

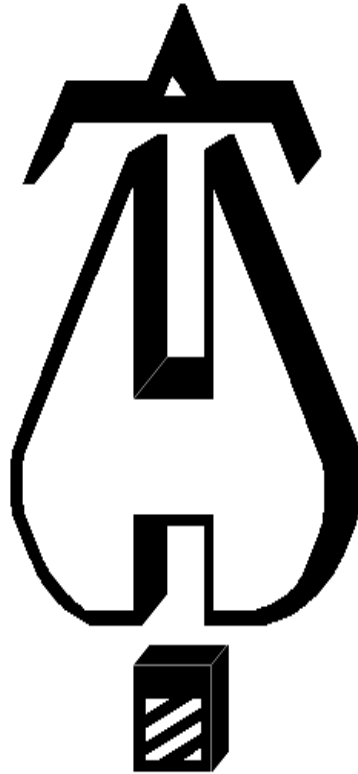


1731 Round Rock Drive, Raleigh, NC 27615 • (919) 872-3250 • fax (919) 877-5775 • www.flsamerica.com

OAKHAVEN LOT 17

HYDRAULIC CALCULATIONS

9/7/2021



Hydraulic calculations using HydraCALC

Fire & Life Safety America
1731 Roundrock Drive
Raleigh, NC 27615
P: (919) 872-3250
F: (919) 877-5775

Job Name : Oakhaven Lot 17- Master Bedroom
Drawing : FP1
Location : 283 Oakhaven Drive
Remote Area : RA1
Contract : 21NC1535
Data File : RA1- Master Bedroom.WXF

HYDRAULIC CALCULATIONS
for

Project name: Oakhaven Lot 17
Location: 283 Oakhaven Drive
Drawing no: FP1
Date: 9/7/2021

Design

Remote area number: RA1
Remote area location: Master Bedroom
Occupancy classification: Residential
Density: .05 - Gpm/SqFt
Area of application: 240 - SqFt
Coverage per sprinkler: 400 - SqFt
Type of sprinklers calculated: VK494
No. of sprinklers calculated: 1
In-rack demand: N/A - GPM
Hose streams: 3 - GPM
Total water required (including hose streams): 23.03 - GPM @ 29.48 - Psi
Type of system: WET
Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 4/21/2021
Location: NC 42, NC 27540
Source: Fire & Life Safety America

Name of contractor: Fire & Life Safety America
Address: 1731 Roundrock Drive / Raleigh, NC 27615 / P: (919) 872-3250
Phone number: F: (919) 877-57
Name of designer: H. WEYANT
Authority having jurisdiction: Harnett County
Notes: (Include peaking information or gridded systems here.)

