



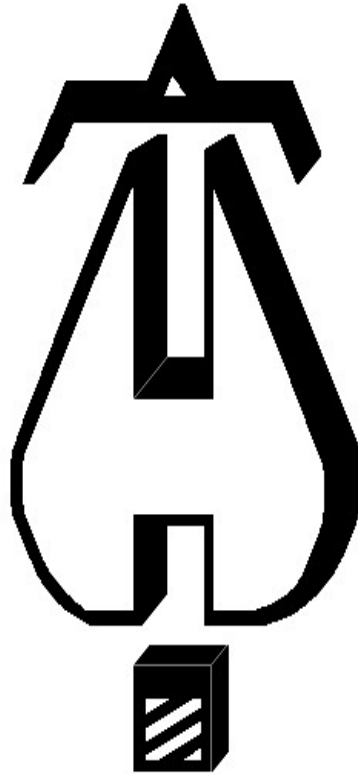
---

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

# OAK HAVEN LOT 06

## HYDRAULIC CALCULATIONS

4/22/2021



Hydraulic calculations using HydraCALC

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

Job Name : Oak Haven Lot 20 - RA1  
Drawing : FP1  
Location : 256 Oak Haven Drive  
Remote Area : RA1  
Contract : 21NC1514  
Data File : RA1.WXF

---

**HYDRAULIC CALCULATIONS**  
**for**

**Project name:** Oak Haven Lot 06  
**Location:** 256 Oak Haven Drive  
**Drawing no:** FP1  
**Date:** 4/22/2021

**Design**

**Remote area number:** RA1  
**Remote area location:** Master Bedroom  
**Occupancy classification:** Residential  
**Density:** .05 - Gpm/SqFt  
**Area of application:** 257 - 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 @ 28.48 - 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  
Oak Haven Lot 20 - RA1

