

Hydraulic Calculations by HydraCALC

Carolina Fire Protection, Inc.
4055 Hodges Chapel Road
Dunn, NC 28334
910-892-1700

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30-Dec-24

Job Name : Antioch Church Remote area 1
Drawing : Roof System
Location : Erwin, NC
Remote Area : 1
Contract : 24J961
Data File : 15 roof.WXF

Hydraulic Design Information Sheet

Name - Antioch Church Remote area 1 Date - 12/27/24
 Location - Erwin, NC
 Building - Roof System System No. - 1
 Contractor - Carolina Fire Protection, Inc. Contract No. - 24J961
 Calculated By - Mark Ford Drawing No. -
 Construction: () Combustible (X) Non-Combustible Ceiling Height - Varies
 Occupancy - Assembly

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

S Other

T Specific Ruling Made By Date

M	Area of Sprinkler Operation	- 1500	System Type	Sprinkler/Nozzle
	Density	- .15	(X) Wet	Make Victaulic
D	Area Per Sprinkler	- 125	() Dry	Model Upright
E	Elevation at Highest Outlet	- 23.167	() Deluge	Size 3/4"/1/2"
S	Hose Allowance - Inside	- n/a	() Preaction	K-Factor 8.0/5.6
I	Rack Sprinkler Allowance	- n/a	() Other	Temp.Rat.155
G	Hose Allowance - Outside	- 250		

N Note

Calculation Flow Required - 272.73 Press Required - 30.12 TEST
 Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 6-3-22		Cap. -
T	Time of Test - 10:15 am	Rated Cap. -	Elev. -
E	Static Press - 46	@ Press -	
R	Residual Press - 42	Elev. -	Well
	Flow - 579		Proof Flow
S	Elevation - 0		

U Location - See attached

P Source of Information - CFP

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

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

E Horizontal Barriers Provided:

Water Supply Curve

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Antioch Church Remote area 1

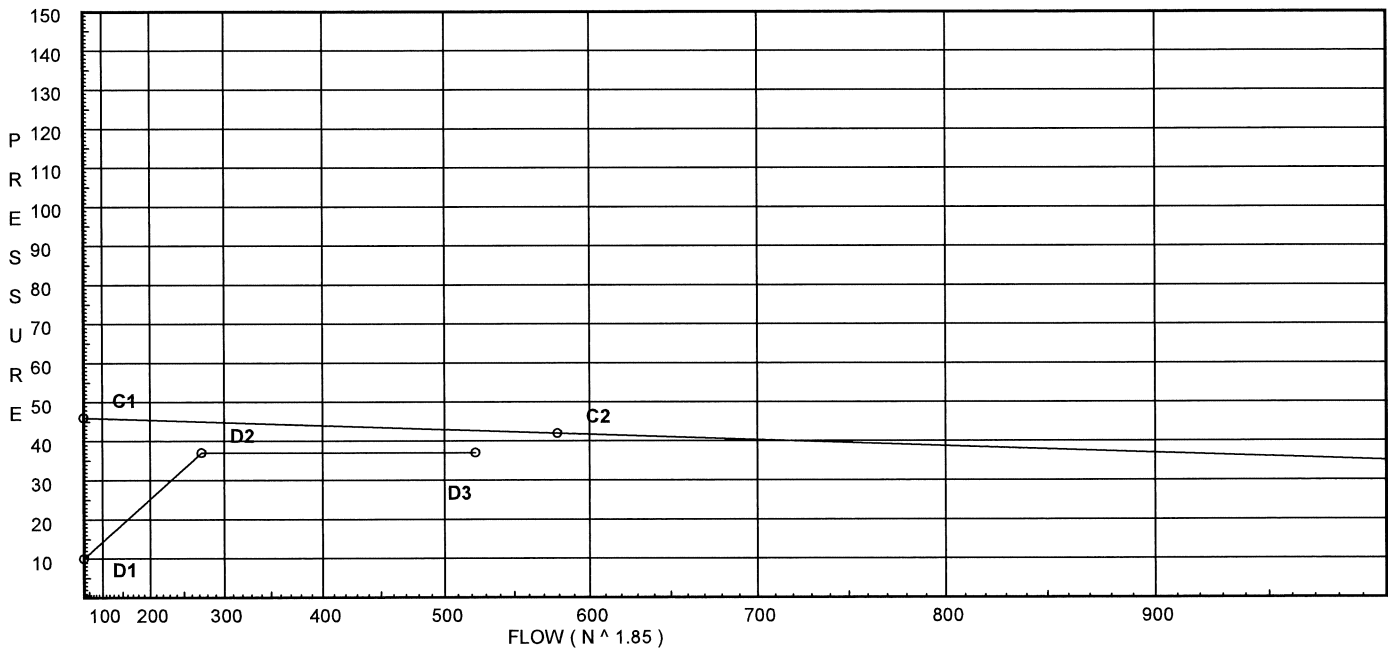
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City Water Supply:

