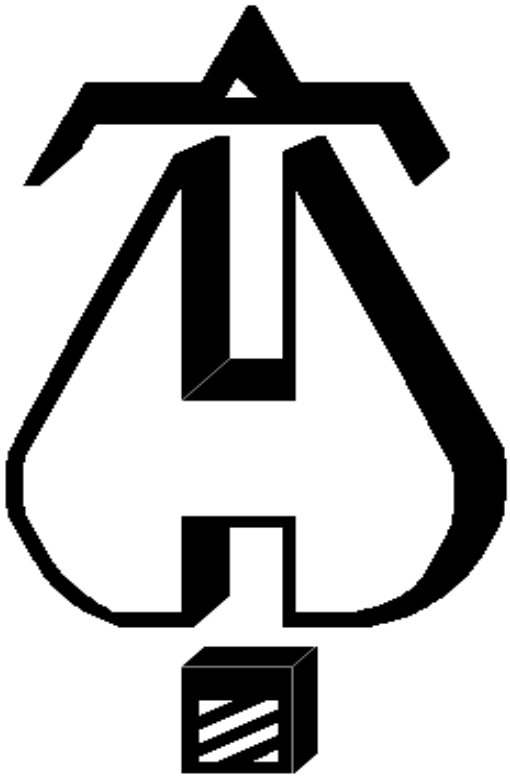
Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
U20	26.5	5.6	12.03	na	19.42	0.1	191	11.6
U21	26.5	5.6	12.42	na	19.73	0.1	191	11.6
U22	26.5	5.6	13.84	na	20.83	0.1	191	11.6
U23	28.667	5.6	11.63	na	19.1	0.1	191	11.6
U24	28.667	5.6	12.01	na	19.41	0.1	191	11.6
U25	28.667	5.6	13.39	na	20.49	0.1	191	11.6
U26	30.792	5.6	14.85	na	21.58	0.1	191	11.6
U27	30.792	5.6	15.32	na	21.92	0.1	191	11.6
M55	26.667		17.37	na				
M56	28.667		16.88	na				
M57	30.792		17.31	na				
M60	36.458		23.94	na				
M30	21.0		37.69	na				
M31	21.0		38.4	na				
M32	21.0		38.75	na				
M33	21.0		38.91	na				
M34	13.208		42.4	na				
M35	13.208		42.6	na				
M36	13.208		43.15	na				
M37	13.208		43.47	na				
TR1	13.208		43.56	na				
BR1	2.5		51.72	na				
BR2	2.5		51.73	na				
PD	2.5		51.79	na				
PS	2.5		31.69	na				
FLG	1.0		32.37	na				
UG1	0.0		32.9	na	100.0			
UG3	0.0		32.98	na				
UG2	0.0		33.0	na				
BF1	2.5		32.13	na				
BF2	0.0		45.06	na				
UG4	0.0		45.13	na				
TAP	0.0		45.32	na				
TEST	0.0		45.71	na				

The maximum velocity is 14.27 and it occurs in the pipe between nodes M57 and M60

Node1 / to / Node2	Elev1 / Elev2	K / Fact	Qa / Qt	Nom / Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact / Pf/Ft	Pt Pe Pf	******* Notes ******
U20	26.500	5.60	19.42	1.25		0.0	14.833	120	12.027	
to						0.0	0.0		0.0	
U21	26.500		19.42	1.442		0.0	14.833	0.0262	0.388	Vel = 3.82
U21	26.500	5.60	19.73	1.25		0.0	14.833	120	12.415	
to						0.0	0.0		0.0	
U22	26.500		39.15	1.442		0.0	14.833	0.0957	1.420	Vel = 7.69
U22	26.500	5.60	20.83	1.25	1T	7.432	9.667	120	13.835	
to						0.0	7.432		-0.072	
M55	26.667		59.98	1.442		0.0	17.099	0.2108	3.604	Vel = 11.78
			0.0							
M55			59.98						17.367	K Factor = 14.39
*										
U23	28.667	5.60	19.10	1.25		0.0	14.833	120	11.633	
to						0.0	0.0		0.0	
U24	28.667		19.1	1.442		0.0	14.833	0.0253	0.376	Vel = 3.75
U24	28.667	5.60	19.41	1.25		0.0	14.833	120	12.009	
to						0.0	0.0		0.0	
U25	28.667		38.51	1.442		0.0	14.833	0.0928	1.377	Vel = 7.57
U25	28.667	5.60	20.49	1.25	1T	7.432	9.667	120	13.386	
to						0.0	7.432		0.0	
M56	28.667		59.0	1.442		0.0	17.099	0.2045	3.496	Vel = 11.59
			0.0							
M56			59.00						16.882	K Factor = 14.36
*										
U26	30.792	5.60	21.58	1.25		0.0	14.833	120	14.852	
to						0.0	0.0		0.0	
U27	30.792		21.58	1.442		0.0	14.833	0.0318	0.471	Vel = 4.24
U27	30.792	5.60	21.92	1.25	1T	7.432	9.667	120	15.323	
to						0.0	7.432		0.0	
M57	30.792		43.5	1.442		0.0	17.099	0.1164	1.990	Vel = 8.55
			0.0							
M57			43.50						17.313	K Factor = 10.45
*										
M55	26.667		59.98	2		0.0	12.833	120	17.367	
to						0.0	0.0		-0.866	
M56	28.667		59.98	2.157		0.0	12.833	0.0297	0.381	Vel = 5.27
M56	28.667		59.00	2		0.0	12.833	120	16.882	
to						0.0	0.0		-0.920	
M57	30.792		118.98	2.157		0.0	12.833	0.1053	1.351	Vel = 10.45
M57	30.792		43.50	2	3I	12.922	35.542	120	17.313	
to						0.0	12.922		-2.454	
M60	36.458		162.48	2.157		0.0	48.464	0.1874	9.082	Vel = 14.27
M60	36.458		0.0	2	1I	4.307	21.042	120	23.941	
to					1T	12.307	16.614		6.695	
M30	21		162.48	2.157		0.0	37.656	0.1874	7.057	Vel = 14.27
			0.0							
M30			162.48						37.693	K Factor = 26.46
*										

Node1 / to / Node2	Elev1 / Elev2	K / Fact	Qa / Qt	Nom / Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact / Pf/Ft	Pt / Pe / Pf	******* Notes ******
M30	21		162.48	4	1J	21.067	83.042	120	37.693	
to						0.0	21.067		0.0	
M31	21		162.48	4.26		0.0	104.109	0.0068	0.709	Vel = 3.66
M31	21		0.0	4	1J	21.067	30.208	120	38.402	
to						0.0	21.067		0.0	
M32	21		162.48	4.26		0.0	51.275	0.0068	0.350	Vel = 3.66
M32	21		0.0	4	1J	21.067	2.500	120	38.752	
to						0.0	21.067		0.0	
M33	21		162.48	4.26		0.0	23.567	0.0068	0.160	Vel = 3.66
M33	21		0.0	4	1I	9.217	7.292	120	38.912	
to						0.0	9.217		3.375	
M34	13.208		162.48	4.26		0.0	16.509	0.0068	0.113	Vel = 3.66
M34	13.208		0.0	4	1J	21.067	8.000	120	42.400	
to						0.0	21.067		0.0	
M35	13.208		162.48	4.26		0.0	29.067	0.0068	0.198	Vel = 3.66
M35	13.208		0.0	4	1I	9.217	71.250	120	42.598	
to						0.0	9.217		0.0	
M36	13.208		162.48	4.26		0.0	80.467	0.0068	0.548	Vel = 3.66
M36	13.208		0.0	4	1I	9.217	38.000	120	43.146	
to						0.0	9.217		0.0	
M37	13.208		162.48	4.26		0.0	47.217	0.0068	0.322	Vel = 3.66
M37	13.208		0.0	4	1I	9.217	3.667	120	43.468	
to						0.0	9.217		0.0	
TR1	13.208		162.48	4.26		0.0	12.884	0.0068	0.088	Vel = 3.66
			0.0							
TR1			162.48						43.556	K Factor = 24.62
*										
TR1	13.208		162.48	4	1B	15.8	10.708	120	43.556	
to					1Fsp	0.0	67.151		7.638	* * Fixed Loss = 3
BR1	2.500		162.48	4.26	1Aty	30.284	77.859	0.0068	0.530	Vel = 3.66
					1J	21.067				
BR1	2.500		0.0	6		0.0	2.000	120	51.724	
to						0.0	0.0		0.0	
BR2	2.500		162.48	6.357		0.0	2.000	0.0010	0.002	Vel = 1.64
			0.0							
BR2			162.48						51.726	K Factor = 22.59
*										
BR2	2.500		162.48	6	1B	12.573	10.000	120	51.726	
to					1S	40.235	52.808		0.0	
PD	2.500		162.48	6.357		0.0	62.808	0.0010	0.060	Vel = 1.64
			0.0							
PD			162.48						51.786	K Factor = 22.58
System Demand Pressure									51.786	
Safety Margin									23.896	
Continuation Pressure									75.682	
Pressure @ Pump Outlet									75.682	
Pressure From Pump Curve									-43.995	
Pressure @ Pump Inlet									31.686	

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
*										
PS	2.5		0.0	6	1G	3.772	10.500	120	31.686	
to					1E	17.603	21.375		0.650	
FLG	1		162.48	6.357		0.0	31.875	0.0010	0.032	Vel = 1.64
			0.0							
FLG			162.48						32.368	K Factor = 28.56
*										
FLG	1		162.48	6	1E	20.084	50.000	140	32.368	
to					1G	4.304	67.425		0.433	
UG1	0		162.48	6.16	1T	43.037	117.425	0.0008	0.099	Vel = 1.75
			0.0							
UG1			162.48						32.900	K Factor = 28.33
*										
UG1	0	H100	174.96	8	2F	28.468	394.000	140	32.900	
to						0.0	28.468		0.0	
UG2	0		174.96	8.27		0.0	422.468	0.0002	0.098	Vel = 1.05
			0.0							
UG2			174.96						32.998	K Factor = 30.46
UG1	0		87.52	8	5F	71.17	988.000	140	32.900	
to					3E	85.404	181.879		0.0	
UG3	0		87.52	8.27	4G	25.305	1169.879	0.0001	0.076	Vel = 0.52
UG3	0		0.0	8	3F	42.702	303.000	140	32.976	
to					1G	6.326	49.028		0.0	
UG2	0		87.52	8.27		0.0	352.028	0.0001	0.022	Vel = 0.52
			0.0							
UG2			87.52						32.998	K Factor = 15.24
*										
UG2	0		262.48	8	2E	56.936	381.000	140	32.998	
to						0.0	56.936		-1.083	
BF1	2.500		262.48	8.27		0.0	437.936	0.0005	0.215	Vel = 1.57
BF1	2.500		0.0	8	1Zai	0.0	6.000	120	32.130	
to						0.0	0.0		12.926	* * Fixed Loss = 11.844
BF2	0		262.48	8.249		0.0	6.000	0.0008	0.005	Vel = 1.58
BF2	0		0.0	8	2E	56.936	26.000	140	45.061	
to					1T	55.354	112.290		0.0	
UG4	0		262.48	8.27		0.0	138.290	0.0005	0.069	Vel = 1.57
UG4	0		0.0	8	1T	55.354	321.000	140	45.130	
to					1G	6.326	61.680		0.0	
TAP	0		262.48	8.27		0.0	382.680	0.0005	0.187	Vel = 1.57
TAP	0		0.0	8	1Eql	297.332	500.000	140	45.317	
to						0.0	297.332		0.0	
TEST	0		262.48	8.27		0.0	797.332	0.0005	0.393	Vel = 1.57
			0.0							
TEST			262.48						45.710	K Factor = 38.82



. . . Fire Protection by Computer Design

Reliable Fire Protection LLC
32 Partin Rd.
Dunn, NC 28334
Robert Lawley
NICET Level III #103122

Job Name	:	EE - AUDITORIUM AREA 4
Building	:	FP1,2,3,4
Location	:	DENIM DR., ERWIN, NC 28339
System	:	4
Contract	:	2020-098
Data File	:	EE AREA 4.WXF

HYDRAULIC CALCULATIONS
for

Project name: ERWIN ELEMENTARY SCHOOL
Location: DENIM DR., ERWIN, NC 28339
Drawing no: FP1,2,3,4
Date: 08-19-20

Design

Remote area number: 4
Remote area location: AUDITORIUM
Occupancy classification: LIGHT HAZARD
Density: 0.10 - Gpm/SqFt
Area of application: 1,500 - SqFt
Coverage per sprinkler: 225 MAX - SqFt
Type of sprinklers calculated: STANDARD SPRAY PENDANT
No. of sprinklers calculated: 17
In-rack demand: N/A - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 414.007 - GPM @ 23.174 - Psi
Type of system: WET - TREE
Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 08-23-20
Location: DENIM DR.
Source: LKC ENGINEERING, LLC

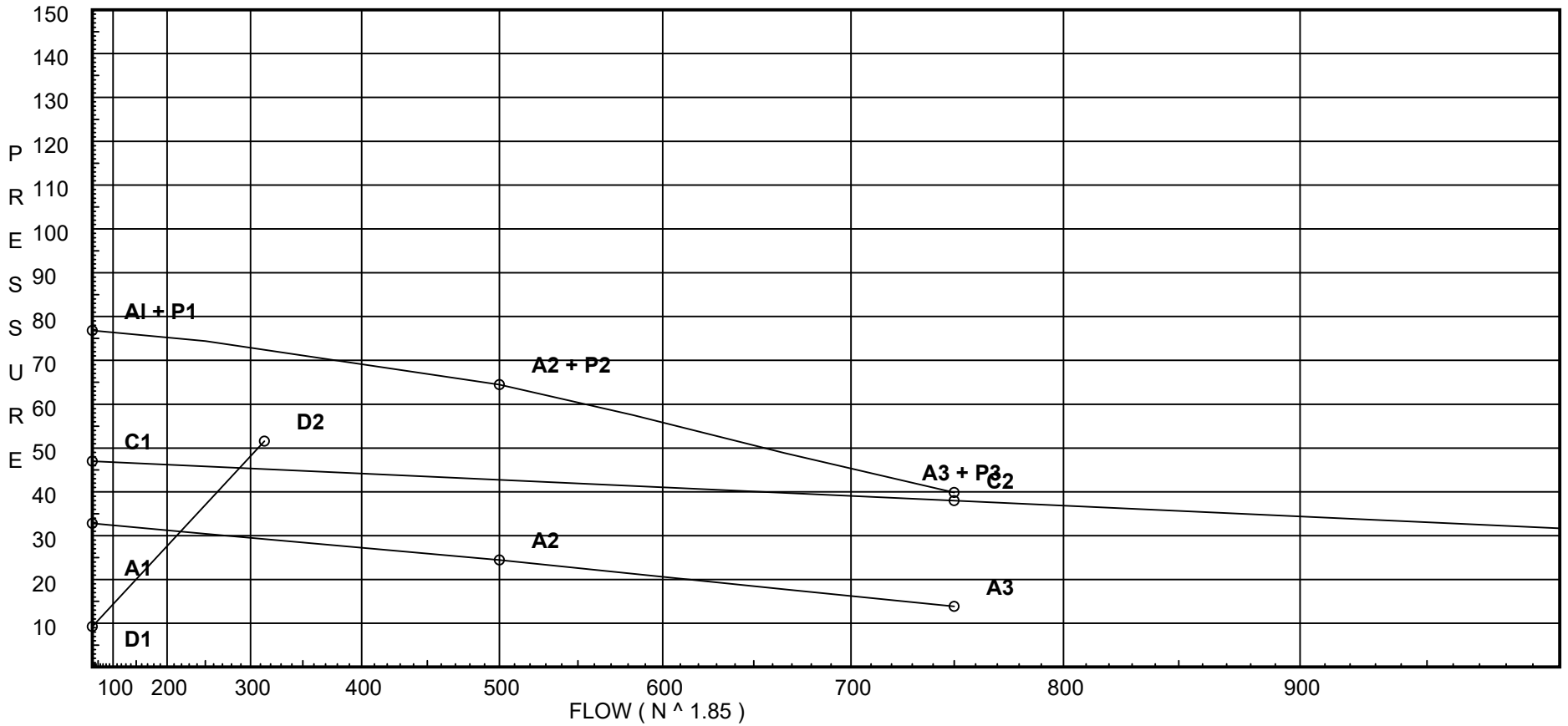
Name of contractor: RELIABLE FIRE PROTECTION, LLC
Address: 32 PARTIN RD., DUNN, NC 28334
Phone number: 910-980-1234
Name of designer: ROBERT LAWLEY 26806-FS1
Authority having jurisdiction: HARNETT COUNTY
Notes: (Include peaking information or gridded systems here.)

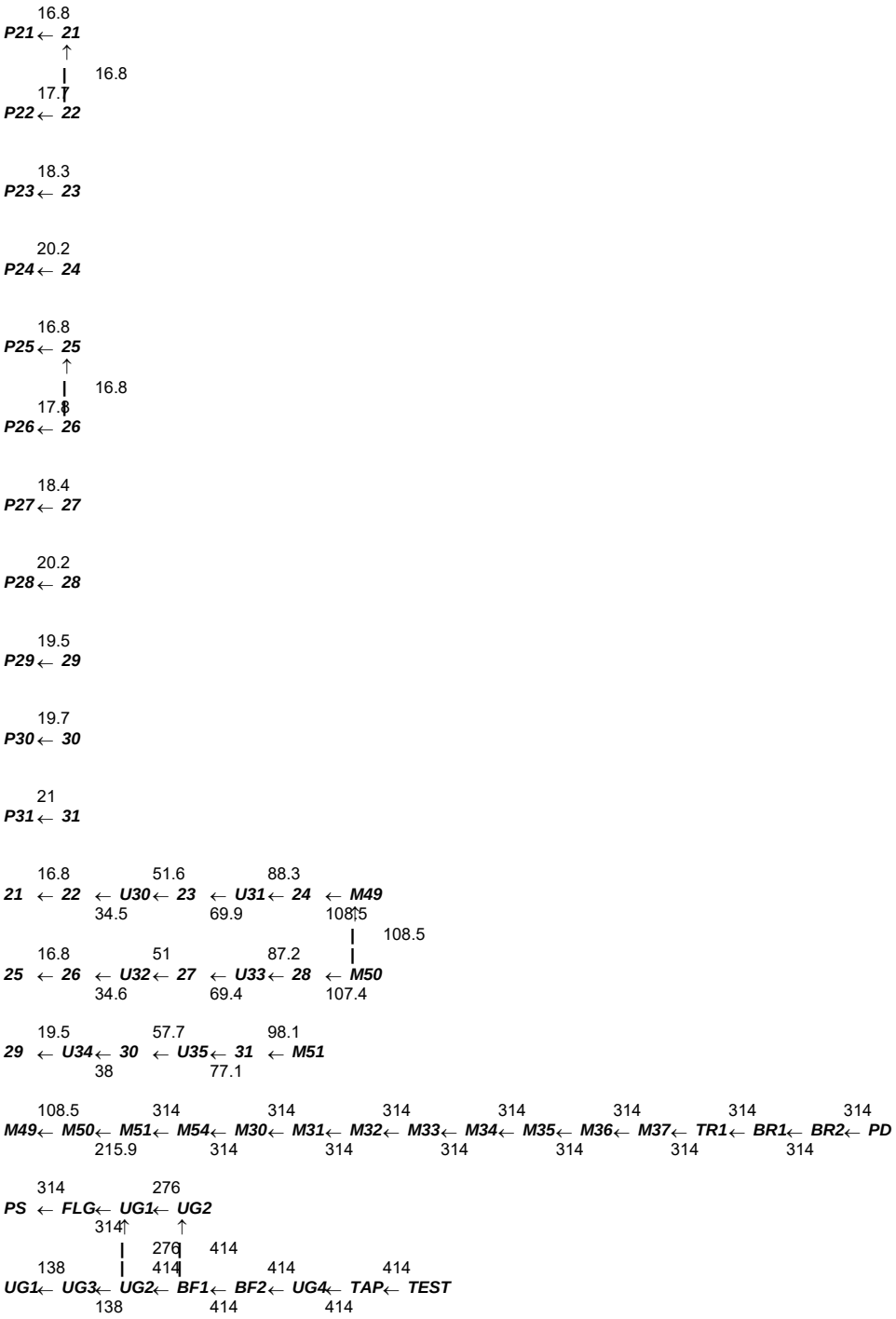
City Water Supply:
- C1 - Static Pressure : 47
- C2 - Residual Pressure: 38
- C2 - Residual Flow : 750