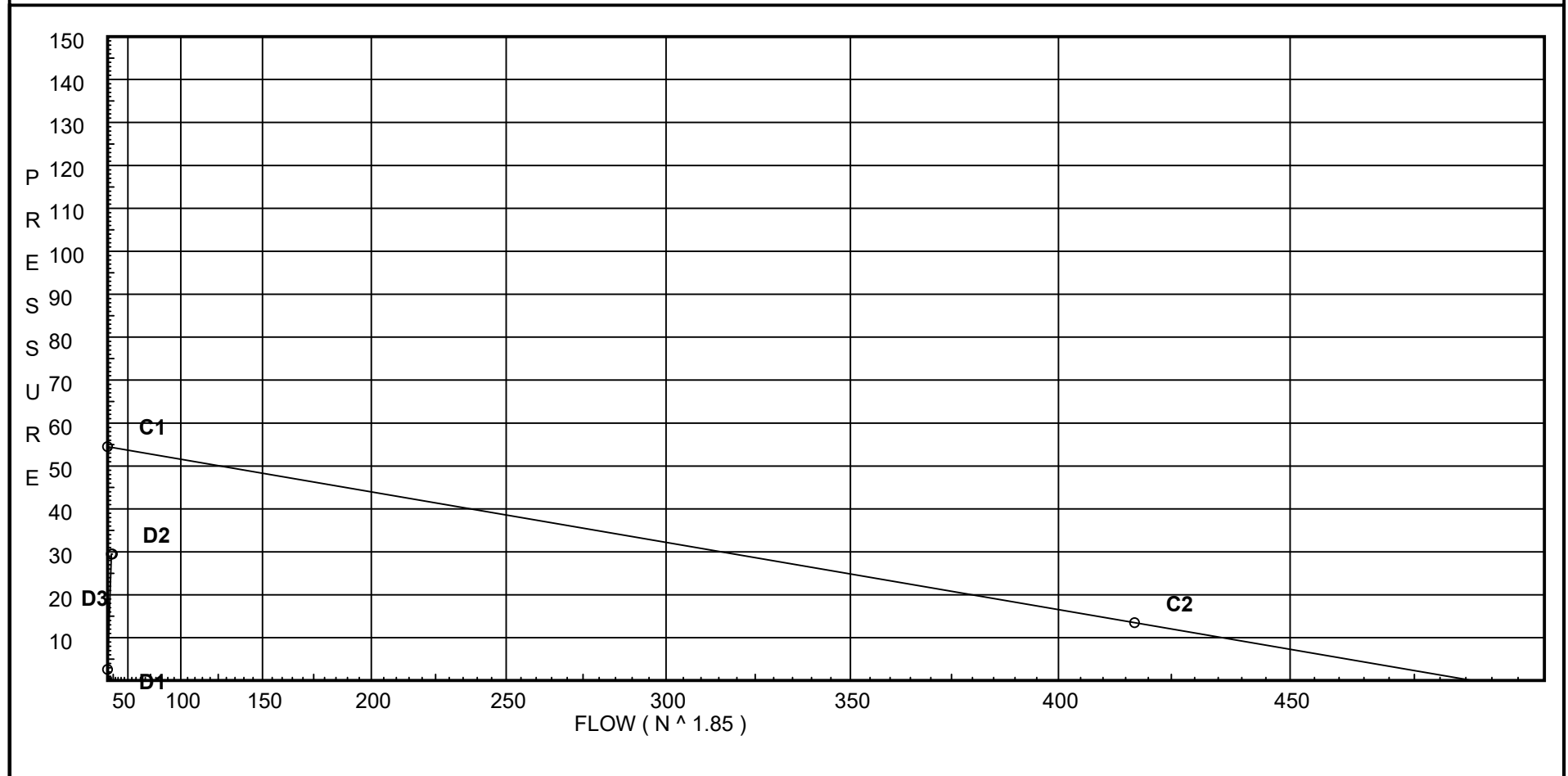
Water Supply Curve C

Fire & Life Safety America
Oakhaven Lot 17- Master Bedroom

Page 2
Date 9/7/2021

City Water Supply:
C1 - Static Pressure : 54.5
C2 - Residual Pressure: 13.5
C2 - Residual Flow : 417

Demand:
D1 - Elevation : 2.599
D2 - System Flow : 20.024
D2 - System Pressure : 29.476
Hose (Demand) : 3
D3 - System Demand : 23.024
Safety Margin : 24.831



Fittings Used Summary

Fire & Life Safety America
Oakhaven Lot 17- Master Bedroom

Page 3
Date 9/7/2021

Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
Ball	B Ball Milw BB-SC100			2.25	2	2.5	2.25	10													
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
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
N *	CPVC 90'Ell Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121

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

Fire & Life Safety America
 Oakhaven Lot 17- Master Bedroom

Page 4
 Date 9/7/2021

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	54.5	13.5	417.0	54.307	23.02	29.476