C1 - Static Pressure : 46
C2 - Residual Pressure: 42
C2 - Residual Flow : 579

Demand:

D1 - Elevation : 10.034
D2 - System Flow : 272.725
D2 - System Pressure : 37.034
Hose (Demand) : 250
D3 - System Demand : 522.725
Safety Margin : 5.655



Fittings Used Summary

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Fitting Legend		½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24	
Abbrev.	Name																					
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	
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	
Rcr	Reliable Riser Check										7.1		13.7									
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	

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.

Flow Summary - NFPA

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SUPPLY ANALYSIS

<i>Node at Source</i>	<i>Static Pressure</i>	<i>Residual Pressure</i>	<i>Flow</i>	<i>Available Pressure</i>	<i>Total Demand</i>	<i>Required Pressure</i>
TEST	46.0	42	579.0	42.689	522.72	37.034

NODE ANALYSIS

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>	
F1	20.583		11.71			
1	23.167	8	7.0	21.17	0.15	125
2	22.667	8	7.15	21.39	0.15	125
3	22.25	8	7.35	21.68	0.15	125
4	21.833	8	7.78	22.32	0.15	125
5	21.417	8	8.7	23.6	0.15	125
F2	20.583		11.73			
6	23.167	8	7.01	21.19	0.15	125
7	22.667	8	7.16	21.41	0.15	125
8	22.25	8	7.36	21.7	0.15	125
9	21.833	8	7.8	22.34	0.15	125
10	21.417	8	8.72	23.62	0.15	125
F3	20.583		11.8			
11	22.667	5.6	9.5	17.26	0.1	130
12	22.25	5.6	9.67	17.42	0.1	130
13	21.833	5.6	9.93	17.64	0.1	130
F4	20.583		11.9			
F5	20.583		11.99			
F6	20.583		12.07			
F7	20.583		12.13			
F8	20.583		12.18			
F9	20.583		12.2			
F10	20.583		12.2			
F11	20.583		13.29			
F12	20.583		13.29			
M1	20.583		12.19			
N1	17.667		13.02			
N2	17.667		13.04			
N3	17.667		13.41			
N4	17.667		13.51			
N5	17.667		13.62			
N6	17.667		13.74			
N7	17.667		13.87			
N8	17.667		14.02			
N9	17.667		14.17			
N10	17.667		14.33			
N11	17.667		14.48			
N12	17.667		14.62			
15A	8.667		17.51			
16A	8.667		17.51			
17A	8.667		17.55			
18A	8.667		17.59			

Flow Summary - NFPA

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NODE ANALYSIS (cont.)

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
19A	8.667		17.63		
20A	8.667		17.67		
21A	9.667		17.01		
22A	8.667		17.51		
23A	8.667		17.55		
24A	8.667		17.6		
25A	8.667		17.64		
M3	9.667		17.01		
15	9.667		17.07		
16	9.667		17.08		
17	9.667		17.11		
18	9.667		17.16		
19	9.667		17.2		
20	9.667		17.23		
M5	9.667		17.02		
22	9.667		17.08		
23	9.667		17.12		
24	9.667		17.16		
25	9.667		17.2		
26	9.667		17.24		
M2	9.667		16.99		
M4	9.667		17.01		
M6	9.667		17.5		
M7	9.667		17.51		
M8	9.667		17.53		
M9	9.667		17.54		
M10	9.667		18.33		
M11	9.667		18.37		
N13	17.667		15.01		
M12	8.0		19.3		
BASR	1.0		30.12	250.0	
TEST	0.0		37.03		