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow
- A1 - Adjusted Static: 32.812
- A2 - Adj Resid : 24.456 @ 500
- A3 - Adj Resid : 13.864 @ 750

Pump Data:
- P1 - Pump Churn Pressure : 44
- P2 - Pump Rated Pressure : 40
- P2 - Pump Rated Flow : 500
- P3 - Pump Pressure @ Max Flow : 26
- P3 - Pump Max Flow : 750
- City Residual Flow @ 0 = 1832.70
- City Residual Flow @ 20 = 1358.20
- City Water @ 150% of Pump = 38.00

Demand:
- D1 - Elevation : 9.239
- D2 - System Flow : 314.007
- D2 - System Pressure : 51.576
- Hose (Demand) : _____
- D3 - System Demand : 314.007
- Hose (Adj City) : 100
- Safety Margin : 20.828




16.8
P21 ← 21
16.8
17.7
P22 ← 22
18.3
P23 ← 23
20.2
P24 ← 24
16.8
P25 ← 25
16.8
17.8
P26 ← 26
18.4
P27 ← 27
20.2
P28 ← 28
19.5
P29 ← 29
19.7
P30 ← 30
21
P31 ← 31
16.8 51.6 88.3
21 ← 22 ← U30 ← 23 ← U31 ← 24 ← M49
34.5 69.9 108.5
108.5
16.8 51 87.2
25 ← 26 ← U32 ← 27 ← U33 ← 28 ← M50
34.6 69.4 107.4
19.5 57.7 98.1
29 ← U34 ← 30 ← U35 ← 31 ← M51
38 77.1
108.5 314 314 314 314 314 314 314
M49 ← M50 ← M51 ← M54 ← M30 ← M31 ← M32 ← M33 ← M34 ← M35 ← M36 ← M37 ← TR1 ← BR1 ← BR2 ← PD
215.9 314 314 314 314 314 314
314 276
PS ← FLG ← UG1 ← UG2
314
276 414
138 414 414 414
UG1 ← UG3 ← UG2 ← BF1 ← BF2 ← UG4 ← TAP ← TEST
138 414 414

Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
Aty	Alarm Tyco AV-1							14			23		24	23							
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
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
I	90' Grvd-Vic Elbow #10	0	0	2	3	4	3.5	6	5	8	7	8.5	10	13	17	20	23	25	33	36	40
J	90'Tee-Branch Grv Vic #20	0	0	4.5	6	8	8.5	10.8	13	17	16	21	25	33	41	50	65	78	88	98	120
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
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
Zai	Ames 4000SS	Fitting generates a Fixed Loss Based on Flow																			

Units 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

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
P21	21.333	5.6	9.0	na	16.8	0.1	168	9.0
P22	21.333	5.6	10.04	na	17.75	0.1	120	7.0
P23	21.333	5.6	10.7	na	18.32	0.1	120	7.0
P24	21.333	5.6	13.04	na	20.22	0.1	120	7.0
P25	21.333	5.6	9.01	na	16.81	0.1	120	7.0
P26	21.333	5.6	10.13	na	17.82	0.1	150	7.3
P27	21.333	5.6	10.77	na	18.38	0.1	120	7.0
P28	21.333	5.6	13.02	na	20.2	0.1	120	7.0
P29	21.333	5.6	12.08	na	19.47	0.1	150	7.3
P30	21.333	5.6	12.41	na	19.72	0.1	120	7.0
P31	21.333	5.6	14.08	na	21.01	0.1	120	7.0
21	25.917		8.99	na				
22	25.917		9.06	na				
U30	25.917	5.6	9.25	na	17.03	0.1	120	7.0
23	25.917		9.77	na				
U31	25.917	5.6	10.83	na	18.43	0.1	120	7.0
24	25.917		12.33	na				
25	28.375		8.16	na				
26	28.375		8.35	na				
U32	28.375	5.6	8.54	na	16.37	0.1	120	7.0
27	28.375		9.06	na				
U33	28.375	5.6	10.1	na	17.8	0.1	120	7.0
28	28.375		11.56	na				
29	28.375		10.86	na				
U34	28.375	5.6	10.93	na	18.51	0.1	120	7.0
30	28.375		11.23	na				
U35	28.375	5.6	11.97	na	19.37	0.1	120	7.0
31	28.375		13.13	na				
M49	25.917		18.49	na				
M50	28.375		17.6	na				
M51	28.375		18.24	na				
M54	36.25		19.62	na				
M30	21.0		30.14	na				
M31	21.0		32.54	na				
M32	21.0		33.72	na				
M33	21.0		34.26	na				
M34	13.208		38.02	na				
M35	13.208		38.69	na				
M36	13.208		40.54	na				
M37	13.208		41.63	na				
TR1	13.208		41.93	na				
BR1	2.5		51.36	na				
BR2	2.5		51.37	na				
PD	2.5		51.58	na				
PS	2.5		29.22	na				
FLG	1.0		29.97	na				
UG1	0.0		30.74	na	100.0			
UG3	0.0		30.92	na				
UG2	0.0		30.97	na				
BF1	2.5		30.39	na				
BF2	0.0		42.5	na				
UG4	0.0		42.65	na				
TAP	0.0		43.09	na				
TEST	0.0		44.0	na				

The maximum velocity is 15.67 and it occurs in the pipe between nodes 24 and M49

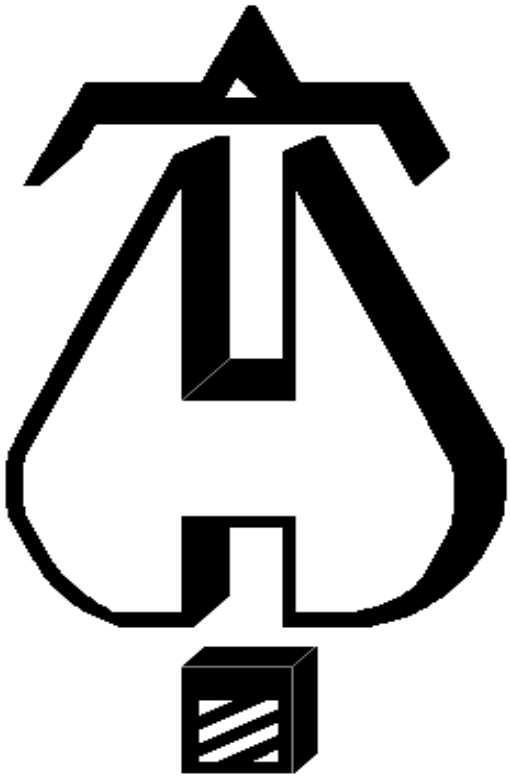
Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
P21	21.333	5.60	16.80	1	1T	5.0	15.917	120	9.000	
to						0.0	5.000		-1.985	
21	25.917		16.8	1.049		0.0	20.917	0.0942	1.971	Vel = 6.24
			0.0							
21			16.80						8.986	K Factor = 5.60
P22	21.333	5.60	17.75	1	1T	5.0	4.583	120	10.042	
to						0.0	5.000		-1.985	
22	25.917		17.75	1.049		0.0	9.583	0.1042	0.999	Vel = 6.59
			0.0							
22			17.75						9.056	K Factor = 5.90
P23	21.333	5.60	18.32	1	1T	5.0	4.583	120	10.700	
to						0.0	5.000		-1.985	
23	25.917		18.32	1.049		0.0	9.583	0.1105	1.059	Vel = 6.80
			0.0							
23			18.32						9.774	K Factor = 5.86
P24	21.333	5.60	20.22	1	1T	5.0	4.583	120	13.039	
to						0.0	5.000		-1.985	
24	25.917		20.22	1.049		0.0	9.583	0.1327	1.272	Vel = 7.51
			0.0							
24			20.22						12.326	K Factor = 5.76
P25	21.333	5.60	16.80	1	1T	5.0	18.375	120	9.006	
to						0.0	5.000		-3.050	
25	28.375		16.8	1.049		0.0	23.375	0.0943	2.204	Vel = 6.24
			0.0							
25			16.80						8.160	K Factor = 5.88
P26	21.333	5.60	17.82	1	1T	5.0	7.042	120	10.130	
to						0.0	5.000		-3.050	
26	28.375		17.82	1.049		0.0	12.042	0.1051	1.266	Vel = 6.62
			0.0							
26			17.82						8.346	K Factor = 6.17
P27	21.333	5.60	18.38	1	1T	5.0	7.042	120	10.770	
to						0.0	5.000		-3.050	
27	28.375		18.38	1.049		0.0	12.042	0.1113	1.340	Vel = 6.82
			0.0							
27			18.38						9.060	K Factor = 6.11
P28	21.333	5.60	20.20	1	1T	5.0	7.042	120	13.015	
to						0.0	5.000		-3.050	
28	28.375		20.2	1.049		0.0	12.042	0.1326	1.597	Vel = 7.50
			0.0							
28			20.20						11.562	K Factor = 5.94
P29	21.333	5.60	19.47	1	1T	5.0	9.750	120	12.083	
to						0.0	5.000		-3.050	
29	28.375		19.47	1.049		0.0	14.750	0.1238	1.826	Vel = 7.23
			0.0							
29			19.47						10.859	K Factor = 5.91
P30	21.333	5.60	19.72	1	1T	5.0	9.750	120	12.406	
to						0.0	5.000		-3.050	
30	28.375		19.72	1.049		0.0	14.750	0.1268	1.870	Vel = 7.32

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
			0.0							
30			19.72						11.226	K Factor = 5.89
P31	21.333	5.60	21.01	1	1T	5.0	9.750	120	14.077	
to						0.0	5.000		-3.050	
31	28.375		21.01	1.049		0.0	14.750	0.1425	2.102	Vel = 7.80
			0.0							
31			21.01						13.129	K Factor = 5.80
*										
21	25.917		16.80	1.5		0.0	7.375	120	8.986	
to						0.0	0.0		0.0	
22	25.917		16.8	1.682		0.0	7.375	0.0095	0.070	Vel = 2.43
22	25.917		17.75	1.5		0.0	5.333	120	9.056	
to						0.0	0.0		0.0	
U30	25.917		34.55	1.682		0.0	5.333	0.0358	0.191	Vel = 4.99
U30	25.917	5.60	17.03	1.5		0.0	7.000	120	9.247	
to						0.0	0.0		0.0	
23	25.917		51.58	1.682		0.0	7.000	0.0753	0.527	Vel = 7.45
23	25.917		18.31	1.5		0.0	8.000	120	9.774	
to						0.0	0.0		0.0	
U31	25.917		69.89	1.682		0.0	8.000	0.1322	1.058	Vel = 10.09
U31	25.917	5.60	18.43	1.5		0.0	7.333	120	10.832	
to						0.0	0.0		0.0	
24	25.917		88.32	1.682		0.0	7.333	0.2037	1.494	Vel = 12.75
24	25.917		20.22	1.5	1T	9.9	10.750	120	12.326	
to						0.0	9.900		0.0	
M49	25.917		108.54	1.682		0.0	20.650	0.2984	6.161	Vel = 15.67
			0.0							
M49			108.54						18.487	K Factor = 25.24
*										
25	28.375		16.80	1.5	2I	9.9	9.708	120	8.160	
to						0.0	9.900		0.0	
26	28.375		16.8	1.682		0.0	19.608	0.0095	0.186	Vel = 2.43
26	28.375		17.83	1.5		0.0	5.500	120	8.346	
to						0.0	0.0		0.0	
U32	28.375		34.63	1.682		0.0	5.500	0.0360	0.198	Vel = 5.00
U32	28.375	5.60	16.37	1.5		0.0	7.000	120	8.544	
to						0.0	0.0		0.0	
27	28.375		51.0	1.682		0.0	7.000	0.0737	0.516	Vel = 7.36
27	28.375		18.38	1.5		0.0	8.000	120	9.060	
to						0.0	0.0		0.0	
U33	28.375		69.38	1.682		0.0	8.000	0.1304	1.043	Vel = 10.02
U33	28.375	5.60	17.80	1.5		0.0	7.333	120	10.103	
to						0.0	0.0		0.0	
28	28.375		87.18	1.682		0.0	7.333	0.1990	1.459	Vel = 12.59
28	28.375		20.20	1.5	1T	9.9	10.750	120	11.562	
to						0.0	9.900		0.0	
M50	28.375		107.38	1.682		0.0	20.650	0.2924	6.039	Vel = 15.50
			0.0							

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
M50			107.38						17.601	K Factor = 25.59
*										
29	28.375		19.47	1.5		0.0	5.500	120	10.859	
to						0.0	0.0		0.0	
U34	28.375		19.47	1.682		0.0	5.500	0.0124	0.068	Vel = 2.81
U34	28.375	5.60	18.51	1.5		0.0	7.000	120	10.927	
to						0.0	0.0		0.0	
30	28.375		37.98	1.682		0.0	7.000	0.0427	0.299	Vel = 5.48
30	28.375		19.72	1.5		0.0	8.000	120	11.226	
to						0.0	0.0		0.0	
U35	28.375		57.7	1.682		0.0	8.000	0.0928	0.742	Vel = 8.33
U35	28.375	5.60	19.38	1.5		0.0	7.333	120	11.968	
to						0.0	0.0		0.0	
31	28.375		77.08	1.682		0.0	7.333	0.1583	1.161	Vel = 11.13
31	28.375		21.00	1.5	1T	9.9	10.750	120	13.129	
to						0.0	9.900		0.0	
M51	28.375		98.08	1.682		0.0	20.650	0.2474	5.109	Vel = 14.16
			0.0							
M51			98.08						18.238	K Factor = 22.97
*										
M49	25.917		108.54	3		0.0	15.000	120	18.487	
to						0.0	0.0		-1.065	
M50	28.375		108.54	3.26		0.0	15.000	0.0119	0.179	Vel = 4.17
M50	28.375		107.38	3		0.0	15.000	120	17.601	
to						0.0	0.0		0.0	
M51	28.375		215.92	3.26		0.0	15.000	0.0425	0.637	Vel = 8.30
M51	28.375		98.09	3	3I	20.159	36.333	120	18.238	
to						0.0	20.159		-3.411	
M54	36.250		314.01	3.26		0.0	56.492	0.0848	4.793	Vel = 12.07
M54	36.250		0.0	3	1I	6.72	19.250	120	19.620	
to					1T	20.159	26.879		6.605	
M30	21		314.01	3.26		0.0	46.129	0.0848	3.913	Vel = 12.07
			0.0							
M30			314.01						30.138	K Factor = 57.20
*										
M30	21		314.01	4	1J	21.067	83.042	120	30.138	
to						0.0	21.067		0.0	
M31	21		314.01	4.26		0.0	104.109	0.0231	2.401	Vel = 7.07
M31	21		0.0	4	1J	21.067	30.208	120	32.539	
to						0.0	21.067		0.0	
M32	21		314.01	4.26		0.0	51.275	0.0231	1.182	Vel = 7.07
M32	21		0.0	4	1J	21.067	2.500	120	33.721	
to						0.0	21.067		0.0	
M33	21		314.01	4.26		0.0	23.567	0.0230	0.543	Vel = 7.07
M33	21		0.0	4	1I	9.217	7.292	120	34.264	
to						0.0	9.217		3.375	
M34	13.208		314.01	4.26		0.0	16.509	0.0231	0.381	Vel = 7.07
M34	13.208		0.0	4	1J	21.067	8.000	120	38.020	
to						0.0	21.067		0.0	
M35	13.208		314.01	4.26		0.0	29.067	0.0231	0.670	Vel = 7.07

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
M35	13.208		0.0	4	1I	9.217	71.250	120	38.690	
to						0.0	9.217		0.0	
M36	13.208		314.01	4.26		0.0	80.467	0.0231	1.855	Vel = 7.07
M36	13.208		0.0	4	1I	9.217	38.000	120	40.545	
to						0.0	9.217		0.0	
M37	13.208		314.01	4.26		0.0	47.217	0.0230	1.088	Vel = 7.07
M37	13.208		0.0	4	1I	9.217	3.667	120	41.633	
to						0.0	9.217		0.0	
TR1	13.208		314.01	4.26		0.0	12.884	0.0231	0.297	Vel = 7.07
			0.0							
TR1			314.01						41.930	K Factor = 48.49
*										
TR1	13.208		314.01	4	1B	15.8	10.708	120	41.930	
to					1Fsp	0.0	67.151		7.638	* * Fixed Loss = 3
BR1	2.500		314.01	4.26	1Aty	30.284	77.859	0.0231	1.795	Vel = 7.07
					1J	21.067				
BR1	2.500		0.0	6		0.0	2.000	120	51.363	
to						0.0	0.0		0.0	
BR2	2.500		314.01	6.357		0.0	2.000	0.0035	0.007	Vel = 3.17
			0.0							
BR2			314.01						51.370	K Factor = 43.81
*										
BR2	2.500		314.01	6	1B	12.573	10.000	120	51.370	
to					1S	40.235	52.808		0.0	
PD	2.500		314.01	6.357		0.0	62.808	0.0033	0.206	Vel = 3.17
			0.0							
PD			314.01						51.576	K Factor = 43.72
System Demand Pressure									51.576	
Safety Margin									20.828	
Continuation Pressure									72.404	
Pressure @ Pump Outlet									72.404	
Pressure From Pump Curve									-43.187	
Pressure @ Pump Inlet									29.217	
*										
PS	2.5		0.0	6	1G	3.772	10.500	120	29.217	
to					1E	17.603	21.375		0.650	
FLG	1		314.01	6.357		0.0	31.875	0.0033	0.105	Vel = 3.17
			0.0							
FLG			314.01						29.972	K Factor = 57.36
*										
FLG	1		314.01	6	1E	20.084	50.000	140	29.972	
to					1G	4.304	67.425		0.433	
UG1	0		314.01	6.16	1T	43.037	117.425	0.0029	0.338	Vel = 3.38
			0.0							
UG1			314.01						30.743	K Factor = 56.63
*										
UG1	0	H100	275.97	8	2F	28.468	394.000	140	30.743	
to						0.0	28.468		0.0	
UG2	0		275.97	8.27		0.0	422.468	0.0005	0.227	Vel = 1.65

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
			0.0							
UG2			275.97						30.970	K Factor = 49.59
UG1	0		138.04	8	5F	71.17	988.000	140	30.743	
to					3E	85.404	181.879		0.0	
UG3	0		138.04	8.27	4G	25.305	1169.879	0.0001	0.175	Vel = 0.82
UG3	0		0.0	8	3F	42.702	303.000	140	30.918	
to					1G	6.326	49.028		0.0	
UG2	0		138.04	8.27		0.0	352.028	0.0001	0.052	Vel = 0.82
			0.0							
UG2			138.04						30.970	K Factor = 24.80
*										
UG2	0		414.01	8	2E	56.936	381.000	140	30.970	
to						0.0	56.936		-1.083	
BF1	2.500		414.01	8.27		0.0	437.936	0.0011	0.501	Vel = 2.47
BF1	2.500		0.0	8	1Zai	0.0	6.000	120	30.388	
to						0.0	0.0		12.097	* * Fixed Loss = 11.014
BF2	0		414.01	8.249		0.0	6.000	0.0017	0.010	Vel = 2.49
BF2	0		0.0	8	2E	56.936	26.000	140	42.495	
to					1T	55.354	112.290		0.0	
UG4	0		414.01	8.27		0.0	138.290	0.0011	0.158	Vel = 2.47
UG4	0		0.0	8	1T	55.354	321.000	140	42.653	
to					1G	6.326	61.680		0.0	
TAP	0		414.01	8.27		0.0	382.680	0.0011	0.437	Vel = 2.47
TAP	0		0.0	8	1Eql	297.332	500.000	140	43.090	
to						0.0	297.332		0.0	
TEST	0		414.01	8.27		0.0	797.332	0.0011	0.912	Vel = 2.47
			0.0							
TEST			414.01						44.002	K Factor = 62.41



. . . Fire Protection by Computer Design

Reliable Fire Protection LLC
32 Partin Rd.
Dunn, NC 28334
Robert Lawley
NICET Level III #103122

Job Name	:	EE - OFFICE - AREA 5 - A100
Building	:	FP1,2,3,4
Location	:	DENIM DR., ERWIN, NC 28339
System	:	5
Contract	:	2020-098
Data File	:	EE AREA 5.WXF

HYDRAULIC CALCULATIONS
for

Project name: ERWIN ELEMENTARY SCHOOL
Location: DENIM DR., ERWIN, NC 28339
Drawing no: FP1,2,3,4
Date: 08-19-20

Design

Remote area number: 5
Remote area location: 1ST FLOOR OFFICE AREAS
Occupancy classification: LIGHT HAZARD
Density: 0.10 - Gpm/SqFt
Area of application: 1,500 - SqFt
Coverage per sprinkler: 225 MAX - SqFt
Type of sprinklers calculated: STANDARD SPRAY PENDANT
No. of sprinklers calculated: 18
In-rack demand: N/A - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 472.149 - GPM @ 27.544 - Psi
Type of system: WET - TREE
Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 08-23-20
Location: DENIM DR.
Source: LKC ENGINEERING, LLC

Name of contractor: RELIABLE FIRE PROTECTION, LLC
Address: 32 PARTIN RD., DUNN, NC 28334
Phone number: 910-980-1234
Name of designer: ROBERT LAWLEY 26806-FS1
Authority having jurisdiction: HARNETT COUNTY
Notes: (Include peaking information or gridded systems here.)