NODE ANALYSIS

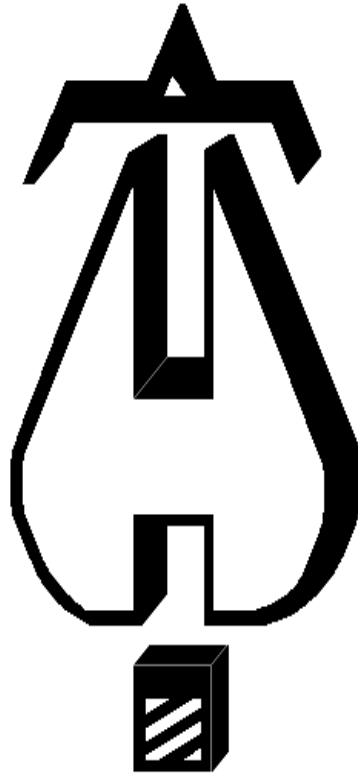
<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
S101	9.0	4.9	16.7	20.02	
101	10.0		16.81		
M101	10.0		18.51		
TOR	8.0		23.07		
BOR	3.0		26.55		
UG1	3.0		27.35	3.0	
UG2	-3.0		32.02		
UG3	-3.0		32.05		
TEST	3.0		29.48		

Final Calculations : Hazen-Williams

Fire & Life Safety America
Oakhaven Lot 17- Master Bedroom

Page 5
Date 9/7/2021

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	*****
S101 to 101	9 10	4.90	20.02 20.02	1 1.101	N 7.0 0.0 0.0	1.000 7.000 8.000	150 0.0681	16.700 -0.433 0.545		Vel = 6.75	
101			0.0 20.02					16.812		K Factor = 4.88	
101 to M101	10 10		20.02 20.02	1 1.101	2O 10.0 0.0 0.0	14.830 10.000 24.830	150 0.0682	16.812 0.0 1.694		Vel = 6.75	
M101 to TOR	10 8		0.0 20.02	1 1.101	2N 14.0 0.0 0.0	40.250 14.000 54.250	150 0.0682	18.506 0.866 3.699		Vel = 6.75	
TOR			0.0 20.02					23.071		K Factor = 4.17	
TOR to BOR	8 3		20.02 20.02	1 1.101	N 7.0 4.303 0.0	8.000 11.303 19.303	150 0.0682	23.071 2.166 1.316		Vel = 6.75	
BOR to UG1	3 3		0.0 20.02	1 1.101	2E 7.65 0.0 0.0	4.000 7.650 11.650	150 0.0682	26.553 0.0 0.795		Vel = 6.75	
UG1 to UG2	3 -3	H3	3.00 23.02	1.25 1.394	T 2E 9.523 9.523 0.0	55.000 19.046 74.046	150 0.0280	27.348 2.599 2.071		Vel = 4.84	
UG2 to UG3	-3 -3		0.0 23.02	6 6.09	2G 3E 2F 9.25 64.749 21.583	1500.083 95.581 1595.664	150 0	32.018 0.0 0.034		Vel = 0.25	
UG3 to TEST	-3 3		0.0 23.02	6 6.16	T 2E G 48.896 45.637 4.89	1000.000 99.422 1099.422	150 0	32.052 -2.599 0.023		Vel = 0.25	
TEST			0.0 23.02					29.476		K Factor = 4.24	



Hydraulic calculations using HydraCALC

Fire & Life Safety America
1731 Roundrock Drive
Raleigh, NC 27615
P: (919) 872-3250
F: (919) 877-5775

Job Name : Oakhaven Lot 17 - Bonus Room
Drawing : FP1
Location : 283 Oakhaven Dr.
Remote Area : RA2
Contract : 21NC1535
Data File : RA2- Bonus Room.WXF

HYDRAULIC CALCULATIONS
for

Project name: Oakhaven Lot 17
Location: 283 Oakhaven Dr.
Drawing no: FP1
Date: 9/7/2021

Design

Remote area number: RA2
Remote area location: Bonus Room
Occupancy classification: Residential
Density: .05 - Gpm/SqFt
Area of application: 262 - SqFt
Coverage per sprinkler: 196 - SqFt
Type of sprinklers calculated: VK494
No. of sprinklers calculated: 2
In-rack demand: N/A - GPM
Hose streams: 3 - GPM
Total water required (including hose streams): 29.34 - GPM @ 31.88 - Psi
Type of system: WET
Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 4/21/2021
Location: NC 42, NC 27540
Source: Fire & Life Safety America

Name of contractor: Fire & Life Safety America
Address: 1731 Roundrock Drive / Raleigh, NC 27615 / P: (919) 872-3250
Phone number: F: (919) 877-57
Name of designer: H. WEYANT
Authority having jurisdiction: Harnett County
Notes: (Include peaking information or gridded systems here.)