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
F1 to 1	20.583 23.167		-35.48 -35.48	1.5 1.682	E T	4.95 9.9	80.500 14.850 95.350	120 -0.0377	11.713 -1.119 -3.594		Vel = 5.12	
1 to 2	23.167 22.667	8.00	21.17 -14.31	1.5 1.682			10.000 10.000	120 -0.0071	7.000 0.217 -0.071		Vel = 2.07	
2 to 3	22.667 22.250	8.00	21.39 7.08	1.5 1.682			10.000 10.000	120 0.0019	7.146 0.181 0.019		Vel = 1.02	
3 to 4	22.250 21.833	8.00	21.68 28.76	1.5 1.682			10.000 10.000	120 0.0255	7.346 0.181 0.255		Vel = 4.15	
4 to 5	21.833 21.417	8.00	22.32 51.08	1.5 1.682			10.000 10.000	120 0.0740	7.782 0.180 0.740		Vel = 7.38	
5 to N1	21.417 17.667	8.00	23.60 74.68	1.5 1.682	E T	4.95 9.9	3.167 14.850 18.017	120 0.1494	8.702 1.624 2.691		Vel = 10.78	
N1			0.0 74.68						13.017		K Factor = 20.70	
F2 to 6	20.583 23.167		-35.50 -35.5	1.5 1.682	E T	4.95 9.9	80.500 14.850 95.350	120 -0.0378	11.732 -1.119 -3.600		Vel = 5.13	
6 to 7	23.167 22.667	8.00	21.18 -14.32	1.5 1.682			10.000 10.000	120 -0.0070	7.013 0.217 -0.070		Vel = 2.07	
7 to 8	22.667 22.250	8.00	21.41 7.09	1.5 1.682			10.000 10.000	120 0.0018	7.160 0.181 0.018		Vel = 1.02	
8 to 9	22.250 21.833	8.00	21.70 28.79	1.5 1.682			10.000 10.000	120 0.0256	7.359 0.181 0.256		Vel = 4.16	
9 to 10	21.833 21.417	8.00	22.34 51.13	1.5 1.682			10.000 10.000	120 0.0741	7.796 0.180 0.741		Vel = 7.38	
10 to N2	21.417 17.667	8.00	23.62 74.75	1.5 1.682	E T	4.95 9.9	3.167 14.850 18.017	120 0.1497	8.717 1.624 2.697		Vel = 10.79	
N2			0.0 74.75						13.038		K Factor = 20.70	
F3 to 11	20.583 22.667		-20.17 -20.17	1.5 1.682	E T	4.95 9.9	90.500 14.850 105.350	120 -0.0133	11.797 -0.903 -1.396		Vel = 2.91	
11 to 12	22.667 22.250	5.60	17.26 -2.91	1.5 1.682			10.000 10.000	120 -0.0004	9.498 0.181 -0.004		Vel = 0.42	
12 to 13	22.250 21.833	5.60	17.42 14.51	1.5 1.682			10.000 10.000	120 0.0071	9.675 0.181 0.071		Vel = 2.10	

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
13 to N3	21.833 17.667	5.60	17.64 32.15	1.5 1.682	E T	4.95 9.9	38.500 14.850 53.350	120 0.0314	9.927 1.804 1.677		Vel = 4.64	
N3			0.0 32.15						13.408		K Factor = 8.78	
F4 to N4	20.583 17.667		7.05 7.05	1.5 1.682	2E 2T	9.9 19.799	152.000 29.699 181.699	120 0.0019	11.901 1.263 0.344		Vel = 1.02	
N4			0.0 7.05						13.508		K Factor = 1.92	
F5 to N5	20.583 17.667		7.99 7.99	1.5 1.682			152.000 152.000	120 0.0024	11.990 1.263 0.363		Vel = 1.15	
N5			0.0 7.99						13.616		K Factor = 2.17	
F6 to N6	20.583 17.667		8.52 8.52	1.5 1.682			152.000 152.000	120 0.0027	12.070 1.263 0.409		Vel = 1.23	
N6			0.0 8.52						13.742		K Factor = 2.30	
F7 to N7	20.583 17.667		9.27 9.27	1.5 1.682			152.000 152.000	120 0.0031	12.127 1.263 0.478		Vel = 1.34	
N7			0.0 9.27						13.868		K Factor = 2.49	
F8 to N8	20.583 17.667		10.26 10.26	1.5 1.682			152.000 152.000	120 0.0038	12.176 1.263 0.577		Vel = 1.48	
N8			0.0 10.26						14.016		K Factor = 2.74	
F9 to M9	20.583 9.667		9.35 9.35	1.5 1.682	4E 2T	19.799 19.799	152.000 39.598 191.598	120 0.0032	12.195 4.728 0.613		Vel = 1.35	
M9			0.0 9.35						17.536		K Factor = 2.23	
F10 to M10	20.583 9.667		14.63 14.63	1.5 1.682	4E 2T	19.799 19.799	152.000 39.598 191.598	120 0.0073	12.199 4.728 1.403		Vel = 2.11	
M10			0.0 14.63						18.330		K Factor = 3.42	
F11 to N11	20.583 17.667		-4.21 -4.21	1.5 1.682	E 2T	4.95 19.799	73.500 24.749 98.249	120 -0.0007	13.289 1.263 -0.072		Vel = 0.61	
N11			0.0 -4.21						14.480		K Factor = -1.11	
F12 to N12	20.583 17.667		4.21 4.21	1.5 1.682	E 2T	4.95 19.799	73.500 24.749 98.249	120 0.0007	13.289 1.263 0.072		Vel = 0.61	