Water Supply Curve C

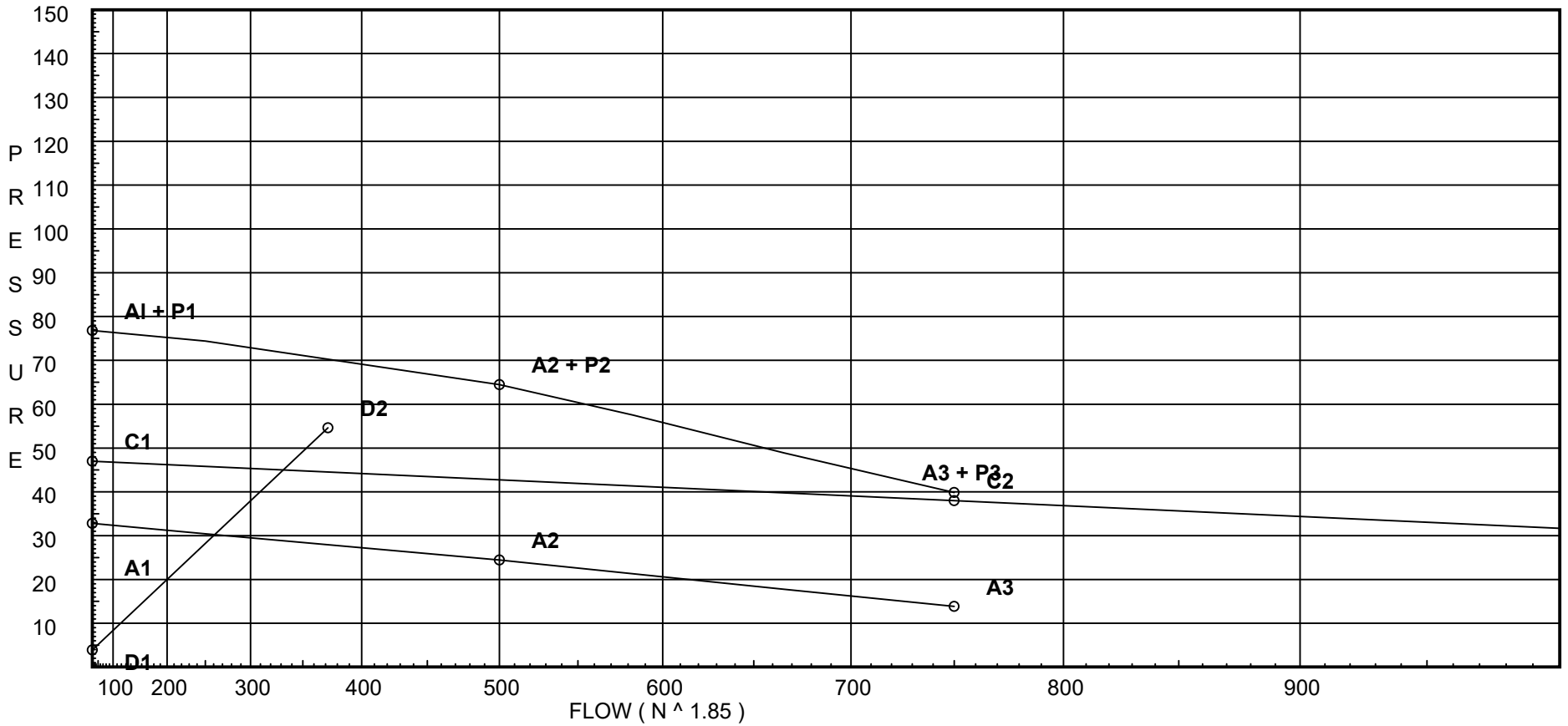
Reliable Fire Protection LLC
EE - OFFICE - AREA 5 - A100

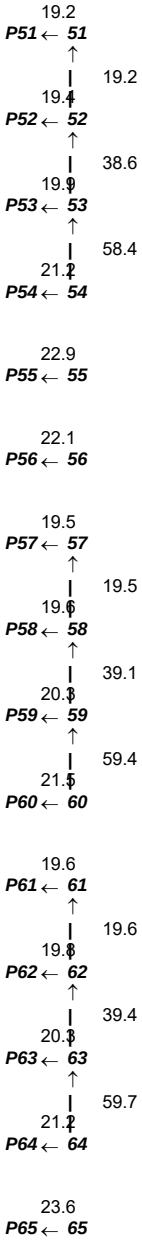
City Water Supply:
- C1 - Static Pressure : 47
- C2 - Residual Pressure: 38
- C2 - Residual Flow : 750

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow
- A1 - Adjusted Static: 32.812
- A2 - Adj Resid : 24.456 @ 500
- A3 - Adj Resid : 13.864 @ 750

Pump Data:
- P1 - Pump Churn Pressure : 44
- P2 - Pump Rated Pressure : 40
- P2 - Pump Rated Flow : 500
- P3 - Pump Pressure @ Max Flow : 26
- P3 - Pump Max Flow : 750
- City Residual Flow @ 0 = 1832.70
- City Residual Flow @ 20 = 1358.20
- City Water @ 150% of Pump = 38.00

Demand:
- D1 - Elevation : 3.898
- D2 - System Flow : 372.149
- D2 - System Pressure : 54.620
- Hose (Demand) : _____
- D3 - System Demand : 372.149
- Hose (Adj City) : 100
- Safety Margin : 15.633

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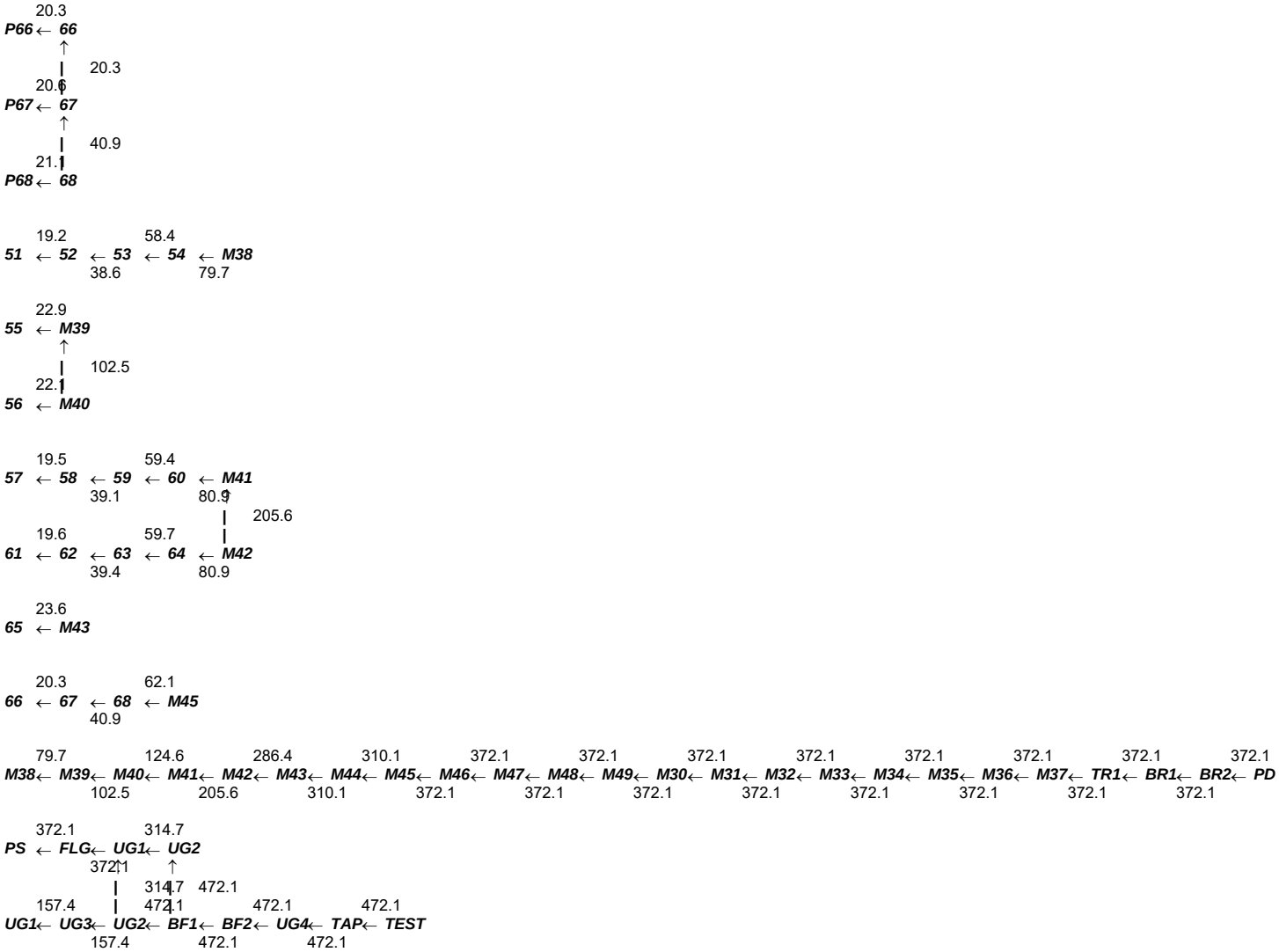
P51 ← 51
19.2
19.4
P52 ← 52
38.6
19.9
P53 ← 53
58.4
21.2
P54 ← 54
22.9
P55 ← 55
22.1
P56 ← 56
19.5
P57 ← 57
19.5
19.6
P58 ← 58
39.1
20.3
P59 ← 59
59.4
21.5
P60 ← 60
19.6
P61 ← 61
19.6
19.8
P62 ← 62
39.4
20.3
P63 ← 63
59.7
21.2
P64 ← 64
23.6
P65 ← 65


20.3
P66 ← 66
20.3
20.6
P67 ← 67
40.9
21.1
P68 ← 68
19.2 58.4
51 ← 52 ← 53 ← 54 ← M38
38.6 79.7
22.9
55 ← M39
102.5
22.1
56 ← M40
19.5 59.4
57 ← 58 ← 59 ← 60 ← M41
39.1 80.9
205.6
19.6 59.7
61 ← 62 ← 63 ← 64 ← M42
39.4 80.9
23.6
65 ← M43
20.3 62.1
66 ← 67 ← 68 ← M45
40.9
79.7 124.6 286.4 310.1 372.1 372.1 372.1 372.1 372.1 372.1 372.1 372.1
M38 ← M39 ← M40 ← M41 ← M42 ← M43 ← M44 ← M45 ← M46 ← M47 ← M48 ← M49 ← M30 ← M31 ← M32 ← M33 ← M34 ← M35 ← M36 ← M37 ← TR1 ← BR1 ← BR2 ← PD
102.5 205.6 310.1 372.1 372.1 372.1 372.1 372.1 372.1 372.1 372.1
372.1 314.7
PS ← FLG ← UG1 ← UG2
372.1
314.7 472.1
157.4 472.1 472.1 472.1
UG1 ← UG3 ← UG2 ← BF1 ← BF2 ← UG4 ← TAP ← TEST
157.4 472.1 472.1

Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
Aty	Alarm Tyco AV-1							14			23		24	23							
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
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
I	90' Grvd-Vic Elbow #10	0	0	2	3	4	3.5	6	5	8	7	8.5	10	13	17	20	23	25	33	36	40
J	90'Tee-Branch Grv Vic #20	0	0	4.5	6	8	8.5	10.8	13	17	16	21	25	33	41	50	65	78	88	98	120
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
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
Zai	Ames 4000SS	Fitting generates a Fixed Loss Based on Flow																			

Units 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

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
P51	9.0	5.6	11.79	na	19.23	0.1	103	7.0
P52	9.0	5.6	11.95	na	19.36	0.1	103	7.0
P53	9.0	5.6	12.57	na	19.85	0.1	165	8.4
P54	9.0	5.6	14.35	na	21.21	0.1	165	8.4
P55	9.0	5.6	16.67	na	22.86	0.1	54	7.0
P56	9.0	5.6	15.59	na	22.11	0.1	54	7.0
P57	9.0	5.6	12.13	na	19.51	0.1	133	7.0
P58	9.0	5.6	12.28	na	19.62	0.1	157	7.8
P59	9.0	5.6	13.17	na	20.32	0.1	100	7.0
P60	9.0	5.6	14.74	na	21.5	0.1	56	7.0
P61	9.0	5.6	12.3	na	19.64	0.1	196	12.3
P62	9.0	5.6	12.51	na	19.8	0.1	45	7.0
P63	9.0	5.6	13.1	na	20.27	0.1	100	7.0
P64	9.0	5.6	14.27	na	21.15	0.1	130	7.0
P65	9.0	5.6	17.83	na	23.65	0.1	100	7.0
P66	9.0	5.6	13.16	na	20.32	0.1	74	7.0
P67	9.0	5.6	13.56	na	20.62	0.1	32	7.0
P68	9.0	5.6	14.23	na	21.13	0.1	130	7.0
51	12.5		13.42	na				
52	12.5		13.62	na				
53	12.5		14.39	na				
54	12.5		16.61	na				
55	12.5		19.49	na				
56	12.5		18.14	na				
57	12.5		13.85	na				
58	12.5		14.03	na				
59	12.5		15.13	na				
60	12.5		17.09	na				
61	12.5		14.06	na				
62	12.5		14.31	na				
63	12.5		15.05	na				
64	12.5		16.5	na				
65	12.5		20.93	na				
66	12.5		15.13	na				
67	12.5		15.63	na				
68	12.5		16.46	na				
M38	12.5		20.53	na				
M39	12.5		20.57	na				
M40	12.5		20.58	na				
M41	12.5		20.65	na				
M42	12.5		20.96	na				
M43	12.5		21.37	na				
M44	12.5		24.01	na				
M45	12.5		24.55	na				
M46	12.5		25.36	na				
M47	12.5		26.29	na				
M48	12.5		26.67	na				
M49	20.5		28.06	na				
M30	20.5		29.56	na				
M31	20.5		32.85	na				
M32	20.5		34.47	na				
M33	20.5		35.21	na				
M34	13.208		38.89	na				
M35	13.208		39.8	na				
M36	13.208		42.34	na				
M37	13.208		43.83	na				
TR1	13.208		44.23	na				
BR1	2.5		54.33	na				
BR2	2.5		54.34	na				
PD	2.5		54.62	na				
PS	2.5		27.93	na				

Flow Summary - Standard

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
FLG	1.0		28.72	na				
UG1	0.0		29.62	na	100.0			
UG3	0.0		29.84	na				
UG2	0.0		29.91	na				
BF1	2.5		29.46	na				
BF2	0.0		41.26	na				
UG4	0.0		41.46	na				
TAP	0.0		42.01	na				
TEST	0.0		43.18	na				

The maximum velocity is 15.9 and it occurs in the pipe between nodes 60 and M41

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
P51	9	5.60	19.23	1	1T	5.0	21.000	120	11.788	
to						0.0	5.000		-1.516	
51	12.500		19.23	1.049		0.0	26.000	0.1210	3.146	Vel = 7.14
			0.0							
51			19.23						13.418	K Factor = 5.25
P52	9	5.60	19.36	1	1T	5.0	21.000	120	11.953	
to						0.0	5.000		-1.516	
52	12.500		19.36	1.049		0.0	26.000	0.1226	3.187	Vel = 7.19
			0.0							
52			19.36						13.624	K Factor = 5.25
P53	9	5.60	19.85	1	1T	5.0	21.000	120	12.567	
to						0.0	5.000		-1.516	
53	12.500		19.85	1.049		0.0	26.000	0.1284	3.338	Vel = 7.37
			0.0							
53			19.85						14.389	K Factor = 5.23
P54	9	5.60	21.21	1	1T	5.0	21.000	120	14.350	
to						0.0	5.000		-1.516	
54	12.500		21.21	1.049		0.0	26.000	0.1451	3.773	Vel = 7.87
			0.0							
54			21.21						16.607	K Factor = 5.20
P55	9	5.60	22.86	1	1T	5.0	21.000	120	16.671	
to						0.0	5.000		-1.516	
55	12.500		22.86	1.049		0.0	26.000	0.1667	4.334	Vel = 8.49
			0.0							
55			22.86						19.489	K Factor = 5.18
P56	9	5.60	22.11	1	1T	5.0	21.000	120	15.586	
to						0.0	5.000		-1.516	
56	12.500		22.11	1.049		0.0	26.000	0.1567	4.073	Vel = 8.21
			0.0							
56			22.11						18.143	K Factor = 5.19
P57	9	5.60	19.50	1	1T	5.0	21.000	120	12.132	
to						0.0	5.000		-1.516	
57	12.500		19.5	1.049		0.0	26.000	0.1242	3.230	Vel = 7.24
			0.0							
57			19.50						13.846	K Factor = 5.24
P58	9	5.60	19.62	1	1T	5.0	21.000	120	12.276	
to						0.0	5.000		-1.516	
58	12.500		19.62	1.049		0.0	26.000	0.1256	3.266	Vel = 7.28
			0.0							
58			19.62						14.026	K Factor = 5.24
P59	9	5.60	20.32	1	1T	5.0	21.000	120	13.166	
to						0.0	5.000		-1.516	
59	12.500		20.32	1.049		0.0	26.000	0.1340	3.484	Vel = 7.54
			0.0							
59			20.32						15.134	K Factor = 5.22
P60	9	5.60	21.50	1	1T	5.0	21.000	120	14.742	
to						0.0	5.000		-1.516	
60	12.500		21.5	1.049		0.0	26.000	0.1488	3.868	Vel = 7.98