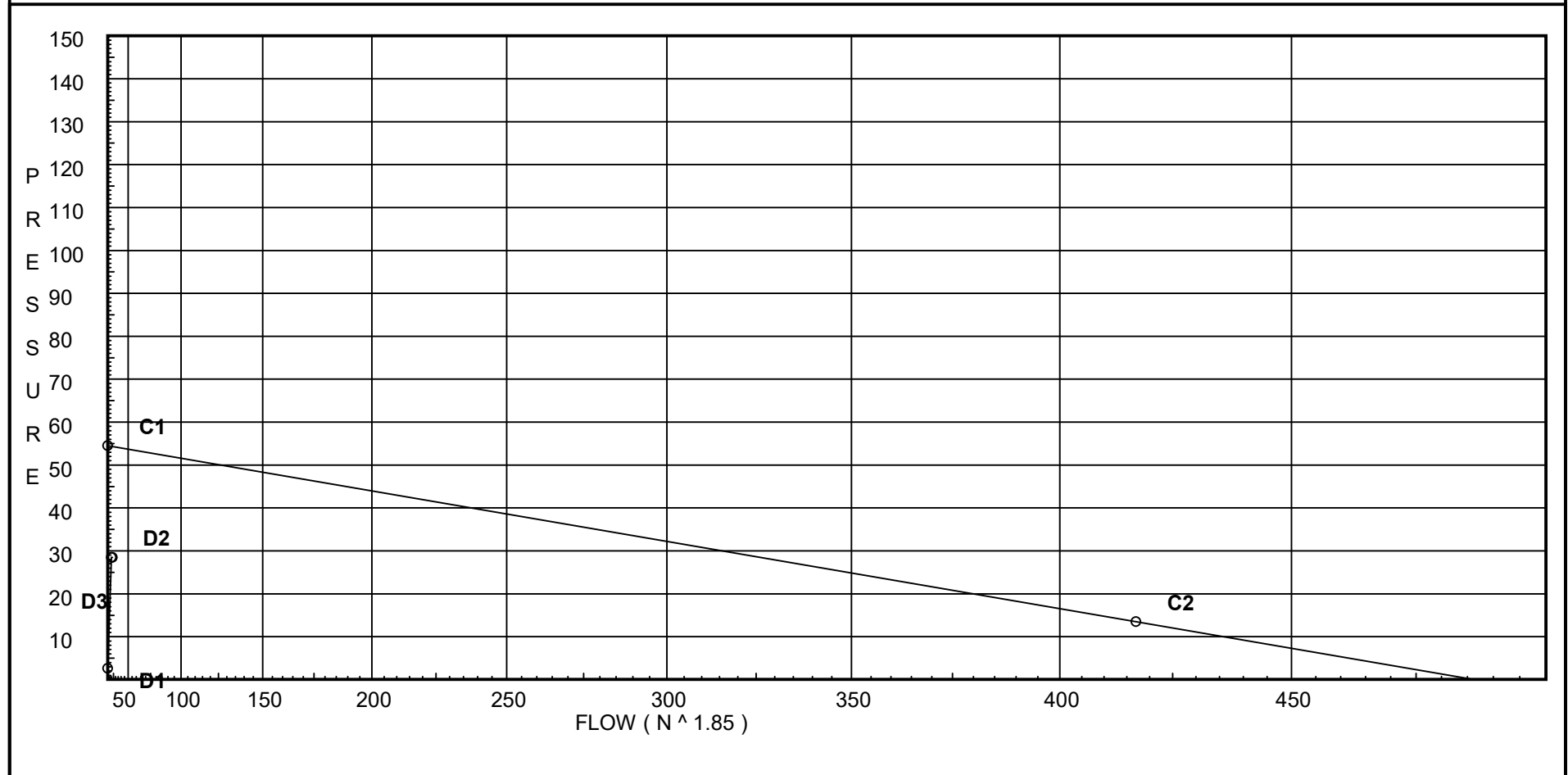
Page 2  
Date 4/22/2021

## 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 : 28.483  
Hose ( Demand ) : 3  
D3 - System Demand : 23.024  
Safety Margin : 25.824



# Fittings Used Summary

Fire & Life Safety America  
Oak Haven Lot 20 - RA1

Page 3  
Date 4/22/2021

## 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
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'El 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  
Oak Haven Lot 20 - RA1

Page 4  
Date 4/22/2021

## 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	28.483

## NODE ANALYSIS

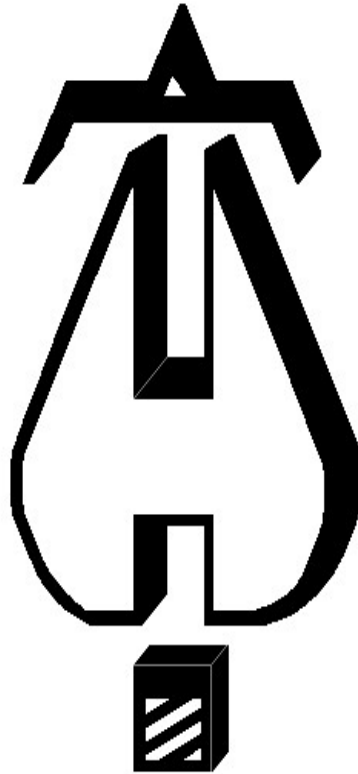
<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
S101	9.0	4.9	16.7	20.02	
101	10.0		16.68		
M101	10.0		17.94		
M102	10.0		20.39		
TOR	8.0		22.38		
BOR	3.0		25.57		
UG1	3.0		26.37	3.0	
UG2	-3.0		31.04		
UG3	-3.0		31.06		
TEST	3.0		28.48		