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
N12			0.0 4.21						14.624		K Factor = 1.10	
F1 to F2	20.583 20.583		35.48	3			12.500	120	11.713 0.0			
F2 to F3	20.583 20.583		35.48	3.26			12.500	0.0015	0.019		Vel = 1.36	
F2 to F3	20.583 20.583		35.50	3			12.083	120	11.732 0.0			
F3 to F4	20.583 20.583		70.98	3.26			12.083	0.0054	0.065		Vel = 2.73	
F3 to F4	20.583 20.583		20.17	3			12.000	120	11.797 0.0			
F4 to F5	20.583 20.583		91.15	3.26			12.000	0.0087	0.104		Vel = 3.50	
F4 to F5	20.583 20.583		-7.05	3			12.000	120	11.901 0.0			
F5 to F6	20.583 20.583		84.1	3.26			12.000	0.0074	0.089		Vel = 3.23	
F5 to F6	20.583 20.583		-7.99	3			13.000	120	11.990 0.0			
F6 to F7	20.583 20.583		76.11	3.26			13.000	0.0062	0.080		Vel = 2.93	
F6 to F7	20.583 20.583		-8.52	3			11.500	120	12.070 0.0			
F7 to F8	20.583 20.583		67.59	3.26			11.500	0.0050	0.057		Vel = 2.60	
F7 to F8	20.583 20.583		-9.26	3			13.000	120	12.127 0.0			
F8 to M1	20.583 20.583		58.33	3.26			13.000	0.0038	0.049		Vel = 2.24	
F8 to M1	20.583 20.583		-10.26	3			5.250	120	12.176 0.0			
M1 to F9	20.583 20.583		48.07	3.26			5.250	0.0027	0.014		Vel = 1.85	
M1 to F9	20.583 20.583		-24.08	3			7.417	120	12.190 0.0			
F9 to F10	20.583 20.583		23.99	3.26			7.417	0.0007	0.005		Vel = 0.92	
F9 to F10	20.583 20.583		-9.36	3			12.500	120	12.195 0.0			
F10 to F11	20.583 20.583		14.63	3.26			12.500	0.0003	0.004		Vel = 0.56	
F10 to F11	20.583 20.583		0.0 14.63						12.199		K Factor = 4.19	
F11 to F12	20.583 20.583		4.21	3			12.000	120	13.289 0.0			
F11 to F12	20.583 20.583		4.21	3.26			12.000	0	0.0		Vel = 0.16	
F12 to N1	17.667 17.667		0.0 4.21						13.289		K Factor = 1.15	
F12 to N1	17.667 17.667		74.68	4			12.500	120	13.017 0.0			
N1 to N2	17.667 17.667		74.68	4.26			12.500	0.0017	0.021		Vel = 1.68	
N2 to N3	17.667 17.667		74.74	4	2E	26.334	37.083 26.334	120	13.038 0.0			
N2 to N3	17.667 17.667		149.42	4.26			63.417	0.0058	0.370		Vel = 3.36	
N3 to N4	17.667 17.667		32.15	4			12.000	120	13.408 0.0			
N3 to N4	17.667 17.667		181.57	4.26			12.000	0.0083	0.100		Vel = 4.09	