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
			0.0							
60			21.50						17.094	K Factor = 5.20
P61	9	5.60	19.64	1	1T	5.0	21.000	120	12.300	
to						0.0	5.000		-1.516	
61	12.500		19.64	1.049		0.0	26.000	0.1258	3.272	Vel = 7.29
			0.0							
61			19.64						14.056	K Factor = 5.24
P62	9	5.60	19.80	1	1T	5.0	21.000	120	12.506	
to						0.0	5.000		-1.516	
62	12.500		19.8	1.049		0.0	26.000	0.1278	3.322	Vel = 7.35
			0.0							
62			19.80						14.312	K Factor = 5.23
P63	9	5.60	20.27	1	1T	5.0	21.000	120	13.096	
to						0.0	5.000		-1.516	
63	12.500		20.27	1.049		0.0	26.000	0.1334	3.468	Vel = 7.52
			0.0							
63			20.27						15.048	K Factor = 5.23
P64	9	5.60	21.15	1	1T	5.0	21.000	120	14.266	
to						0.0	5.000		-1.516	
64	12.500		21.15	1.049		0.0	26.000	0.1443	3.752	Vel = 7.85
			0.0							
64			21.15						16.502	K Factor = 5.21
P65	9	5.60	23.65	1	1T	5.0	21.000	120	17.832	
to						0.0	5.000		-1.516	
65	12.500		23.65	1.049		0.0	26.000	0.1774	4.613	Vel = 8.78
			0.0							
65			23.65						20.929	K Factor = 5.17
P66	9	5.60	20.32	1	1T	5.0	21.000	120	13.162	
to						0.0	5.000		-1.516	
66	12.500		20.32	1.049		0.0	26.000	0.1340	3.483	Vel = 7.54
			0.0							
66			20.32						15.129	K Factor = 5.22
P67	9	5.60	20.62	1	1T	5.0	21.000	120	13.564	
to						0.0	5.000		-1.516	
67	12.500		20.62	1.049		0.0	26.000	0.1378	3.582	Vel = 7.65
			0.0							
67			20.62						15.630	K Factor = 5.22
P68	9	5.60	21.13	1	1T	5.0	21.000	120	14.233	
to						0.0	5.000		-1.516	
68	12.500		21.13	1.049		0.0	26.000	0.1440	3.744	Vel = 7.84
			0.0							
68			21.13						16.461	K Factor = 5.21
*										
51	12.500		19.23	1.25		0.0	8.000	120	13.418	
to						0.0	0.0		0.0	
52	12.500		19.23	1.442		0.0	8.000	0.0258	0.206	Vel = 3.78
52	12.500		19.36	1.25		0.0	8.208	120	13.624	
to						0.0	0.0		0.0	
53	12.500		38.59	1.442		0.0	8.208	0.0932	0.765	Vel = 7.58

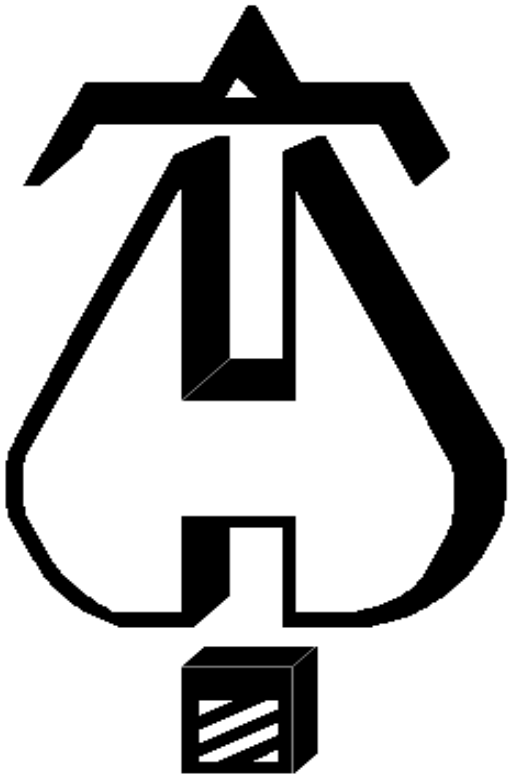
Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
53	12.500		19.85	1.25		0.0	11.042	120	14.389	
to						0.0	0.0		0.0	
54	12.500		58.44	1.442		0.0	11.042	0.2009	2.218	Vel = 11.48
54	12.500		21.21	1.25	1T	7.432	3.583	120	16.607	
to						0.0	7.432		0.0	
M38	12.500		79.65	1.442		0.0	11.015	0.3562	3.924	Vel = 15.65
			0.0							
M38			79.65						20.531	K Factor = 17.58
*										
55	12.500		22.86	1	1T	5.0	1.500	120	19.489	
to						0.0	5.000		0.0	
M39	12.500		22.86	1.049		0.0	6.500	0.1668	1.084	Vel = 8.49
			0.0							
M39			22.86						20.573	K Factor = 5.04
*										
56	12.500		22.11	1	1T	5.0	10.583	120	18.143	
to						0.0	5.000		0.0	
M40	12.500		22.11	1.049		0.0	15.583	0.1566	2.441	Vel = 8.21
			0.0							
M40			22.11						20.584	K Factor = 4.87
*										
57	12.500		19.50	1.25		0.0	6.833	120	13.846	
to						0.0	0.0		0.0	
58	12.500		19.5	1.442		0.0	6.833	0.0263	0.180	Vel = 3.83
58	12.500		19.63	1.25		0.0	11.583	120	14.026	
to						0.0	0.0		0.0	
59	12.500		39.13	1.442		0.0	11.583	0.0957	1.108	Vel = 7.69
59	12.500		20.31	1.25		0.0	9.458	120	15.134	
to						0.0	0.0		0.0	
60	12.500		59.44	1.442		0.0	9.458	0.2072	1.960	Vel = 11.68
60	12.500		21.51	1.25	1T	7.432	2.250	120	17.094	
to						0.0	7.432		0.0	
M41	12.500		80.95	1.442		0.0	9.682	0.3671	3.554	Vel = 15.90
			0.0							
M41			80.95						20.648	K Factor = 17.81
*										
61	12.500		19.64	1.25		0.0	9.583	120	14.056	
to						0.0	0.0		0.0	
62	12.500		19.64	1.442		0.0	9.583	0.0267	0.256	Vel = 3.86
62	12.500		19.80	1.25		0.0	7.583	120	14.312	
to						0.0	0.0		0.0	
63	12.500		39.44	1.442		0.0	7.583	0.0971	0.736	Vel = 7.75
63	12.500		20.27	1.25		0.0	6.958	120	15.048	
to						0.0	0.0		0.0	
64	12.500		59.71	1.442		0.0	6.958	0.2090	1.454	Vel = 11.73
64	12.500		21.15	1.25	1T	7.432	4.750	120	16.502	
to						0.0	7.432		0.0	
M42	12.500		80.86	1.442		0.0	12.182	0.3663	4.462	Vel = 15.89

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
			0.0							
M42			80.86						20.964	K Factor = 17.66
*										
65	12.500		23.65	1.25		0.0	11.708	120	20.929	
to						0.0	0.0		0.0	
M43	12.500		23.65	1.442		0.0	11.708	0.0377	0.441	Vel = 4.65
			0.0							
M43			23.65						21.370	K Factor = 5.12
*										
66	12.500		20.32	1.25		0.0	17.583	120	15.129	
to						0.0	0.0		0.0	
67	12.500		20.32	1.442		0.0	17.583	0.0285	0.501	Vel = 3.99
67	12.500		20.62	1.25		0.0	8.000	120	15.630	
to						0.0	0.0		0.0	
68	12.500		40.94	1.442		0.0	8.000	0.1039	0.831	Vel = 8.04
68	12.500		21.13	1.25	1T	7.432	28.583	120	16.461	
to						0.0	7.432		0.0	
M45	12.500		62.07	1.442		0.0	36.015	0.2245	8.087	Vel = 12.19
			0.0							
M45			62.07						24.548	K Factor = 12.53
*										
M38	12.500		79.65	3		0.0	6.292	120	20.531	
to						0.0	0.0		0.0	
M39	12.500		79.65	3.26		0.0	6.292	0.0067	0.042	Vel = 3.06
M39	12.500		22.87	3		0.0	1.000	120	20.573	
to						0.0	0.0		0.0	
M40	12.500		102.52	3.26		0.0	1.000	0.0110	0.011	Vel = 3.94
M40	12.500		22.11	3		0.0	4.167	120	20.584	
to						0.0	0.0		0.0	
M41	12.500		124.63	3.26		0.0	4.167	0.0154	0.064	Vel = 4.79
M41	12.500		80.94	3		0.0	8.167	120	20.648	
to						0.0	0.0		0.0	
M42	12.500		205.57	3.26		0.0	8.167	0.0387	0.316	Vel = 7.90
M42	12.500		80.86	3		0.0	5.667	120	20.964	
to						0.0	0.0		0.0	
M43	12.500		286.43	3.26		0.0	5.667	0.0716	0.406	Vel = 11.01
M43	12.500		23.65	3	1I	6.72	25.125	120	21.370	
to						0.0	6.720		0.0	
M44	12.500		310.08	3.26		0.0	31.845	0.0829	2.639	Vel = 11.92
M44	12.500		0.0	3		0.0	6.500	120	24.009	
to						0.0	0.0		0.0	
M45	12.500		310.08	3.26		0.0	6.500	0.0829	0.539	Vel = 11.92
M45	12.500		62.07	3		0.0	7.000	120	24.548	
to						0.0	0.0		0.0	
M46	12.500		372.15	3.26		0.0	7.000	0.1161	0.813	Vel = 14.30
M46	12.500		0.0	3		0.0	8.000	120	25.361	
to						0.0	0.0		0.0	
M47	12.500		372.15	3.26		0.0	8.000	0.1162	0.930	Vel = 14.30

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
M47	12.500		0.0	3		0.0	3.292	120	26.291	
to						0.0	0.0		0.0	
M48	12.500		372.15	3.26		0.0	3.292	0.1160	0.382	Vel = 14.30
M48	12.500		0.0	3	1I	6.72	17.583	120	26.673	
to					1J	17.471	24.191		-3.465	
M49	20.500		372.15	3.26		0.0	41.774	0.1162	4.854	Vel = 14.30
			0.0							
M49			372.15						28.062	K Factor = 70.25
*										
M49	20.500		372.15	4		0.0	47.625	120	28.062	
to						0.0	0.0		0.0	
M30	20.500		372.15	4.26		0.0	47.625	0.0316	1.503	Vel = 8.38
M30	20.500		0.0	4	1J	21.067	83.042	120	29.565	
to						0.0	21.067		0.0	
M31	20.500		372.15	4.26		0.0	104.109	0.0316	3.287	Vel = 8.38
M31	20.500		0.0	4	1J	21.067	30.208	120	32.852	
to						0.0	21.067		0.0	
M32	20.500		372.15	4.26		0.0	51.275	0.0316	1.618	Vel = 8.38
M32	20.500		0.0	4	1J	21.067	2.500	120	34.470	
to						0.0	21.067		0.0	
M33	20.500		372.15	4.26		0.0	23.567	0.0316	0.744	Vel = 8.38
M33	20.500		0.0	4	1I	9.217	7.292	120	35.214	
to						0.0	9.217		3.158	
M34	13.208		372.15	4.26		0.0	16.509	0.0316	0.522	Vel = 8.38
M34	13.208		0.0	4	1J	21.067	7.500	120	38.894	
to						0.0	21.067		0.0	
M35	13.208		372.15	4.26		0.0	28.567	0.0315	0.901	Vel = 8.38
M35	13.208		0.0	4	1I	9.217	71.250	120	39.795	
to						0.0	9.217		0.0	
M36	13.208		372.15	4.26		0.0	80.467	0.0316	2.541	Vel = 8.38
M36	13.208		0.0	4	1I	9.217	38.000	120	42.336	
to						0.0	9.217		0.0	
M37	13.208		372.15	4.26		0.0	47.217	0.0316	1.490	Vel = 8.38
M37	13.208		0.0	4	1I	9.217	3.667	120	43.826	
to						0.0	9.217		0.0	
TR1	13.208		372.15	4.26		0.0	12.884	0.0316	0.407	Vel = 8.38
			0.0							
TR1			372.15						44.233	K Factor = 55.96
*										
TR1	13.208		372.15	4	1B	15.8	10.708	120	44.233	
to					1Fsp	0.0	67.151		7.638	* * Fixed Loss = 3
BR1	2.500		372.15	4.26	1Aty	30.284	77.859	0.0316	2.457	Vel = 8.38
					1J	21.067				
BR1	2.500		0.0	6		0.0	2.000	120	54.328	
to						0.0	0.0		0.0	
BR2	2.500		372.15	6.357		0.0	2.000	0.0045	0.009	Vel = 3.76
			0.0							
BR2			372.15						54.337	K Factor = 50.49

Node1 / to / Node2	Elev1 / Elev2	K / Fact	Qa / Qt	Nom / Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact / Pf/Ft	Pt / Pe / Pf	******* Notes ******
*										
BR2	2.500		372.15	6	1B	12.573	10.000	120	54.337	
to					1S	40.235	52.808		0.0	
PD	2.500		372.15	6.357		0.0	62.808	0.0045	0.283	Vel = 3.76
			0.0							
PD			372.15						54.620	K Factor = 50.35
System Demand Pressure									54.620	
Safety Margin									15.633	
Continuation Pressure									70.253	
Pressure @ Pump Outlet									70.253	
Pressure From Pump Curve									-42.325	
Pressure @ Pump Inlet									27.928	
*										
PS	2.5		0.0	6	1G	3.772	10.500	120	27.928	
to					1E	17.603	21.375		0.650	
FLG	1		372.15	6.357		0.0	31.875	0.0045	0.143	Vel = 3.76
			0.0							
FLG			372.15						28.721	K Factor = 69.44
*										
FLG	1		372.15	6	1E	20.084	50.000	140	28.721	
to					1G	4.304	67.425		0.433	
UG1	0		372.15	6.16	1T	43.037	117.425	0.0039	0.463	Vel = 4.01
			0.0							
UG1			372.15						29.617	K Factor = 68.38
*										
UG1	0	H100	314.73	8	2F	28.468	394.000	140	29.617	
to						0.0	28.468		0.0	
UG2	0		314.73	8.27		0.0	422.468	0.0007	0.291	Vel = 1.88
			0.0							
UG2			314.73						29.908	K Factor = 57.55
UG1	0		157.42	8	5F	71.17	988.000	140	29.617	
to					3E	85.404	181.879		0.0	
UG3	0		157.42	8.27	4G	25.305	1169.879	0.0002	0.223	Vel = 0.94
UG3	0		0.0	8	3F	42.702	303.000	140	29.840	
to					1G	6.326	49.028		0.0	
UG2	0		157.42	8.27		0.0	352.028	0.0002	0.068	Vel = 0.94
			0.0							
UG2			157.42						29.908	K Factor = 28.78
*										
UG2	0		472.15	8	2E	56.936	381.000	140	29.908	
to						0.0	56.936		-1.083	
BF1	2.500		472.15	8.27		0.0	437.936	0.0015	0.638	Vel = 2.82
BF1	2.500		0.0	8	1Zai	0.0	6.000	120	29.463	
to						0.0	0.0		11.781	* * Fixed Loss = 10.698
BF2	0		472.15	8.249		0.0	6.000	0.0020	0.012	Vel = 2.83
BF2	0		0.0	8	2E	56.936	26.000	140	41.256	
to					1T	55.354	112.290		0.0	
UG4	0		472.15	8.27		0.0	138.290	0.0015	0.201	Vel = 2.82

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	*******	Notes	******
UG4	0		0.0	8	1T	55.354	321.000	140	41.457			
to					1G	6.326	61.680		0.0			
TAP	0		472.15	8.27		0.0	382.680	0.0015	0.558	Vel = 2.82		
TAP	0		0.0	8	1Eql	297.332	500.000	140	42.015			
to						0.0	297.332		0.0			
TEST	0		472.15	8.27		0.0	797.332	0.0015	1.162	Vel = 2.82		
			0.0									
TEST			472.15						43.177	K Factor = 71.85		



. . . Fire Protection by Computer Design

Reliable Fire Protection LLC
32 Partin Rd.
Dunn, NC 28334
Robert Lawley
NICET Level III #103122

Job Name	:	EE - MUSIC/DANCE - AREA 6 - B100
Building	:	FP1,2,3,4
Location	:	DENIM DR., ERWIN, NC 28339
System	:	6
Contract	:	2020-098
Data File	:	EE AREA 6.WXF

HYDRAULIC CALCULATIONS
for

Project name: ERWIN ELEMENTARY SCHOOL
Location: DENIM DR., ERWIN, NC 28339
Drawing no: FP1,2,3,4
Date: 08-19-20

Design

Remote area number: 6
Remote area location: MUSIC/DANCE CLASSROOMS
Occupancy classification: LIGHT HAZARD
Density: 0.10 - Gpm/SqFt
Area of application: 1,500 - SqFt
Coverage per sprinkler: 225 MAX - SqFt
Type of sprinklers calculated: STANDARD SPRAY PENDANT
No. of sprinklers calculated: 10
In-rack demand: N/A - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 337.578 - GPM @ 29.647 - Psi
Type of system: WET - TREE
Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 08-23-20
Location: DENIM DR.
Source: LKC ENGINEERING, LLC

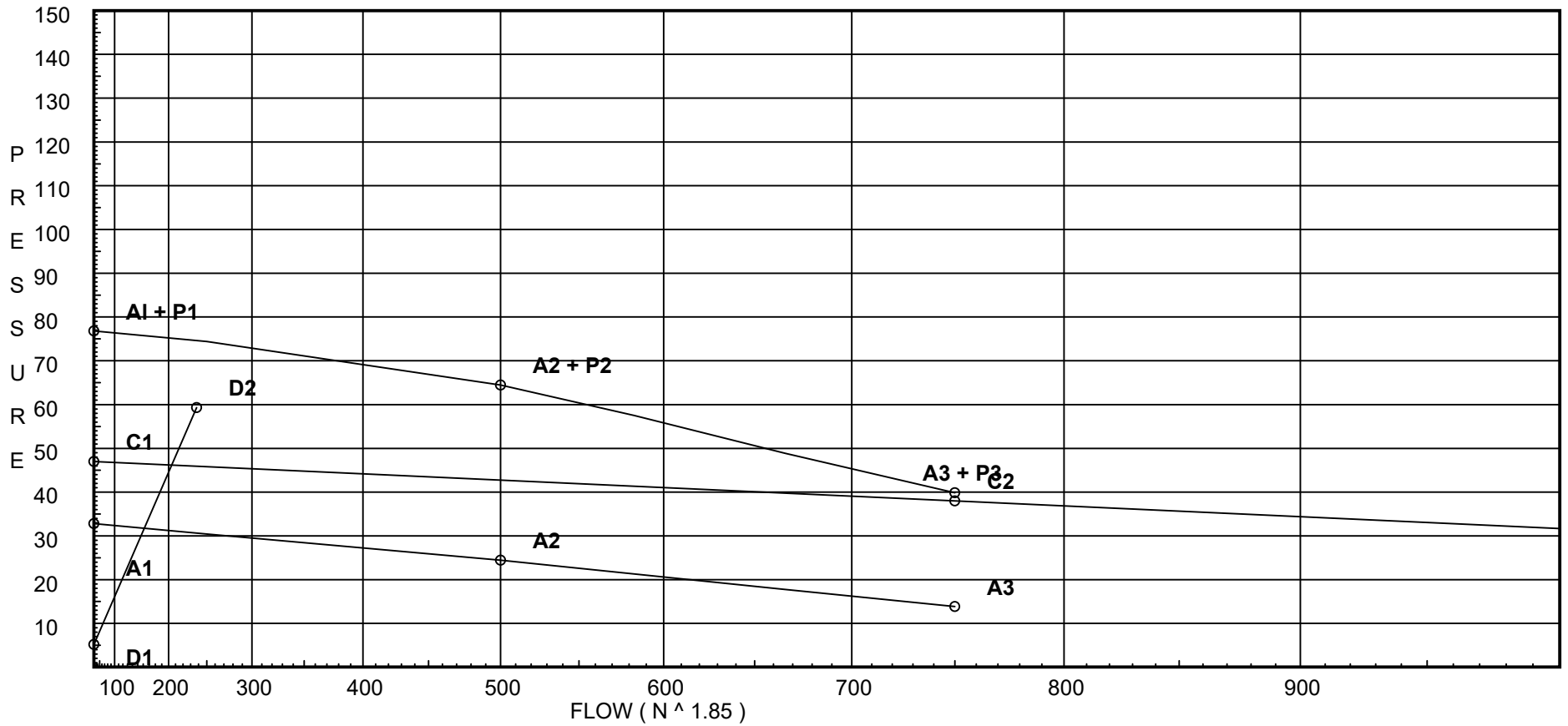
Name of contractor: RELIABLE FIRE PROTECTION, LLC
Address: 32 PARTIN RD., DUNN, NC 28334
Phone number: 910-980-1234
Name of designer: ROBERT LAWLEY 26806-FS1
Authority having jurisdiction: HARNETT COUNTY
Notes: (Include peaking information or gridded systems here.)