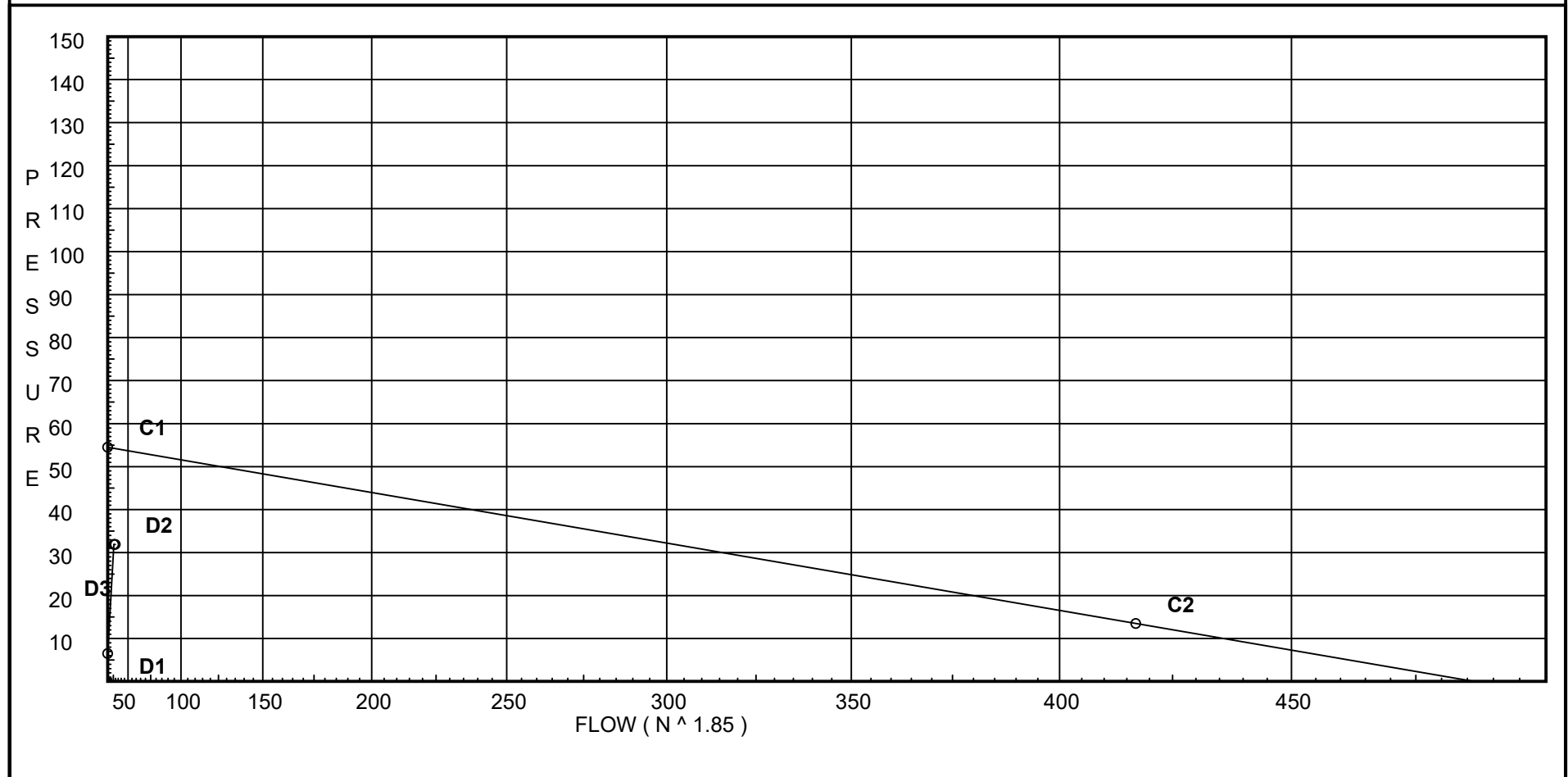
Water Supply Curve C

Fire & Life Safety America
Oakhaven Lot 17 - Bonus Room

Page 2
Date 9/7/2021

City Water Supply:
C1 - Static Pressure : 54.5
C2 - Residual Pressure: 13.5
C2 - Residual Flow : 417