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
N4 to N5	17.667 17.667		7.05 188.62	4 4.26		12.000 12.000	120 0.0090	13.508 0.0 0.108		Vel = 4.25	
N5 to N6	17.667 17.667		7.99 196.61	4 4.26		13.000 13.000	120 0.0097	13.616 0.0 0.126		Vel = 4.43	
N6 to N7	17.667 17.667		8.52 205.13	4 4.26		12.000 12.000	120 0.0105	13.742 0.0 0.126		Vel = 4.62	
N7 to N8	17.667 17.667		9.27 214.4	4 4.26		13.000 13.000	120 0.0114	13.868 0.0 0.148		Vel = 4.83	
N8 to N9	17.667 17.667		10.26 224.66	4 4.26		12.667 12.667	120 0.0124	14.016 0.0 0.157		Vel = 5.06	
N9 to N10	17.667 17.667		0.0 224.66	4 4.26		12.500 12.500	120 0.0124	14.173 0.0 0.155		Vel = 5.06	
N10 to N11	17.667 17.667		0.0 224.66	4 4.26		12.250 12.250	120 0.0124	14.328 0.0 0.152		Vel = 5.06	
N11 to N12	17.667 17.667		-4.21 220.45	4 4.26		12.000 12.000	120 0.0120	14.480 0.0 0.144		Vel = 4.96	
N12 to N13	17.667 17.667		4.21 224.66	4 4.26	2E 26.334	5.167 26.334 31.501	120 0.0124	14.624 0.0 0.391		Vel = 5.06	
N13			0.0 224.66					15.015		K Factor = 57.98	
15A to 15	8.667 9.667		0.0 0.0	1 1.049	T Eq 43.0	5.0 48.000 49.000	120 0	17.506 -0.433 0.0		Vel = 0	
15			0.0 0.0					17.073		K Factor = 0	
16A to 16	8.667 9.667		0.0 0.0	1 1.049		1.000 1.000	120 -0.0010	17.512 -0.433 -0.001		Vel = 0	
16			0.0 0.0					17.078		K Factor = 0	
17A to 17	8.667 9.667		0.0 0.0	1 1.049		1.000 1.000	120 0	17.547 -0.433 0.0		Vel = 0	
17			0.0 0.0					17.114		K Factor = 0	
18A to 18	8.667 9.667		0.0 0.0	1 1.049		1.000 1.000	120 0	17.588 -0.433 0.0		Vel = 0	

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
18			0.0 0.0						17.155		K Factor = 0	
19A to 19	8.667 9.667		0.0 0.0	1 1.049			1.000 1.000	120 0	17.629 -0.433 0.0		Vel = 0	
19			0.0 0.0						17.196		K Factor = 0	
20A to 20	8.667 9.667		0.0 0.0	1 1.049			1.000 1.000	120 0	17.666 -0.433 0.0		Vel = 0	
20			0.0 0.0						17.233		K Factor = 0	
21A to M4	9.667 9.667		0.0 0.0	1 1.049			1.000 1.000	120 0	17.012 0.0 0.0		Vel = 0	
M4			0.0 0.0						17.012		K Factor = 0	
22A to 22	8.667 9.667		0.0 0.0	1 1.049			1.000 1.000	120 0	17.514 -0.433 0.0		Vel = 0	
22			0.0 0.0						17.081		K Factor = 0	
23A to 23	8.667 9.667		0.0 0.0	1 1.049			1.000 1.000	120 0	17.555 -0.433 0.0		Vel = 0	
23			0.0 0.0						17.122		K Factor = 0	
24A to 24	8.667 9.667		0.0 0.0	1 1.049			1.000 1.000	120 0	17.596 -0.433 0.0		Vel = 0	
24			0.0 0.0						17.163		K Factor = 0	
25A to 25	8.667 9.667		0.0 0.0	1 1.049			1.000 1.000	120 0	17.636 -0.433 0.0		Vel = 0	
25			0.0 0.0						17.203		K Factor = 0	
M3 to 15	9.667 9.667		12.04 12.04	1.5 1.682	T	9.9	2.833 9.900 12.733	120 0.0051	17.008 0.0 0.065		Vel = 1.74	
15 to 16	9.667 9.667		0.0 12.04	1.5 1.682			1.000 1.000	120 0.0050	17.073 0.0 0.005		Vel = 1.74	
16 to 17	9.667 9.667		0.0 12.04	1.5 1.682			7.000 7.000	120 0.0051	17.078 0.0 0.036		Vel = 1.74	
17 to 18	9.667 9.667		0.0 12.04	1.5 1.682			8.000 8.000	120 0.0051	17.114 0.0 0.041		Vel = 1.74	