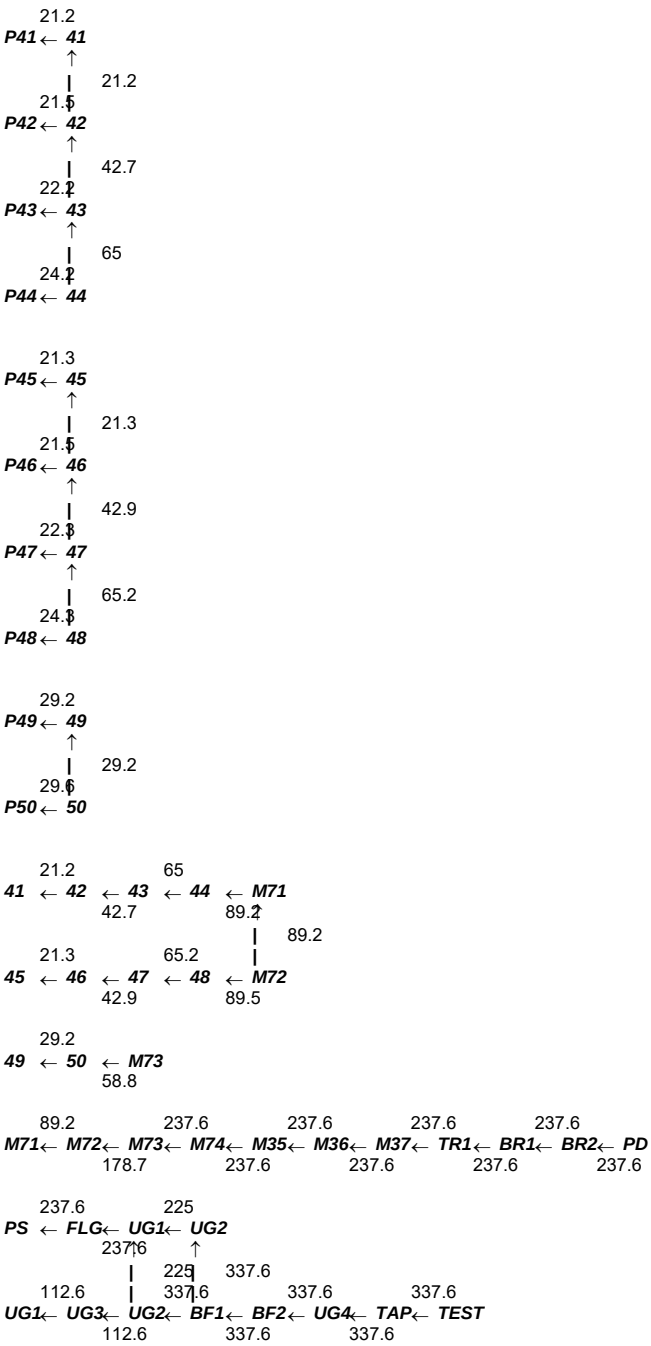
City Water Supply:
- C1 - Static Pressure : 47
- C2 - Residual Pressure: 38
- C2 - Residual Flow : 750

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow
- A1 - Adjusted Static: 32.812
- A2 - Adj Resid : 24.456 @ 500
- A3 - Adj Resid : 13.864 @ 750

Pump Data:
- P1 - Pump Churn Pressure : 44
- P2 - Pump Rated Pressure : 40
- P2 - Pump Rated Flow : 500
- P3 - Pump Pressure @ Max Flow : 26
- P3 - Pump Max Flow : 750
- City Residual Flow @ 0 = 1832.70
- City Residual Flow @ 20 = 1358.20
- City Water @ 150% of Pump = 38.00

Demand:
- D1 - Elevation : 5.197
- D2 - System Flow : 237.578
- D2 - System Pressure : 59.324
- Hose (Demand) : _____
- D3 - System Demand : 237.578
- Hose (Adj City) : 100
- Safety Margin : 15.297




21.2
P41 ← 41
21.2
21.5
P42 ← 42
42.7
22.2
P43 ← 43
65
24.2
P44 ← 44
21.3
P45 ← 45
21.3
21.5
P46 ← 46
42.9
22.3
P47 ← 47
65.2
24.3
P48 ← 48
29.2
P49 ← 49
29.2
29.6
P50 ← 50
21.2 65
41 ← 42 ← 43 ← 44 ← M71
42.7 89.2
89.2
21.3 65.2
45 ← 46 ← 47 ← 48 ← M72
42.9 89.5
29.2
49 ← 50 ← M73
58.8
89.2 237.6 237.6 237.6 237.6
M71 ← M72 ← M73 ← M74 ← M35 ← M36 ← M37 ← TR1 ← BR1 ← BR2 ← PD
178.7 237.6 237.6 237.6 237.6
237.6 225
PS ← FLG ← UG1 ← UG2
237.6
225 337.6
112.6 337.6 337.6 337.6
UG1 ← UG3 ← UG2 ← BF1 ← BF2 ← UG4 ← TAP ← TEST
112.6 337.6 337.6

Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
Aty	Alarm Tyco AV-1							14			23		24	23							
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
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
I	90' Grvd-Vic Elbow #10	0	0	2	3	4	3.5	6	5	8	7	8.5	10	13	17	20	23	25	33	36	40
J	90'Tee-Branch Grv Vic #20	0	0	4.5	6	8	8.5	10.8	13	17	16	21	25	33	41	50	65	78	88	98	120
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
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
Zai	Ames 4000SS	Fitting generates a Fixed Loss Based on Flow																			

Units 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.

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
P41	12.0	5.6	14.4	na	21.25	0.1	210	14.4
P42	12.0	5.6	14.7	na	21.47	0.1	210	14.4
P43	12.0	5.6	15.78	na	22.25	0.1	210	14.4
P44	12.0	5.6	18.74	na	24.24	0.1	210	14.4
P45	12.0	5.6	14.5	na	21.32	0.1	210	14.4
P46	12.0	5.6	14.8	na	21.54	0.1	210	14.4
P47	12.0	5.6	15.9	na	22.33	0.1	210	14.4
P48	12.0	5.6	18.87	na	24.33	0.1	210	14.4
P49	12.0	5.6	27.27	na	29.24	0.1	210	14.4
P50	12.0	5.6	27.94	na	29.6	0.1	210	14.4
41	13.0		17.75	na				
42	13.0		18.12	na				
43	13.0		19.47	na				
44	13.0		23.14	na				
45	13.0		17.88	na				
46	13.0		18.25	na				
47	13.0		19.61	na				
48	13.0		23.3	na				
49	13.0		33.66	na				
50	13.0		34.5	na				
M71	13.208		41.81	na				
M72	13.208		42.09	na				
M73	13.208		43.1	na				
M74	13.208		47.02	na				
M35	13.208		48.55	na				
M36	13.208		49.66	na				
M37	13.208		50.31	na				
TR1	13.208		50.49	na				
BR1	2.5		59.2	na				
BR2	2.5		59.2	na				
PD	2.5		59.32	na				
PS	2.5		30.63	na				
FLG	1.0		31.34	na				
UG1	0.0		31.98	na	100.0			
UG3	0.0		32.1	na				
UG2	0.0		32.13	na				
BF1	2.5		31.39	na				
BF2	0.0		43.91	na				
UG4	0.0		44.02	na				
TAP	0.0		44.32	na				
TEST	0.0		44.95	na				

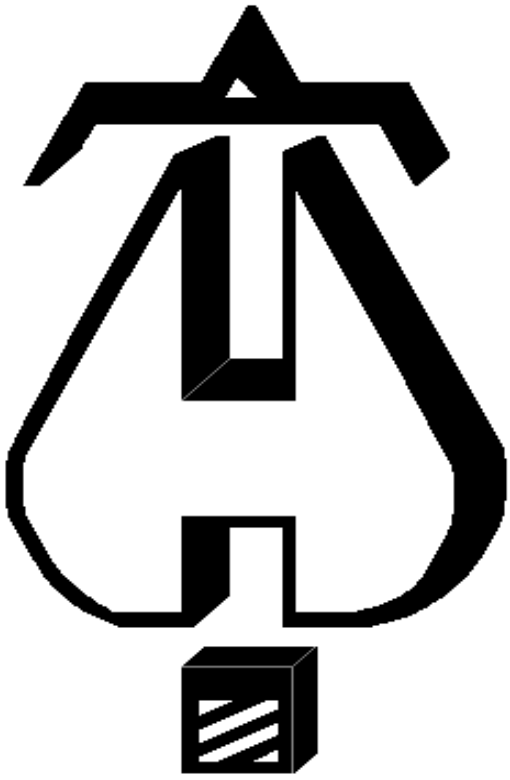
The maximum velocity is 17.59 and it occurs in the pipe between nodes 48 and M72

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
P41	12	5.60	21.25	1	1T	5.0	21.000	120	14.400	
to						0.0	5.000		-0.433	
41	13		21.25	1.049		0.0	26.000	0.1456	3.785	Vel = 7.89
			0.0							
41			21.25						17.752	K Factor = 5.04
P42	12	5.60	21.47	1	1T	5.0	21.000	120	14.698	
to						0.0	5.000		-0.433	
42	13		21.47	1.049		0.0	26.000	0.1484	3.858	Vel = 7.97
			0.0							
42			21.47						18.123	K Factor = 5.04
P43	12	5.60	22.25	1	1T	5.0	21.000	120	15.785	
to						0.0	5.000		-0.433	
43	13		22.25	1.049		0.0	26.000	0.1585	4.121	Vel = 8.26
			0.0							
43			22.25						19.473	K Factor = 5.04
P44	12	5.60	24.24	1	1T	5.0	21.000	120	18.741	
to						0.0	5.000		-0.433	
44	13		24.24	1.049		0.0	26.000	0.1858	4.830	Vel = 9.00
			0.0							
44			24.24						23.138	K Factor = 5.04
P45	12	5.60	21.32	1	1T	5.0	21.000	120	14.500	
to						0.0	5.000		-0.433	
45	13		21.32	1.049		0.0	26.000	0.1465	3.810	Vel = 7.91
			0.0							
45			21.32						17.877	K Factor = 5.04
P46	12	5.60	21.54	1	1T	5.0	21.000	120	14.801	
to						0.0	5.000		-0.433	
46	13		21.54	1.049		0.0	26.000	0.1493	3.882	Vel = 8.00
			0.0							
46			21.54						18.250	K Factor = 5.04
P47	12	5.60	22.33	1	1T	5.0	21.000	120	15.895	
to						0.0	5.000		-0.433	
47	13		22.33	1.049		0.0	26.000	0.1595	4.147	Vel = 8.29
			0.0							
47			22.33						19.609	K Factor = 5.04
P48	12	5.60	24.33	1	1T	5.0	21.000	120	18.870	
to						0.0	5.000		-0.433	
48	13		24.33	1.049		0.0	26.000	0.1870	4.861	Vel = 9.03
			0.0							
48			24.33						23.298	K Factor = 5.04
P49	12	5.60	29.24	1	1T	5.0	21.000	120	27.266	
to						0.0	5.000		-0.433	
49	13		29.24	1.049		0.0	26.000	0.2627	6.831	Vel = 10.85
			0.0							
49			29.24						33.664	K Factor = 5.04
P50	12	5.60	29.60	1	1T	5.0	21.000	120	27.945	
to						0.0	5.000		-0.433	
50	13		29.6	1.049		0.0	26.000	0.2688	6.989	Vel = 10.99

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
			0.0							
50			29.60						34.501	K Factor = 5.04
*										
41	13		21.25	1.25		0.0	12.000	120	17.752	
to						0.0	0.0		0.0	
42	13		21.25	1.442		0.0	12.000	0.0309	0.371	Vel = 4.17
42	13		21.47	1.25		0.0	12.000	120	18.123	
to						0.0	0.0		0.0	
43	13		42.72	1.442		0.0	12.000	0.1125	1.350	Vel = 8.39
43	13		22.25	1.25		0.0	15.000	120	19.473	
to						0.0	0.0		0.0	
44	13		64.97	1.442		0.0	15.000	0.2443	3.665	Vel = 12.76
44	13		24.24	1.25	2I	7.432	27.833	120	23.138	
to					1T	7.432	14.864		-0.090	
M71	13.208		89.21	1.442		0.0	42.697	0.4393	18.758	Vel = 17.53
			0.0							
M71			89.21						41.806	K Factor = 13.80
*										
45	13		21.32	1.25		0.0	12.000	120	17.877	
to						0.0	0.0		0.0	
46	13		21.32	1.442		0.0	12.000	0.0311	0.373	Vel = 4.19
46	13		21.55	1.25		0.0	12.000	120	18.250	
to						0.0	0.0		0.0	
47	13		42.87	1.442		0.0	12.000	0.1132	1.359	Vel = 8.42
47	13		22.32	1.25		0.0	15.000	120	19.609	
to						0.0	0.0		0.0	
48	13		65.19	1.442		0.0	15.000	0.2459	3.689	Vel = 12.81
48	13		24.33	1.25	2I	7.432	27.833	120	23.298	
to					1T	7.432	14.864		-0.090	
M72	13.208		89.52	1.442		0.0	42.697	0.4421	18.878	Vel = 17.59
			0.0							
M72			89.52						42.086	K Factor = 13.80
*										
49	13		29.24	1.25		0.0	15.000	120	33.664	
to						0.0	0.0		0.0	
50	13		29.24	1.442		0.0	15.000	0.0558	0.837	Vel = 5.74
50	13		29.60	1.25	2I	7.432	27.833	120	34.501	
to					1T	7.432	14.864		-0.090	
M73	13.208		58.84	1.442		0.0	42.697	0.2035	8.687	Vel = 11.56
			0.0							
M73			58.84						43.098	K Factor = 8.96
*										
M71	13.208		89.21	2.5		0.0	12.000	120	41.806	
to						0.0	0.0		0.0	
M72	13.208		89.21	2.635		0.0	12.000	0.0233	0.280	Vel = 5.25
M72	13.208		89.52	2.5		0.0	12.000	120	42.086	
to						0.0	0.0		0.0	
M73	13.208		178.73	2.635		0.0	12.000	0.0843	1.012	Vel = 10.52

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
M73	13.208		58.85	2.5	1J	14.827	12.667	120	43.098	
to						0.0	14.827		0.0	
M74	13.208		237.58	2.635		0.0	27.494	0.1428	3.925	Vel = 13.98
			0.0							
M74			237.58						47.023	K Factor = 34.65
*										
M74	13.208		237.58	3		0.0	30.208	120	47.023	
to						0.0	0.0		0.0	
M35	13.208		237.58	3.26		0.0	30.208	0.0506	1.530	Vel = 9.13
			0.0							
M35			237.58						48.553	K Factor = 34.10
*										
M35	13.208		237.58	4	1I	9.217	71.250	120	48.553	
to						0.0	9.217		0.0	
M36	13.208		237.58	4.26		0.0	80.467	0.0138	1.108	Vel = 5.35
M36	13.208		0.0	4	1I	9.217	38.000	120	49.661	
to						0.0	9.217		0.0	
M37	13.208		237.58	4.26		0.0	47.217	0.0137	0.649	Vel = 5.35
M37	13.208		0.0	4	1I	9.217	3.667	120	50.310	
to						0.0	9.217		0.0	
TR1	13.208		237.58	4.26		0.0	12.884	0.0138	0.178	Vel = 5.35
			0.0							
TR1			237.58						50.488	K Factor = 33.44
*										
TR1	13.208		237.58	4	1B	15.8	10.708	120	50.488	
to					1Fsp	0.0	67.151		7.638	* * Fixed Loss = 3
BR1	2.500		237.58	4.26	1Aty	30.284	77.859	0.0138	1.071	Vel = 5.35
					1J	21.067				
BR1	2.500		0.0	6		0.0	2.000	120	59.197	
to						0.0	0.0		0.0	
BR2	2.500		237.58	6.357		0.0	2.000	0.0020	0.004	Vel = 2.40
			0.0							
BR2			237.58						59.201	K Factor = 30.88
*										
BR2	2.500		237.58	6	1B	12.573	10.000	120	59.201	
to					1S	40.235	52.808		0.0	
PD	2.500		237.58	6.357		0.0	62.808	0.0020	0.123	Vel = 2.40
			0.0							
PD			237.58						59.324	K Factor = 30.85
System Demand Pressure									59.324	
Safety Margin									15.297	
Continuation Pressure									74.621	
Pressure @ Pump Outlet									74.621	
Pressure From Pump Curve									-43.991	
Pressure @ Pump Inlet									30.630	
*										
PS	2.5		0.0	6	1G	3.772	10.500	120	30.630	
to					1E	17.603	21.375		0.650	
FLG	1		237.58	6.357		0.0	31.875	0.0019	0.062	Vel = 2.40

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
			0.0							
FLG			237.58						31.342	K Factor = 42.44
*										
FLG	1		237.58	6	1E	20.084	50.000	140	31.342	
to					1G	4.304	67.425		0.433	
UG1	0		237.58	6.16	1T	43.037	117.425	0.0017	0.202	Vel = 2.56
			0.0							
UG1			237.58						31.977	K Factor = 42.01
*										
UG1	0	H100	225.02	8	2F	28.468	394.000	140	31.977	
to						0.0	28.468		0.0	
UG2	0		225.02	8.27		0.0	422.468	0.0004	0.156	Vel = 1.34
			0.0							
UG2			225.02						32.133	K Factor = 39.70
UG1	0		112.56	8	5F	71.17	988.000	140	31.977	
to					3E	85.404	181.879		0.0	
UG3	0		112.56	8.27	4G	25.305	1169.879	0.0001	0.120	Vel = 0.67
UG3	0		0.0	8	3F	42.702	303.000	140	32.097	
to					1G	6.326	49.028		0.0	
UG2	0		112.56	8.27		0.0	352.028	0.0001	0.036	Vel = 0.67
			0.0							
UG2			112.56						32.133	K Factor = 19.86
*										
UG2	0		337.58	8	2E	56.936	381.000	140	32.133	
to						0.0	56.936		-1.083	
BF1	2.500		337.58	8.27		0.0	437.936	0.0008	0.343	Vel = 2.02
BF1	2.500		0.0	8	1Zai	0.0	6.000	120	31.393	
to						0.0	0.0		12.512	* * Fixed Loss = 11.429
BF2	0		337.58	8.249		0.0	6.000	0.0012	0.007	Vel = 2.03
BF2	0		0.0	8	2E	56.936	26.000	140	43.912	
to					1T	55.354	112.290		0.0	
UG4	0		337.58	8.27		0.0	138.290	0.0008	0.108	Vel = 2.02
UG4	0		0.0	8	1T	55.354	321.000	140	44.020	
to					1G	6.326	61.680		0.0	
TAP	0		337.58	8.27		0.0	382.680	0.0008	0.300	Vel = 2.02
TAP	0		0.0	8	1Eql	297.332	500.000	140	44.320	
to						0.0	297.332		0.0	
TEST	0		337.58	8.27		0.0	797.332	0.0008	0.625	Vel = 2.02
			0.0							
TEST			337.58						44.945	K Factor = 50.35



. . . Fire Protection by Computer Design

Reliable Fire Protection LLC
32 Partin Rd.
Dunn, NC 28334
Robert Lawley
NICET Level III #103122

Job Name	:	EE - KITCHEN - AREA 7 - B100
Building	:	FP1,2,3,4
Location	:	DENIM DR., ERWIN, NC 28339
System	:	7
Contract	:	2020-098
Data File	:	EE AREA 7 - OH2.WXF

HYDRAULIC CALCULATIONS
for

Project name: ERWIN ELEMENTARY SCHOOL
Location: DENIM DR., ERWIN, NC 28339
Drawing no: FP1,2,3,4
Date: 08-19-20

Design

Remote area number: 7
Remote area location: KITCHEN AREA
Occupancy classification: ORDINARY HAZARD GROUP 2
Density: 0.20 - Gpm/SqFt
Area of application: 1,065 - SqFt
Coverage per sprinkler: 130 MAX - SqFt
Type of sprinklers calculated: STANDARD SPRAY PENDANT
No. of sprinklers calculated: 11
In-rack demand: N/A - GPM
Hose streams: 250 - GPM
Total water required (including hose streams): 544.485 - GPM @ 25.685 - Psi
Type of system: WET - TREE
Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 08-23-20
Location: DENIM DR.
Source: LKC ENGINEERING, LLC

Name of contractor: RELIABLE FIRE PROTECTION, LLC
Address: 32 PARTIN RD., DUNN, NC 28334
Phone number: 910-980-1234
Name of designer: ROBERT LAWLEY 26806-FS1
Authority having jurisdiction: HARNETT COUNTY
Notes: (Include peaking information or gridded systems here.)