Demand:
D1 - Elevation : 6.496
D2 - System Flow : 26.336
D2 - System Pressure : 31.883
Hose (Demand) : 3
D3 - System Demand : 29.336
Safety Margin : 22.315



Fittings Used Summary

Fire & Life Safety America
Oakhaven Lot 17 - Bonus Room

Page 3
Date 9/7/2021

Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
Ball	B Ball Milw BB-SC100			2.25	2	2.5	2.25	10													
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
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
N *	CPVC 90'ElI Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121

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

Fire & Life Safety America
Oakhaven Lot 17 - Bonus Room

Page 4
Date 9/7/2021

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	54.5	13.5	417.0	54.198	29.34	31.883

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>
S201	18.0	4.9	7.0	12.96	
S202	18.0	4.9	7.45	13.37	
201	19.0		6.81		
202	19.0		7.21		
M201	10.0		15.36		
M202	10.0		17.18		
TOR	8.0		22.88		
BOR	3.0		27.23		
UG1	3.0		28.55	3.0	
UG2	-3.0		34.39		
UG3	-3.0		34.45		
TEST	3.0		31.88		

Final Calculations : Hazen-Williams

Fire & Life Safety America
Oakhaven Lot 17 - Bonus Room

Page 5
Date 9/7/2021

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	*****
S201 to 201	18 19	4.90	12.96 12.96	1 1.101	N	7.0 0.0 0.0	1.000 7.000 8.000	150 0.0305	7.000 -0.433 0.244			Vel = 4.37
201			0.0 12.96						6.811		K Factor = 4.97	
S202 to 202	18 19	4.90	13.37 13.37	1 1.101	O	5.0 0.0 0.0	1.000 5.000 6.000	150 0.0323	7.447 -0.433 0.194			Vel = 4.51
202			0.0 13.37						7.208		K Factor = 4.98	
201 to 202	19 19		12.96 12.96	1 1.101		0.0 0.0 0.0	13.000 0.0 13.000	150 0.0305	6.811 0.0 0.397			Vel = 4.37
202 to M201	19 10		13.38 26.34	1 1.101	3N	21.0 0.0 0.0	16.625 21.000 37.625	150 0.1132	7.208 3.898 4.259			Vel = 8.88
M201 to M202	10 10		0.0 26.34	1 1.101	N	7.0 0.0 0.0	9.000 7.000 16.000	150 0.1132	15.365 0.0 1.811			Vel = 8.88
M202 to TOR	10 8		0.0 26.34	1 1.101	O 2N	5.0 14.0 0.0	23.750 19.000 42.750	150 0.1132	17.176 0.866 4.840			Vel = 8.88
TOR			0.0 26.34						22.882		K Factor = 5.51	
TOR to BOR	8 3		26.34 26.34	1 1.101	N Ball	7.0 4.303 0.0	8.000 11.303 19.303	150 0.1132	22.882 2.166 2.185			Vel = 8.88
BOR to UG1	3 3		0.0 26.34	1 1.101	2E	7.65 0.0 0.0	4.000 7.650 11.650	150 0.1132	27.233 0.0 1.319			Vel = 8.88
UG1 to UG2	3 -3	H3	3.00 29.34	1.25 1.394	T 2E	9.523 9.523 0.0	55.000 19.046 74.046	150 0.0438	28.552 2.599 3.243			Vel = 6.17
UG2 to UG3	-3 -3		0.0 29.34	6 6.09	2G 3E 2F	9.25 64.749 21.583	1500.083 95.581 1595.664	150 0	34.394 0.0 0.053			Vel = 0.32
UG3 to TEST	-3 3		0.0 29.34	6 6.16	T 2E G	48.896 45.637 4.89	1000.000 99.422 1099.422	150 0	34.447 -2.599 0.035			Vel = 0.32
TEST			0.0 29.34						31.883		K Factor = 5.20	