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
18 to 19	9.667 9.667		0.0 12.04	1.5 1.682			8.000 8.000	120 0.0051	17.155 0.0 0.041		Vel = 1.74	
19 to 20	9.667 9.667		0.0 12.04	1.5 1.682			7.333 7.333	120 0.0050	17.196 0.0 0.037		Vel = 1.74	
20 to M6	9.667 9.667		0.0 12.04	1.5 1.682	T	9.9	42.750 9.900 52.650	120 0.0051	17.233 0.0 0.269		Vel = 1.74	
M6			0.0 12.04						17.502		K Factor = 2.88	
M5 to 22	9.667 9.667		12.04 12.04	1.5 1.682	T	9.9	2.833 9.900 12.733	120 0.0051	17.016 0.0 0.065		Vel = 1.74	
22 to 23	9.667 9.667		0.0 12.04	1.5 1.682			8.000 8.000	120 0.0051	17.081 0.0 0.041		Vel = 1.74	
23 to 24	9.667 9.667		0.0 12.04	1.5 1.682			8.000 8.000	120 0.0051	17.122 0.0 0.041		Vel = 1.74	
24 to 25	9.667 9.667		0.0 12.04	1.5 1.682			8.000 8.000	120 0.0050	17.163 0.0 0.040		Vel = 1.74	
25 to 26	9.667 9.667		0.0 12.04	1.5 1.682			7.333 7.333	120 0.0052	17.203 0.0 0.038		Vel = 1.74	
26 to M7	9.667 9.667		0.0 12.04	1.5 1.682	T	9.9	42.750 9.900 52.650	120 0.0051	17.241 0.0 0.269		Vel = 1.74	
M7			0.0 12.04						17.510		K Factor = 2.88	
M1 to M2	20.583 9.667		24.08 24.08	2.5 2.635	E T	8.237 16.474	11.917 24.711 36.628	120 0.0020	12.190 4.728 0.075		Vel = 1.42	
M2 to M3	9.667 9.667		0.0 24.08	2.5 2.635			7.417 7.417	120 0.0020	16.993 0.0 0.015		Vel = 1.42	
M3 to M4	9.667 9.667		-12.04 12.04	2.5 2.635			7.000 7.000	120 0.0006	17.008 0.0 0.004		Vel = 0.71	
M4 to M5	9.667 9.667		0.0 12.04	2.5 2.635			6.000 6.000	120 0.0007	17.012 0.0 0.004		Vel = 0.71	
M5			0.0 12.04						17.016		K Factor = 2.92	
M6 to M7	9.667 9.667		12.04 12.04	2.5 2.635			13.000 13.000	120 0.0006	17.502 0.0 0.008		Vel = 0.71	

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
M7 to M8	9.667 9.667		12.04 24.08	2.5 2.635			11.250 11.250	120 0.0020	17.510 0.0 0.023			Vel = 1.42
M8 to M9	9.667 9.667		-16.53 7.55	2.5 2.635			10.750 10.750	120 0.0003	17.533 0.0 0.003			Vel = 0.44
M9			0.0 7.55						17.536			K Factor = 1.80
M8 to M10	9.667 9.667		16.53 16.53	1.5 1.682	2T	19.799	67.000 19.799 86.799	120 0.0092	17.533 0.0 0.797			Vel = 2.39
M10			0.0 16.53						18.330			K Factor = 3.86
M9 to M11	9.667 9.667		16.90 16.9	1.5 1.682	2T	19.799	67.000 19.799 86.799	120 0.0096	17.536 0.0 0.830			Vel = 2.44
M11			0.0 16.90						18.366			K Factor = 3.94
M10 to M11	9.667 9.667		31.17 31.17	2.5 2.635			10.750 10.750	120 0.0033	18.330 0.0 0.036			Vel = 1.83
M11 to M12	9.667 8		16.90 48.07	2.5 2.635	E T	8.237 16.474	4.000 24.711 28.711	120 0.0074	18.366 0.722 0.213			Vel = 2.83
M12			0.0 48.07						19.301			K Factor = 10.94
N13 to M12	17.667 8		224.66 224.66	4 4.26			8.000 8.000	120 0.0124	15.015 4.187 0.099			Vel = 5.06
M12 to BASR	8 1		48.07 272.73	4 4.26	2E Rcr	26.334 9.349	8.667 35.683 44.350	120 0.0177	19.301 10.032 0.787			** Fixed Loss = 7 Vel = 6.14
BASR to TEST	1 0	H250	249.99 522.72	6 6.16	3E T G	60.252 43.037 4.304	770.000 107.593 877.593	140 0.0074	30.120 0.433 6.481			Vel = 5.63
TEST			0.0 522.72						37.034			K Factor = 85.90