Water Supply Curve C

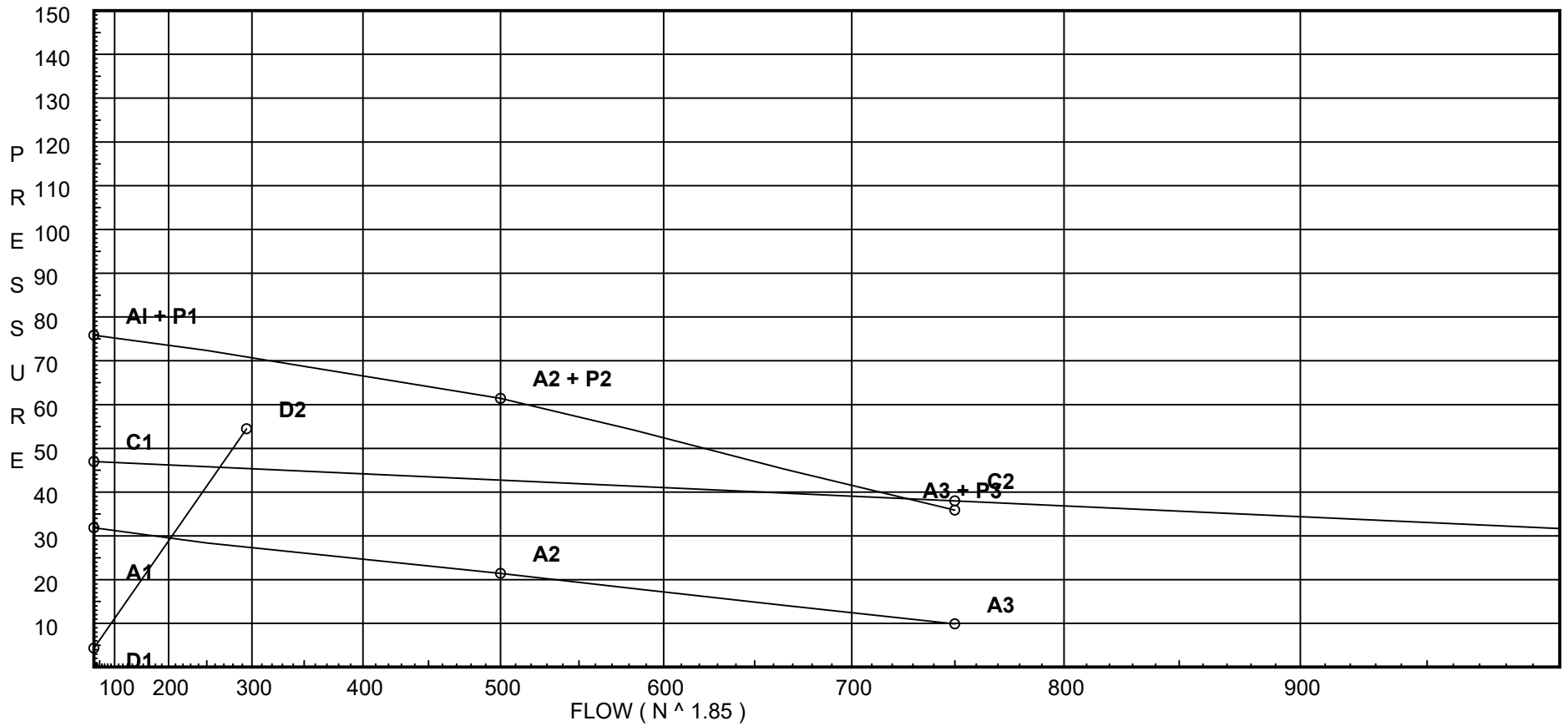
Reliable Fire Protection LLC
EE - KITCHEN - AREA 7 - B100

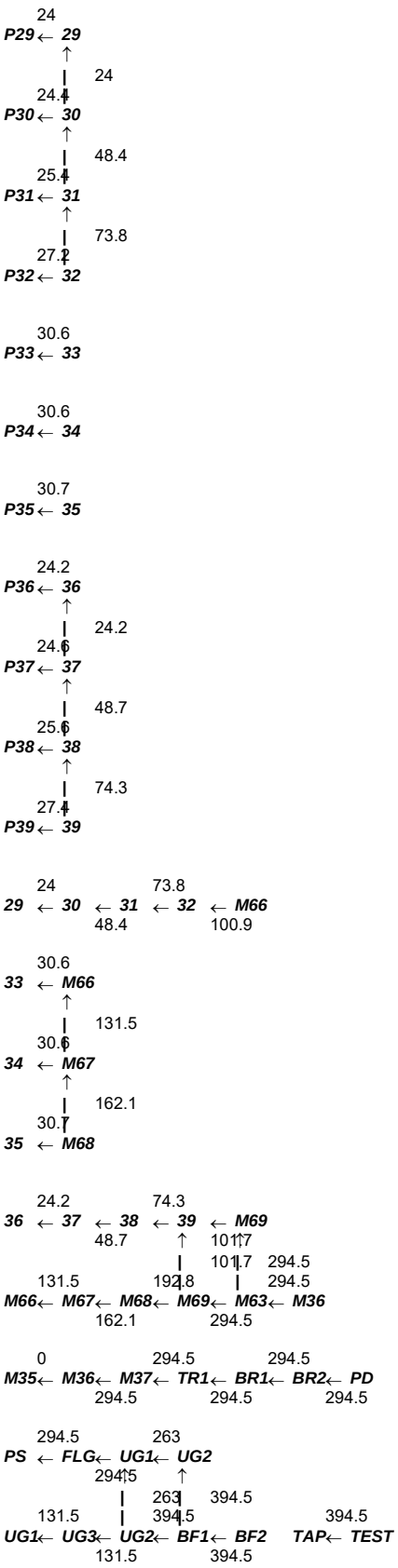
City Water Supply:
- C1 - Static Pressure : 47
- C2 - Residual Pressure: 38
- C2 - Residual Flow : 750

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow
- A1 - Adjusted Static: 31.849
- A2 - Adj Resid : 21.412 @ 500
- A3 - Adj Resid : 9.885 @ 750

Pump Data:
- P1 - Pump Churn Pressure : 44
- P2 - Pump Rated Pressure : 40
- P2 - Pump Rated Flow : 500
- P3 - Pump Pressure @ Max Flow : 26
- P3 - Pump Max Flow : 750
- City Residual Flow @ 0 = 1832.70
- City Residual Flow @ 20 = 1358.20
- City Water @ 150% of Pump = 38.00

Demand:
- D1 - Elevation : 4.331
- D2 - System Flow : 294.485
- D2 - System Pressure : 54.481
- Hose (Demand) : _____
- D3 - System Demand : 294.485
- Hose (Adj City) : 250
- Safety Margin : 16.338




24
P29 ← 29
24
24.4
P30 ← 30
48.4
25.4
P31 ← 31
73.8
27.2
P32 ← 32
30.6
P33 ← 33
30.6
P34 ← 34
30.7
P35 ← 35
24.2
P36 ← 36
24.2
24.6
P37 ← 37
48.7
25.6
P38 ← 38
74.3
27.4
P39 ← 39
24
29 ← 30
48.4
73.8
← 31 ← 32
100.9
← M66
30.6
33 ← M66
131.5
30.6
34 ← M67
162.1
30.7
35 ← M68
24.2
36 ← 37
48.7
74.3
← 38 ← 39
101.7
← M69
101.7
294.5
131.5
192.8
294.5
M66 ← M67 ← M68 ← M69 ← M63 ← M36
162.1
294.5
0
294.5
294.5
M35 ← M36 ← M37 ← TR1 ← BR1 ← BR2 ← PD
294.5
294.5
294.5
294.5
263
PS ← FLG ← UG1 ← UG2
294.5
263
394.5
131.5
394.5
394.5
UG1 ← UG3 ← UG2 ← BF1 ← BF2
TAP ← TEST
131.5
394.5

Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
Aty	Alarm Tyco AV-1							14			23		24	23							
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
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
I	90' Grvd-Vic Elbow #10	0	0	2	3	4	3.5	6	5	8	7	8.5	10	13	17	20	23	25	33	36	40
J	90'Tee-Branch Grv Vic #20	0	0	4.5	6	8	8.5	10.8	13	17	16	21	25	33	41	50	65	78	88	98	120
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
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
Zai	Ames 4000SS	Fitting generates a Fixed Loss Based on Flow																			

Units 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

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
P29	10.0	5.6	18.37	na	24.0	0.2	120	10.2
P30	10.0	5.6	18.94	na	24.37	0.2	120	10.2
P31	10.0	5.6	20.54	na	25.38	0.2	120	10.2
P32	10.0	5.6	23.55	na	27.17	0.2	112	9.0
P33	10.0	5.6	29.86	na	30.6	0.2	70	7.0
P34	10.0	5.6	29.86	na	30.6	0.2	105	7.8
P35	10.0	5.6	30.02	na	30.68	0.2	105	7.8
P36	10.0	5.6	18.64	na	24.18	0.2	120	10.2
P37	10.0	5.6	19.22	na	24.55	0.2	84	7.0
P38	10.0	5.6	20.85	na	25.57	0.2	84	7.0
P39	10.0	5.6	23.89	na	27.37	0.2	84	7.0
29	13.208		21.72	na				
30	13.208		22.43	na				
31	13.208		24.41	na				
32	13.208		28.12	na				
33	13.208		35.9	na				
34	13.208		35.9	na				
35	13.208		36.1	na				
36	13.208		22.06	na				
37	13.208		22.78	na				
38	13.208		24.79	na				
39	13.208		28.55	na				
M66	13.208		36.71	na				
M67	13.208		36.84	na				
M68	13.208		37.04	na				
M69	13.208		37.25	na				
M63	13.208		40.39	na				
M35	13.208		43.83	na				
M36	13.208		43.83	na				
M37	13.208		44.8	na				
TR1	13.208		45.06	na				
BR1	2.5		54.29	na				
BR2	2.5		54.3	na				
PD	2.5		54.48	na				
PS	2.5		27.37	na				
FLG	1.0		28.11	na				
UG1	0.0		28.85	na	100.0			
UG3	0.0		29.01	na				
UG2	0.0		29.06	na				
BF1	2.5		28.43	na				
BF2	0.0		40.64	na				
UG4	0.0		40.79	na				
TAP	0.0		41.19	na				
TEST	0.0		42.02	na	150.0			

The maximum velocity is 19.97 and it occurs in the pipe between nodes 39 and M69

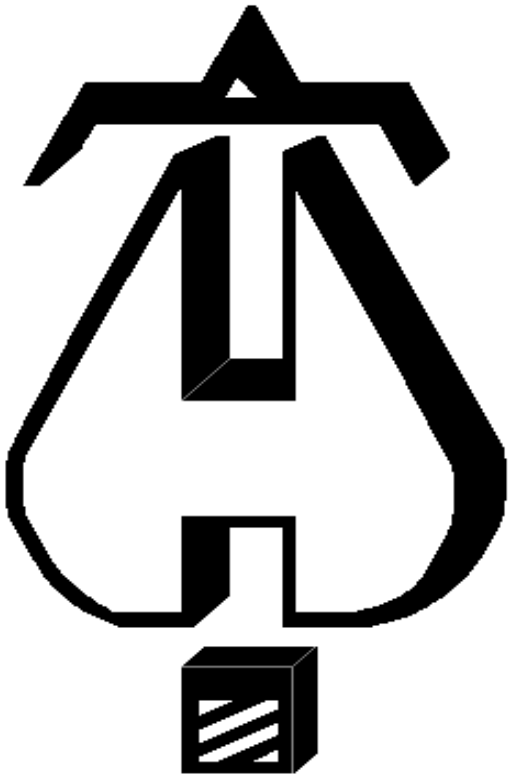
Node1 / to / Node2	Elev1 / Elev2	K / Fact	Qa / Qt	Nom / Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact / Pf/Ft	Pt / Pe / Pf	******* Notes ******
P29	10	5.60	24.00	1	1T	5.0	21.000	120	18.367	
to						0.0	5.000		-1.389	
29	13.208		24.0	1.049		0.0	26.000	0.1823	4.741	Vel = 8.91
			0.0							
29			24.00						21.719	K Factor = 5.15
P30	10	5.60	24.37	1	1T	5.0	21.000	120	18.944	
to						0.0	5.000		-1.389	
30	13.208		24.37	1.049		0.0	26.000	0.1876	4.877	Vel = 9.05
			0.0							
30			24.37						22.432	K Factor = 5.15
P31	10	5.60	25.38	1	1T	5.0	21.000	120	20.545	
to						0.0	5.000		-1.389	
31	13.208		25.38	1.049		0.0	26.000	0.2022	5.258	Vel = 9.42
			0.0							
31			25.38						24.414	K Factor = 5.14
P32	10	5.60	27.17	1	1T	5.0	21.000	120	23.546	
to						0.0	5.000		-1.389	
32	13.208		27.17	1.049		0.0	26.000	0.2294	5.965	Vel = 10.09
			0.0							
32			27.17						28.122	K Factor = 5.12
P33	10	5.60	30.60	1	1T	5.0	21.000	120	29.860	
to						0.0	5.000		-1.389	
33	13.208		30.6	1.049		0.0	26.000	0.2858	7.431	Vel = 11.36
			0.0							
33			30.60						35.902	K Factor = 5.11
P34	10	5.60	30.60	1	1T	5.0	21.000	120	29.860	
to						0.0	5.000		-1.389	
34	13.208		30.6	1.049		0.0	26.000	0.2858	7.430	Vel = 11.36
			0.0							
34			30.60						35.901	K Factor = 5.11
P35	10	5.60	30.68	1	1T	5.0	21.000	120	30.018	
to						0.0	5.000		-1.389	
35	13.208		30.68	1.049		0.0	26.000	0.2872	7.467	Vel = 11.39
			0.0							
35			30.68						36.096	K Factor = 5.11
P36	10	5.60	24.18	1	1T	5.0	21.000	120	18.640	
to						0.0	5.000		-1.389	
36	13.208		24.18	1.049		0.0	26.000	0.1848	4.805	Vel = 8.98
			0.0							
36			24.18						22.056	K Factor = 5.15
P37	10	5.60	24.55	1	1T	5.0	21.000	120	19.224	
to						0.0	5.000		-1.389	
37	13.208		24.55	1.049		0.0	26.000	0.1902	4.944	Vel = 9.11
			0.0							
37			24.55						22.779	K Factor = 5.14
P38	10	5.60	25.57	1	1T	5.0	21.000	120	20.848	
to						0.0	5.000		-1.389	
38	13.208		25.57	1.049		0.0	26.000	0.2050	5.330	Vel = 9.49

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
			0.0							
38			25.57						24.789	K Factor = 5.14
P39	10	5.60	27.37	1	1T	5.0	21.000	120	23.891	
to						0.0	5.000		-1.389	
39	13.208		27.37	1.049		0.0	26.000	0.2325	6.045	Vel = 10.16
			0.0							
39			27.37						28.547	K Factor = 5.12
*										
*										
29	13.208		24.00	1.25	2I	7.432	11.000	120	21.719	
to						0.0	7.432		0.0	
30	13.208		24.0	1.442		0.0	18.432	0.0387	0.713	Vel = 4.71
30	13.208		24.37	1.25		0.0	14.000	120	22.432	
to						0.0	0.0		0.0	
31	13.208		48.37	1.442		0.0	14.000	0.1416	1.982	Vel = 9.50
31	13.208		25.39	1.25		0.0	12.000	120	24.414	
to						0.0	0.0		0.0	
32	13.208		73.76	1.442		0.0	12.000	0.3090	3.708	Vel = 14.49
32	13.208		27.17	1.25	1T	7.432	8.125	120	28.122	
to						0.0	7.432		0.0	
M66	13.208		100.93	1.442		0.0	15.557	0.5520	8.588	Vel = 19.83
			0.0							
M66			100.93						36.710	K Factor = 16.66
*										
33	13.208		30.60	1.25	1T	7.432	5.875	120	35.902	
to						0.0	7.432		0.0	
M66	13.208		30.6	1.442		0.0	13.307	0.0607	0.808	Vel = 6.01
			0.0							
M66			30.60						36.710	K Factor = 5.05
*										
34	13.208		30.60	1.25	1T	7.432	8.125	120	35.901	
to						0.0	7.432		0.0	
M67	13.208		30.6	1.442		0.0	15.557	0.0607	0.944	Vel = 6.01
			0.0							
M67			30.60						36.845	K Factor = 5.04
*										
35	13.208		30.68	1.25	1T	7.432	8.125	120	36.096	
to						0.0	7.432		0.0	
M68	13.208		30.68	1.442		0.0	15.557	0.0610	0.949	Vel = 6.03
			0.0							
M68			30.68						37.045	K Factor = 5.04
*										
36	13.208		24.18	1.25	2I	7.432	11.000	120	22.056	
to						0.0	7.432		0.0	
37	13.208		24.18	1.442		0.0	18.432	0.0392	0.723	Vel = 4.75
37	13.208		24.55	1.25		0.0	14.000	120	22.779	
to						0.0	0.0		0.0	
38	13.208		48.73	1.442		0.0	14.000	0.1436	2.010	Vel = 9.57

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
38	13.208		25.57	1.25		0.0	12.000	120	24.789	
to						0.0	0.0		0.0	
39	13.208		74.3	1.442		0.0	12.000	0.3132	3.758	Vel = 14.60
39	13.208		27.37	1.25	1T	7.432	8.125	120	28.547	
to						0.0	7.432		0.0	
M69	13.208		101.67	1.442		0.0	15.557	0.5596	8.705	Vel = 19.97
			0.0							
M69			101.67						37.252	K Factor = 16.66
*										
M66	13.208		131.53	3		0.0	8.000	120	36.710	
to						0.0	0.0		0.0	
M67	13.208		131.53	3.26		0.0	8.000	0.0169	0.135	Vel = 5.06
M67	13.208		30.60	3		0.0	8.000	120	36.845	
to						0.0	0.0		0.0	
M68	13.208		162.13	3.26		0.0	8.000	0.0250	0.200	Vel = 6.23
M68	13.208		30.68	3		0.0	6.000	120	37.045	
to						0.0	0.0		0.0	
M69	13.208		192.81	3.26		0.0	6.000	0.0345	0.207	Vel = 7.41
M69	13.208		101.67	3	1J	17.471	24.167	120	37.252	
to						0.0	17.471		0.0	
M63	13.208		294.48	3.26		0.0	41.638	0.0753	3.137	Vel = 11.32
M63	13.208		0.0	3	1J	17.471	28.208	120	40.389	
to						0.0	17.471		0.0	
M36	13.208		294.48	3.26		0.0	45.679	0.0753	3.441	Vel = 11.32
			0.0							
M36			294.48						43.830	K Factor = 44.48
*										
M35	13.208	.0	0.0	4	1I	9.217	71.250	120	43.830	
to						0.0	9.217		0.0	
M36	13.208		0.0	4.26		0.0	80.467	0	0.0	Vel = 0
M36	13.208		294.48	4	1I	9.217	38.000	120	43.830	
to						0.0	9.217		0.0	
M37	13.208		294.48	4.26		0.0	47.217	0.0205	0.967	Vel = 6.63
M37	13.208		0.0	4	1I	9.217	3.667	120	44.797	
to						0.0	9.217		0.0	
TR1	13.208		294.48	4.26		0.0	12.884	0.0205	0.264	Vel = 6.63
			0.0							
TR1			294.48						45.061	K Factor = 43.87
*										
TR1	13.208		294.48	4	1B	15.8	10.708	120	45.061	
to					1Fsp	0.0	67.151		7.638	* * Fixed Loss = 3
BR1	2.500		294.48	4.26	1Aty	30.284	77.859	0.0205	1.593	Vel = 6.63
					1J	21.067				
BR1	2.500		0.0	6		0.0	2.000	120	54.292	
to						0.0	0.0		0.0	
BR2	2.500		294.48	6.357		0.0	2.000	0.0030	0.006	Vel = 2.98
			0.0							
BR2			294.48						54.298	K Factor = 39.96