# Final Calculations : Hazen-Williams

Fire & Life Safety America  
Oak Haven Lot 20 - RA1

Page 5  
Date 4/22/2021

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	1	O	5.0 0.0	1.000 5.000	150	16.700 -0.433			
			20.02	1.101		0.0	6.000	0.0682	0.409	Vel =	6.75	
			0.0						16.676	K Factor =	4.90	
101 to M101	10 10		20.02	1	O	5.0 0.0	13.583 5.000	150	16.676 0.0			
			20.02	1.101		0.0	18.583	0.0682	1.267	Vel =	6.75	
			0.0						17.943	K Factor =	4.73	
M101 to M102	10 10		20.02	1	O	5.0 0.0	30.917 5.000	150	17.943 0.0			
			20.02	1.101		0.0	35.917	0.0682	2.450	Vel =	6.75	
M102 to TOR	10 8		0.0	1	O	5.0 0.0	11.500 5.000	150	20.393 0.866			
			20.02	1.101		0.0	16.500	0.0682	1.125	Vel =	6.75	
			0.0						22.384	K Factor =	4.23	
TOR to BOR	8 3		20.02	1	N	7.0 0.0	8.000 7.000	150	22.384 2.166			
			20.02	1.101		0.0	15.000	0.0681	1.022	Vel =	6.75	
BOR to UG1	3 3		0.0	1	2E	7.65 0.0	4.000 7.650	150	25.572 0.0			
			20.02	1.101		0.0	11.650	0.0682	0.795	Vel =	6.75	
UG1 to UG2	3 -3	H3	3.00	1.25	T 2E	9.523 9.523	55.000 19.046	150	26.367 2.599			
			23.02	1.394		0.0	74.046	0.0280	2.071	Vel =	4.84	
UG2 to UG3	-3 -3		0.0	6	2G 3E	9.25 64.749	937.417 95.581	150	31.037 0.0			
			23.02	6.09	2F	21.583	1032.998	0	0.022	Vel =	0.25	
UG3 to TEST	-3 3		0.0	6	T 2E	48.896 45.637	1000.000 99.422	150	31.059 -2.599			
			23.02	6.16	G	4.89	1099.422	0	0.023	Vel =	0.25	
			0.0						28.483	K Factor =	4.31	
TEST			23.02									



Hydraulic calculations using HydraCALC

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

Job Name : Oak Haven Lot 06 - RA2  
Drawing : FP1  
Location : 256 Oak Haven Drive  
Remote Area : RA2  
Contract : 21NC1514  
Data File : RA2.WXF



---

**HYDRAULIC CALCULATIONS**  
**for**

**Project name:** Oak Haven Lot 06  
**Location:** 256 Oak Haven Drive  
**Drawing no:** FP1  
**Date:** 4/22/2021

**Design**

**Remote area number:** RA2  
**Remote area location:** Bonus Room  
**Occupancy classification:** Residential  
**Density:** .05 - Gpm/SqFt  
**Area of application:** 275.9 - SqFt  
**Coverage per sprinkler:** 256 - 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):** 29.47 - GPM @ 29.51 - 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  
Oak Haven Lot 06 - RA2