Node1 / to / Node2	Elev1 / Elev2	K / Fact	Qa / Qt	Nom / Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact / Pf/Ft	Pt / Pe / Pf	******* Notes ******
*										
BR2	2.500		294.48	6	1B	12.573	10.000	120	54.298	
to					1S	40.235	52.808		0.0	
PD	2.500		294.48	6.357		0.0	62.808	0.0029	0.183	Vel = 2.98
			0.0							
PD			294.48						54.481	K Factor = 39.90
System Demand Pressure									54.481	
Safety Margin									16.338	
Continuation Pressure									70.819	
Pressure @ Pump Outlet									70.819	
Pressure From Pump Curve									-43.448	
Pressure @ Pump Inlet									27.371	
*										
PS	2.5		0.0	6	1G	3.772	10.500	120	27.371	
to					1E	17.603	21.375		0.650	
FLG	1		294.48	6.357		0.0	31.875	0.0029	0.093	Vel = 2.98
			0.0							
FLG			294.48						28.114	K Factor = 55.54
*										
FLG	1		294.48	6	1E	20.084	50.000	140	28.114	
to					1G	4.304	67.425		0.433	
UG1	0		294.48	6.16	1T	43.037	117.425	0.0026	0.300	Vel = 3.17
			0.0							
UG1			294.48						28.847	K Factor = 54.83
*										
UG1	0	H100	262.96	8	2F	28.468	394.000	140	28.847	
to						0.0	28.468		0.0	
UG2	0		262.96	8.27		0.0	422.468	0.0005	0.209	Vel = 1.57
			0.0							
UG2			262.96						29.056	K Factor = 48.78
UG1	0		131.53	8	5F	71.17	988.000	140	28.847	
to					3E	85.404	181.879		0.0	
UG3	0		131.53	8.27	4G	25.305	1169.879	0.0001	0.160	Vel = 0.79
UG3	0		0.0	8	3F	42.702	303.000	140	29.007	
to					1G	6.326	49.028		0.0	
UG2	0		131.53	8.27		0.0	352.028	0.0001	0.049	Vel = 0.79
			0.0							
UG2			131.53						29.056	K Factor = 24.40
*										
UG2	0		394.48	8	2E	56.936	381.000	140	29.056	
to						0.0	56.936		-1.083	
BF1	2.500		394.48	8.27		0.0	437.936	0.0010	0.458	Vel = 2.36
BF1	2.500		0.0	8	1Zai	0.0	6.000	120	28.431	
to						0.0	0.0		12.206	* * Fixed Loss = 11.124
BF2	0		394.48	8.249		0.0	6.000	0.0013	0.008	Vel = 2.37
BF2	0		0.0	8	2E	56.936	26.000	140	40.645	
to					1T	55.354	112.290		0.0	
UG4	0		394.48	8.27		0.0	138.290	0.0010	0.145	Vel = 2.36

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
UG4	0		0.0	8	1T	55.354	321.000	140	40.790	
to					1G	6.326	61.680		0.0	
TAP	0		394.48	8.27		0.0	382.680	0.0010	0.400	Vel = 2.36
TAP	0		0.0	8	1Eql	297.332	500.000	140	41.190	
to						0.0	297.332		0.0	
TEST	0		394.48	8.27		0.0	797.332	0.0010	0.833	Vel = 2.36
			150.00							Qa = 150.00
TEST			544.48						42.023	K Factor = 83.99



. . . Fire Protection by Computer Design

Reliable Fire Protection LLC
32 Partin Rd.
Dunn, NC 28334
Robert Lawley
NICET Level III #103122

Job Name	:	EE - AUDITORIUM PLATFORM AREA 8 - A100
Building	:	FP1,2,3,4
Location	:	DENIM DR., ERWIN, NC 28339
System	:	8
Contract	:	2020-098
Data File	:	EE AREA 8.WXF

HYDRAULIC CALCULATIONS
for

Project name: ERWIN ELEMENTARY SCHOOL
Location: DENIM DR., ERWIN, NC 28339
Drawing no: FP1,2,3,4
Date: 08-19-20

Design

Remote area number: 8
Remote area location: AUDITORIUM - PLATFORM OVERHEAD
Occupancy classification: ORDINARY HAZARD 2
Density: 0.20 - Gpm/SqFt
Area of application: 986 - SqFt
Coverage per sprinkler: 225 MAX - SqFt
Type of sprinklers calculated: STANDARD SPRAY PENDANT
No. of sprinklers calculated: 10
In-rack demand: N/A - GPM
Hose streams: 250 - GPM
Total water required (including hose streams): 504.902 - GPM @ 11.038 - Psi
Type of system: WET - TREE
Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 08-23-20
Location: DENIM DR.
Source: LKC ENGINEERING, LLC

Name of contractor: RELIABLE FIRE PROTECTION, LLC
Address: 32 PARTIN RD., DUNN, NC 28334
Phone number: 910-980-1234
Name of designer: ROBERT LAWLEY 26806-FS1
Authority having jurisdiction: HARNETT COUNTY
Notes: (Include peaking information or gridded systems here.)

Water Supply Curve C

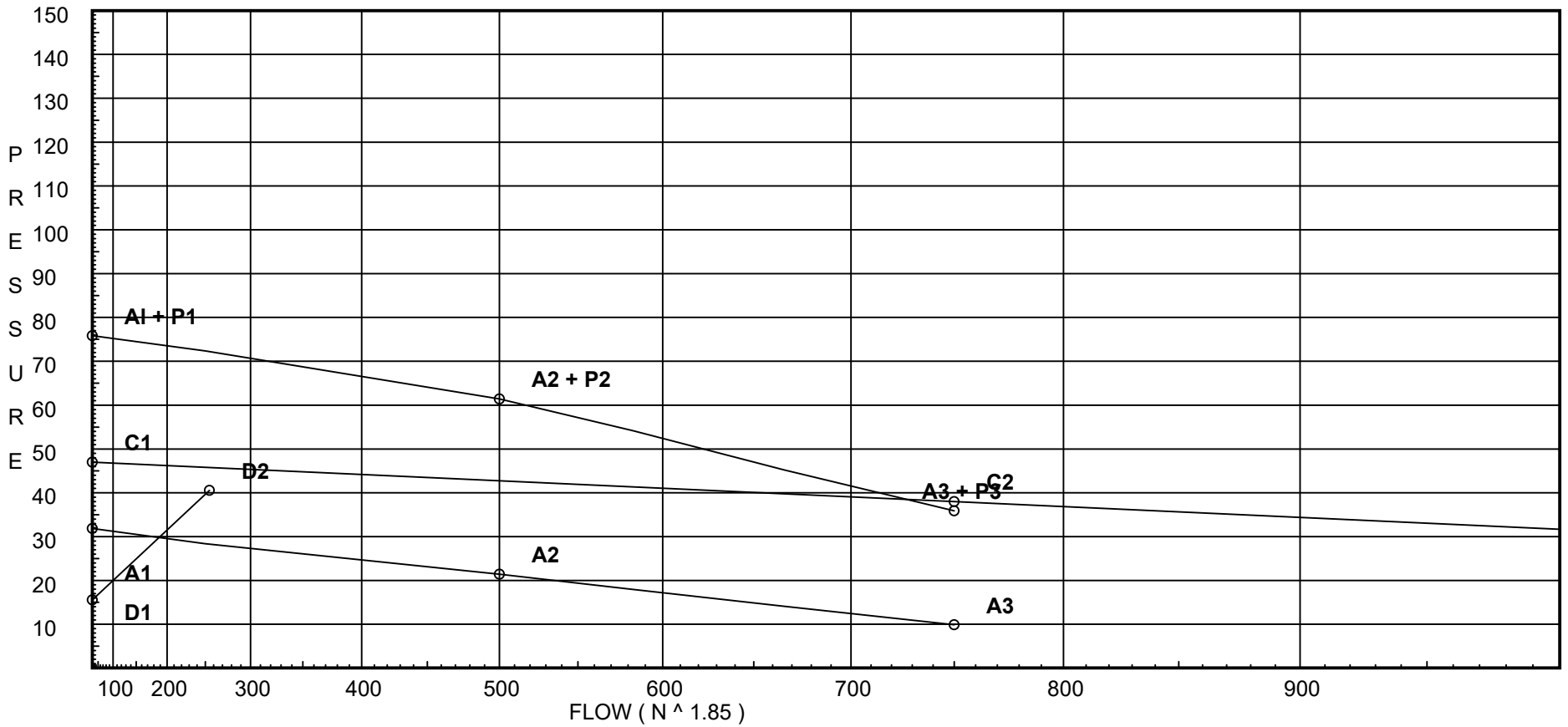
Reliable Fire Protection LLC
EE - AUDITORIUM PLATFORM AREA 8 - A100

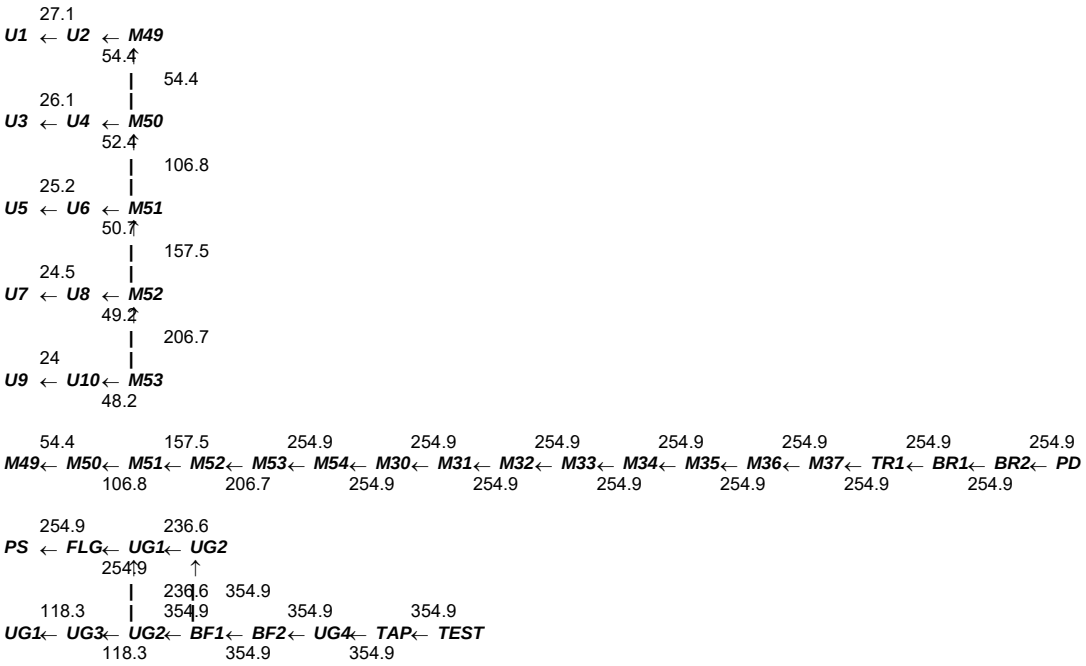
City Water Supply:
- C1 - Static Pressure : 47
- C2 - Residual Pressure: 38
- C2 - Residual Flow : 750

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow
- A1 - Adjusted Static: 31.849
- A2 - Adj Resid : 21.412 @ 500
- A3 - Adj Resid : 9.885 @ 750

Pump Data:
- P1 - Pump Churn Pressure : 44
- P2 - Pump Rated Pressure : 40
- P2 - Pump Rated Flow : 500
- P3 - Pump Pressure @ Max Flow : 26
- P3 - Pump Max Flow : 750
- City Residual Flow @ 0 = 1832.70
- City Residual Flow @ 20 = 1358.20
- City Water @ 150% of Pump = 38.00

Demand:
- D1 - Elevation : 15.556
- D2 - System Flow : 254.902
- D2 - System Pressure : 40.564
- Hose (Demand) : _____
- D3 - System Demand : 254.902
- Hose (Adj City) : 250
- Safety Margin : 31.634




27.1
U1 ← U2 ← M49
54.4
54.4
26.1
U3 ← U4 ← M50
52.4
106.8
25.2
U5 ← U6 ← M51
50.7
157.5
24.5
U7 ← U8 ← M52
49.2
206.7
24
U9 ← U10 ← M53
48.2
54.4 157.5 254.9 254.9 254.9 254.9 254.9 254.9 254.9
M49 ← M50 ← M51 ← M52 ← M53 ← M54 ← M30 ← M31 ← M32 ← M33 ← M34 ← M35 ← M36 ← M37 ← TR1 ← BR1 ← BR2 ← PD
106.8 206.7 254.9 254.9 254.9 254.9 254.9 254.9
254.9 236.6
PS ← FLG ← UG1 ← UG2
254.9
236.6 354.9
118.3 354.9 354.9 354.9
UG1 ← UG3 ← UG2 ← BF1 ← BF2 ← UG4 ← TAP ← TEST
118.3 354.9 354.9

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
Aty	Alarm Tyco AV-1							14			23		24	23							
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
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
I	90' Grvd-Vic Elbow #10	0	0	2	3	4	3.5	6	5	8	7	8.5	10	13	17	20	23	25	33	36	40
J	90'Tee-Branch Grv Vic #20	0	0	4.5	6	8	8.5	10.8	13	17	16	21	25	33	41	50	65	78	88	98	120
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
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
Zai	Ames 4000SS	Fitting generates a Fixed Loss Based on Flow																			

Units 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

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
U1	25.917	8	11.46	na	27.08	0.2	120	9.0
U2	25.917	8	11.64	na	27.3	0.2	120	9.0
U3	28.417	8	10.66	na	26.12	0.2	120	9.0
U4	28.417	8	10.83	na	26.32	0.2	120	9.0
U5	30.917	8	9.95	na	25.23	0.2	120	9.0
U6	30.917	8	10.11	na	25.44	0.2	120	9.0
U7	33.417	8	9.38	na	24.51	0.2	120	9.0
U8	33.417	8	9.54	na	24.71	0.2	120	9.0
U9	35.917	8	9.0	na	24.0	0.2	120	9.0
U10	35.917	8	9.15	na	24.19	0.2	120	9.0
M49	25.917		14.98	na				
M50	28.417		13.95	na				
M51	30.917		13.04	na				
M52	33.417		12.31	na				
M53	35.917		11.81	na				
M54	36.25		13.2	na				
M30	21.0		22.46	na				
M31	21.0		24.1	na				
M32	21.0		24.9	na				
M33	21.0		25.27	na				
M34	13.208		28.9	na				
M35	13.208		29.36	na				
M36	13.208		30.62	na				
M37	13.208		31.36	na				
TR1	13.208		31.56	na				
BR1	2.5		40.42	na				
BR2	2.5		40.42	na				
PD	2.5		40.56	na				
PS	2.5		28.26	na				
FLG	1.0		28.98	na				
UG1	0.0		29.65	na	100.0			
UG3	0.0		29.78	na				
UG2	0.0		29.82	na				
BF1	2.5		29.11	na				
BF2	0.0		41.54	na				
UG4	0.0		41.66	na				
TAP	0.0		41.99	na				
TEST	0.0		42.67	na	150.0			

The maximum velocity is 9.8 and it occurs in the pipe between nodes M53 and M54

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
U1	25.917	8.00	27.08	1.5		0.0	8.000	120	11.461	
to						0.0	0.0		0.0	
U2	25.917		27.08	1.682		0.0	8.000	0.0229	0.183	Vel = 3.91
U2	25.917	8.00	27.30	1.5	1T	9.9	30.250	120	11.644	
to						0.0	9.900		0.0	
M49	25.917		54.38	1.682		0.0	40.150	0.0831	3.336	Vel = 7.85
			0.0							
M49			54.38						14.980	K Factor = 14.05
*										
U3	28.417	8.00	26.12	1.5		0.0	8.000	120	10.657	
to						0.0	0.0		0.0	
U4	28.417		26.12	1.682		0.0	8.000	0.0214	0.171	Vel = 3.77
U4	28.417	8.00	26.32	1.5	1T	9.9	30.250	120	10.828	
to						0.0	9.900		0.0	
M50	28.417		52.44	1.682		0.0	40.150	0.0777	3.119	Vel = 7.57
			0.0							
M50			52.44						13.947	K Factor = 14.04
*										
U5	30.917	8.00	25.24	1.5		0.0	8.000	120	9.950	
to						0.0	0.0		0.0	
U6	30.917		25.24	1.682		0.0	8.000	0.0200	0.160	Vel = 3.64
U6	30.917	8.00	25.43	1.5	1T	9.9	30.250	120	10.110	
to						0.0	9.900		0.0	
M51	30.917		50.67	1.682		0.0	40.150	0.0729	2.927	Vel = 7.32
			0.0							
M51			50.67						13.037	K Factor = 14.03
*										
U7	33.417	8.00	24.51	1.5		0.0	8.000	120	9.385	
to						0.0	0.0		0.0	
U8	33.417		24.51	1.682		0.0	8.000	0.0190	0.152	Vel = 3.54
U8	33.417	8.00	24.70	1.5	1T	9.9	30.250	120	9.537	
to						0.0	9.900		0.0	
M52	33.417		49.21	1.682		0.0	40.150	0.0690	2.772	Vel = 7.11
			0.0							
M52			49.21						12.309	K Factor = 14.03
*										
U9	35.917	8.00	24.00	1.5		0.0	8.000	120	9.000	
to						0.0	0.0		0.0	
U10	35.917		24.0	1.682		0.0	8.000	0.0182	0.146	Vel = 3.47
U10	35.917	8.00	24.19	1.5	1T	9.9	30.250	120	9.146	
to						0.0	9.900		0.0	
M53	35.917		48.19	1.682		0.0	40.150	0.0665	2.668	Vel = 6.96
			0.0							
M53			48.19						11.814	K Factor = 14.02
*										
M49	25.917		54.38	3		0.0	15.000	120	14.980	
to						0.0	0.0		-1.083	
M50	28.417		54.38	3.26		0.0	15.000	0.0033	0.050	Vel = 2.09

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
M50	28.417		52.44	3		0.0	15.000	120	13.947	
to						0.0	0.0		-1.083	
M51	30.917		106.82	3.26		0.0	15.000	0.0115	0.173	Vel = 4.11
M51	30.917		50.68	3		0.0	15.000	120	13.037	
to						0.0	0.0		-1.083	
M52	33.417		157.5	3.26		0.0	15.000	0.0237	0.355	Vel = 6.05
M52	33.417		49.21	3		0.0	15.000	120	12.309	
to						0.0	0.0		-1.083	
M53	35.917		206.71	3.26		0.0	15.000	0.0392	0.588	Vel = 7.95
M53	35.917		48.19	3	3I	20.159	6.333	120	11.814	
to						0.0	20.159		-0.144	
M54	36.250		254.9	3.26		0.0	26.492	0.0577	1.528	Vel = 9.80
M54	36.250		0.0	3	1I	6.72	19.250	120	13.198	
to					1T	20.159	26.879		6.605	
M30	21		254.9	3.26		0.0	46.129	0.0577	2.661	Vel = 9.80
			0.0							
M30			254.90						22.464	K Factor = 53.78
*										
M30	21		254.90	4	1J	21.067	83.042	120	22.464	
to						0.0	21.067		0.0	
M31	21		254.9	4.26		0.0	104.109	0.0157	1.632	Vel = 5.74
M31	21		0.0	4	1J	21.067	30.208	120	24.096	
to						0.0	21.067		0.0	
M32	21		254.9	4.26		0.0	51.275	0.0157	0.803	Vel = 5.74
M32	21		0.0	4	1J	21.067	2.500	120	24.899	
to						0.0	21.067		0.0	
M33	21		254.9	4.26		0.0	23.567	0.0157	0.370	Vel = 5.74
M33	21		0.0	4	1I	9.217	7.292	120	25.269	
to						0.0	9.217		3.375	
M34	13.208		254.9	4.26		0.0	16.509	0.0156	0.258	Vel = 5.74
M34	13.208		0.0	4	1J	21.067	8.000	120	28.902	
to						0.0	21.067		0.0	
M35	13.208		254.9	4.26		0.0	29.067	0.0157	0.456	Vel = 5.74
M35	13.208		0.0	4	1I	9.217	71.250	120	29.358	
to						0.0	9.217		0.0	
M36	13.208		254.9	4.26		0.0	80.467	0.0157	1.261	Vel = 5.74
M36	13.208		0.0	4	1I	9.217	38.000	120	30.619	
to						0.0	9.217		0.0	
M37	13.208		254.9	4.26		0.0	47.217	0.0157	0.741	Vel = 5.74
M37	13.208		0.0	4	1I	9.217	3.667	120	31.360	
to						0.0	9.217		0.0	
TR1	13.208		254.9	4.26		0.0	12.884	0.0156	0.201	Vel = 5.74
			0.0							
TR1			254.90						31.561	K Factor = 45.37
*										
TR1	13.208		254.90	4	1B	15.8	10.708	120	31.561	
to					1Fsp	0.0	67.151		7.638	* * Fixed Loss = 3
BR1	2.500		254.9	4.26	1Aty	30.284	77.859	0.0157	1.221	Vel = 5.74

Node1 / to / Node2	Elev1 / Elev2	K / Fact	Qa / Qt	Nom / Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact / Pf/Ft	Pt / Pe / Pf	******* Notes ******
					1J	21.067				
BR1	2.500		0.0	6		0.0	2.000	120	40.420	
to						0.0	0.0		0.0	
BR2	2.500		254.9	6.357		0.0	2.000	0.0020	0.004	Vel = 2.58
			0.0							
BR2			254.90						40.424	K Factor = 40.09
*										
BR2	2.500		254.90	6	1B	12.573	10.000	120	40.424	
to					1S	40.235	52.808		0.0	
PD	2.500		254.9	6.357		0.0	62.808	0.0022	0.140	Vel = 2.58
			0.0							
PD			254.90						40.564	K Factor = 40.02
System Demand Pressure									40.564	
Safety Margin									31.634	
Continuation Pressure									72.198	
Pressure @ Pump Outlet									72.198	
Pressure From Pump Curve									-43.934	
Pressure @ Pump Inlet									28.264	
*										
PS	2.5		0.0	6	1G	3.772	10.500	120	28.264	
to					1E	17.603	21.375		0.650	
FLG	1		254.9	6.357		0.0	31.875	0.0022	0.071	Vel = 2.58
			0.0							
FLG			254.90						28.985	K Factor = 47.35
*										
FLG	1		254.90	6	1E	20.084	50.000	140	28.985	
to					1G	4.304	67.425		0.433	
UG1	0		254.9	6.16	1T	43.037	117.425	0.0020	0.230	Vel = 2.74
			0.0							
UG1			254.90						29.648	K Factor = 46.81
*										
UG1	0	H100	236.57	8	2F	28.468	394.000	140	29.648	
to						0.0	28.468		0.0	
UG2	0		236.57	8.27		0.0	422.468	0.0004	0.171	Vel = 1.41
			0.0							
UG2			236.57						29.819	K Factor = 43.32
UG1	0		118.33	8	5F	71.17	988.000	140	29.648	
to					3E	85.404	181.879		0.0	
UG3	0		118.33	8.27	4G	25.305	1169.879	0.0001	0.132	Vel = 0.71
UG3	0		0.0	8	3F	42.702	303.000	140	29.780	
to					1G	6.326	49.028		0.0	
UG2	0		118.33	8.27		0.0	352.028	0.0001	0.039	Vel = 0.71
			0.0							
UG2			118.33						29.819	K Factor = 21.67
*										
UG2	0		354.90	8	2E	56.936	381.000	140	29.819	
to						0.0	56.936		-1.083	
BF1	2.500		354.9	8.27		0.0	437.936	0.0009	0.377	Vel = 2.12

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
BF1	2.500		0.0	8	1Zai	0.0	6.000	120	29.113	
to						0.0	0.0		12.419	* * Fixed Loss = 11.336
BF2	0		354.9	8.249		0.0	6.000	0.0012	0.007	Vel = 2.13
BF2	0		0.0	8	2E	56.936	26.000	140	41.539	
to					1T	55.354	112.290		0.0	
UG4	0		354.9	8.27		0.0	138.290	0.0009	0.119	Vel = 2.12
UG4	0		0.0	8	1T	55.354	321.000	140	41.658	
to					1G	6.326	61.680		0.0	
TAP	0		354.9	8.27		0.0	382.680	0.0009	0.329	Vel = 2.12
TAP	0		0.0	8	1Eql	297.332	500.000	140	41.987	
to						0.0	297.332		0.0	
TEST	0		354.9	8.27		0.0	797.332	0.0009	0.685	Vel = 2.12
			150.00							Qa = 150.00
TEST			504.90						42.672	K Factor = 77.29

LKC Engineering, PLLC
140 Aqua Shed Court
Aberdeen, NC 28315
PH: (910) 420-1437
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License #P-1095

FIRE FLOW TEST RESULTS:

Test Number	**3**
Test Date & Time	8/23/20 2:15 PM
Client	
Location	Ewrin, NC
Performed by	J Maples Logan Willams Scottie Scott

Static Pressure	47	psi	Location:	S 10th St & Old Post Rd
Residual Pressure	38	psi	Location:	
Nozzle inside Diameter		inches	(measure nozzle used)	
Pitot Tube Pressure	20	psi	Location:	S 10th St & E D St
Discharge rate (measured)	750	gpm	Flow Measuring Device:	PollardWater Pitot Gauge
Required Residual Pressure	30	psi	(varies - 20psi minimum)	

Formula: $$Q_R = Q_F \times \left({}^{H_R}/_{H_F}\right)^{0.54}$$

Q(R) = Rated Capacity (in gpm) at 20 psi residual
Q(F) = Total test flow (gpm) from at pitot pressure
H(R) = Static Pressure - Required Pressure (psi)
H(F) = Static Pressure - Residual Pressure

Q(R) =	750	17	9
	Q(F)	H(R)	H(F)

Available Fire Flow Q(R) =	**1,057**	gpm at	30	psi residual (calculated)

Performed By: Jackson Maples — 8/27/2020 (Date)

Certified By: Tim Carpenter — 8/27/2020 (Date)

Notes:

FIRE HYDRANT FLOW TESTING FIELD FORM

Project: ~~Ervin Elementary~~

Owner: Ervin Elementary

Date: 8/26/20

LKC Engineering, PLLC
140 Aqua Shed Court
Aberdeen, NC 28315
(910) 420-1437

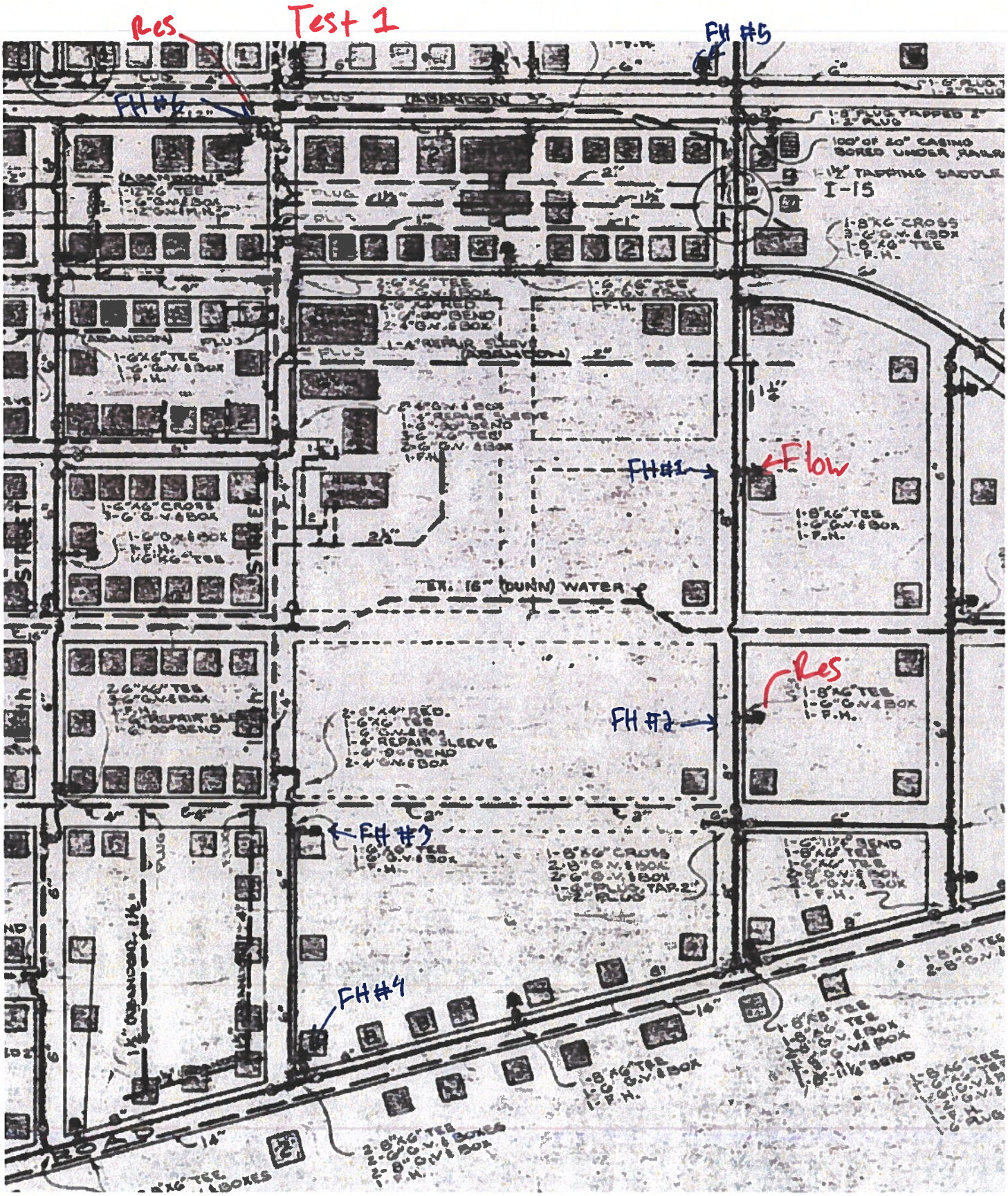
LKC

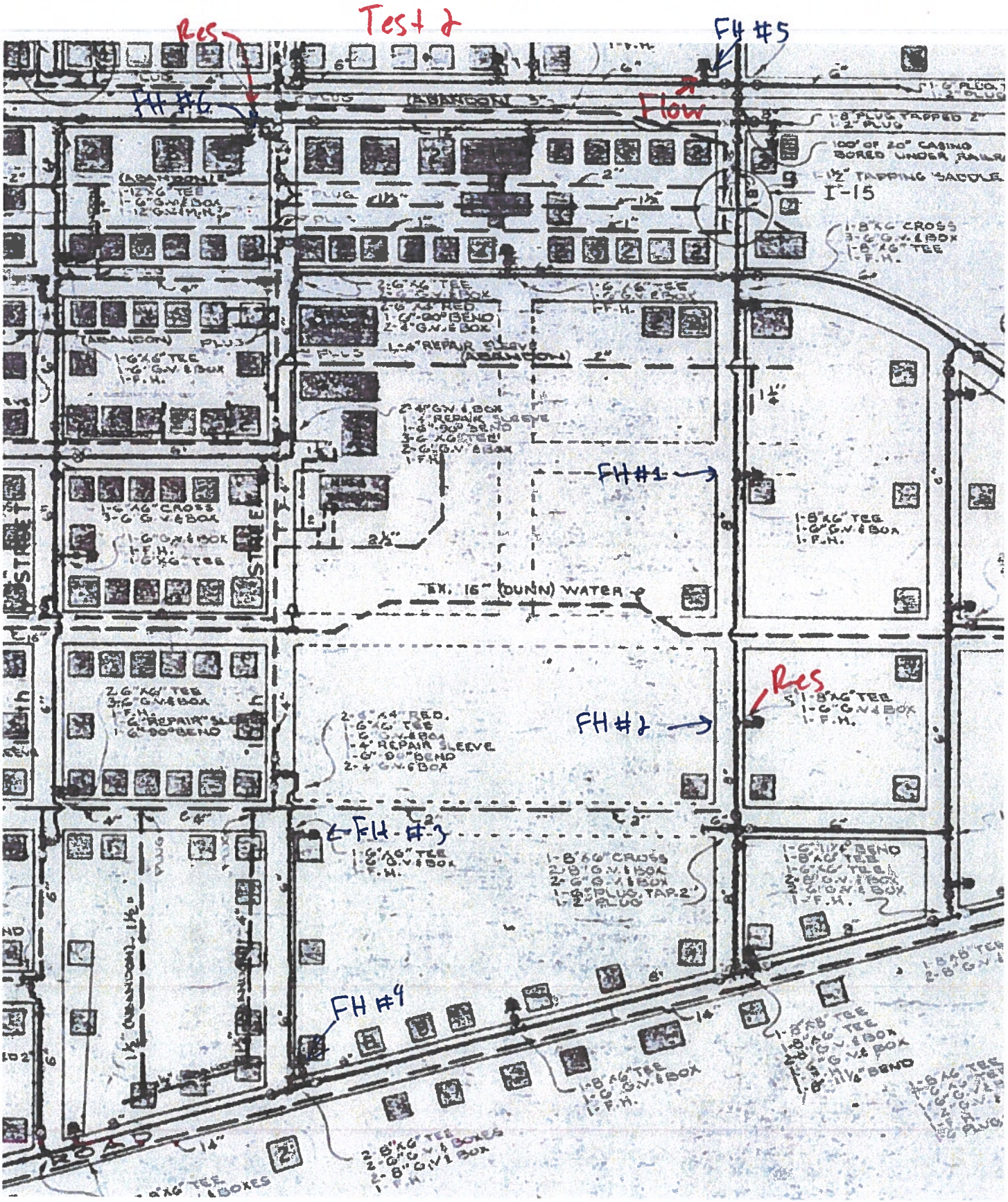
Test No.	Time	Gauge Hydrant			Flow Hydrant		
		Hydrant No.	Static Pressure (psi)	Residual Pressure (psi)	Hydrant No.	Pitot Pressure (psi)	Measured Flow (gpm)
1	1:45	2 S	52	96	#1 L	30	920
		6 J	48	44			
2		2 S	52	49	5 L	35	1000
		6 J	48	45-46			
3		2 S	52	48	3 L	20	750
		4 J	47	38			

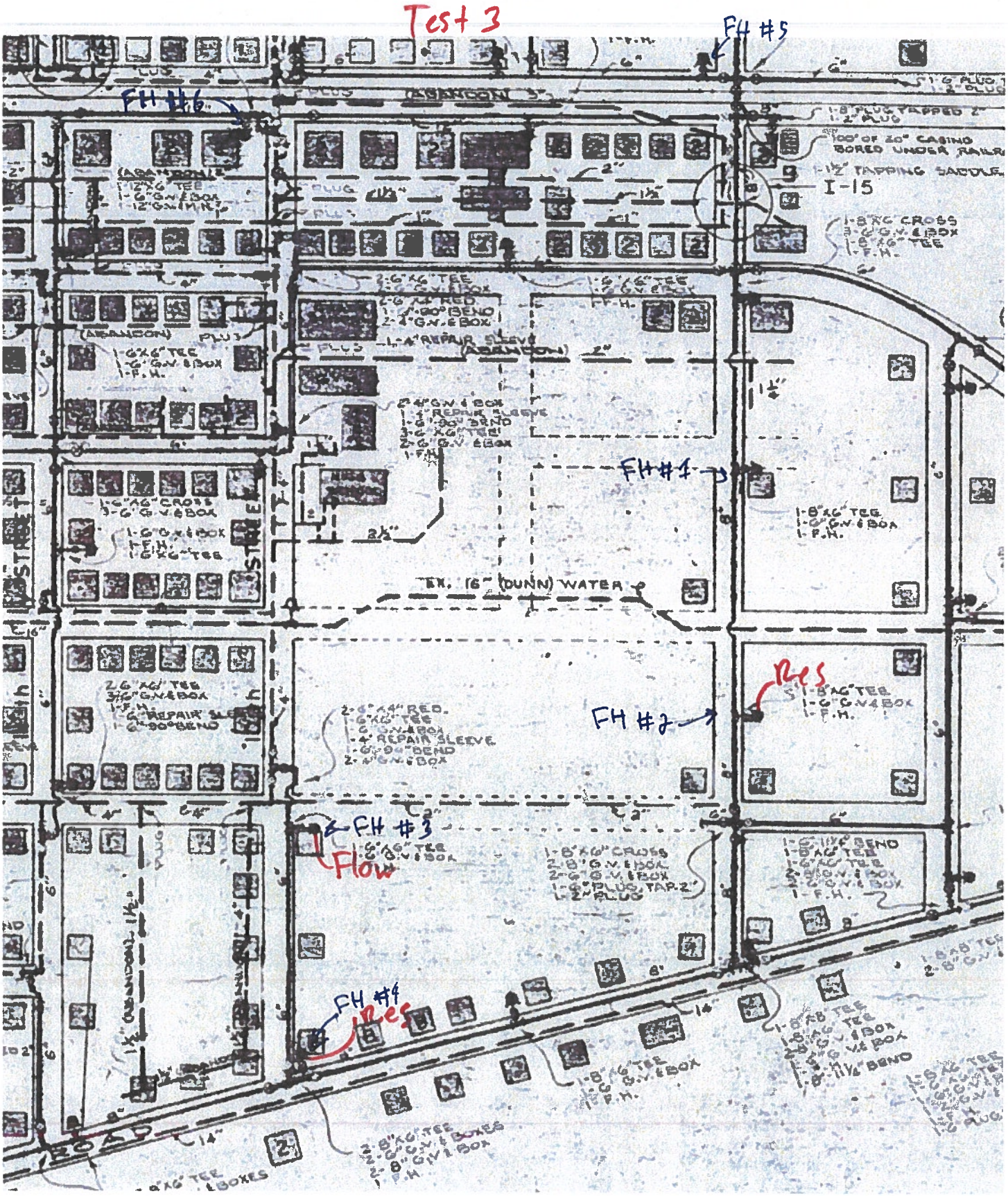
Preformed By: LKC Engineering, PLLC

Witnessed By: Jackson / Scottie Scott / Logan Bay

NOTES:


Res
Test 1
FH #5
FH #6
I-15
FH #1
Flow
FH #2
Res
FH #3
FH #4


Res
Test 2
FH #5
FH #6
Flow
I-15
FH #1
FH #2
FH #3
FH #4
Res
TEX. 16" (DUNN) WATER
ROAD


Test 3
FH #5
FH #6
I-15
FH #1
EX. 16" (DUNN) WATER
Res
FH #2
FH #3
Flow
FH #4
Res