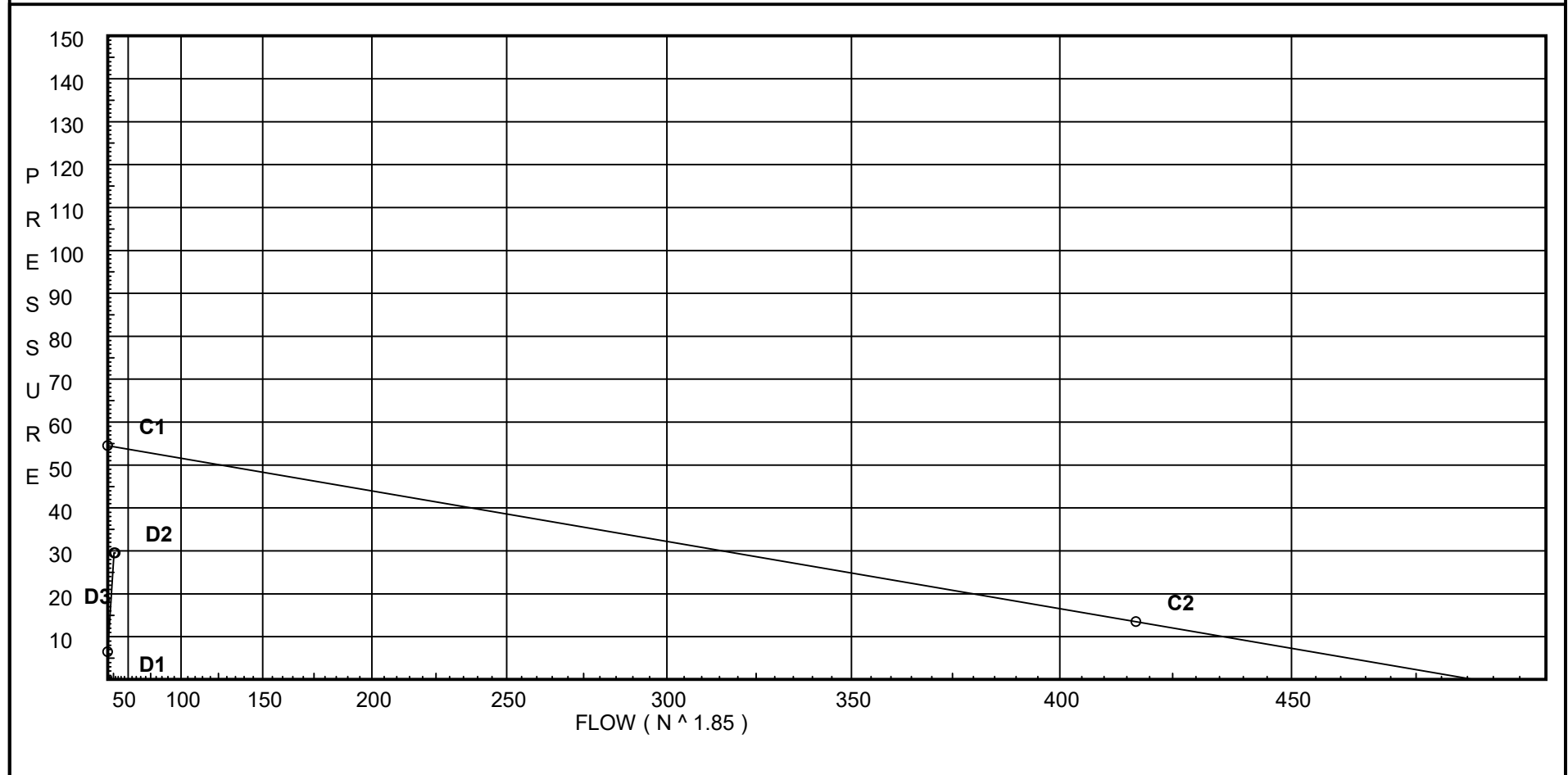
Page 2  
Date 4/22/2021

### 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 : 26.469  
D2 - System Pressure : 29.506  
Hose ( Demand ) : 3  
D3 - System Demand : 29.469  
Safety Margin : 24.689



# Fittings Used Summary

Fire & Life Safety America  
Oak Haven Lot 06 - RA2

Page 3  
Date 4/22/2021

## 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
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'El 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.

**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	54.195	29.47	29.506

**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	7.6	13.5	
201	19.0		6.81		
202	19.0		7.36		
M102	10.0		14.59		
D102	10.0		16.53		
TOR	8.0		20.94		
BOR	3.0		24.82		
UG1	3.0		26.15	3.0	
UG2	-3.0		32.02		
UG3	-3.0		32.07		
TEST	3.0		29.51		

# Final Calculations : Hazen-Williams

Fire & Life Safety America  
Oak Haven Lot 06 - RA2

Page 5  
Date 4/22/2021

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	1.000 7.000 8.000	150	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	13.50 13.5	1 1.101	O	5.0 0.0	1.000 5.000 6.000	150	7.596 -0.433 0.197		Vel = 4.55	
202			0.0 13.50						7.360		K Factor = 4.98	
201 to 202	19 19		12.96 12.96	1 1.101		0.0 0.0	18.000 0.0 18.000	150	6.811 0.0 0.549		Vel = 4.37	
202			0.0 12.96						7.360		K Factor = 4.78	
202 to M102	19 10		26.47 26.47	1 1.101	2N	14.0 0.0	15.125 14.000 29.125	150	7.360 3.898 3.328		Vel = 8.92	
M102 to D102	10 10		0.0 26.47	1 1.101	N	7.0 0.0	10.000 7.000 17.000	150	14.586 0.0 1.943		Vel = 8.92	
D102 to TOR	10 8		0.0 26.47	1 1.101	3O N	15.0 7.0	9.000 22.000 31.000	150	16.529 0.866 3.542		Vel = 8.92	
TOR			0.0 26.47						20.937		K Factor = 5.78	
TOR to BOR	8 3		26.47 26.47	1 1.101	N	7.0 0.0	8.000 7.000 15.000	150	20.937 2.166 1.714		Vel = 8.92	
BOR to UG1	3 3		0.0 26.47	1 1.101	2E	7.65 0.0	4.000 7.650 11.650	150	24.817 0.0 1.331		Vel = 8.92	
UG1 to UG2	3 -3	H3	3.00 29.47	1.25 1.394	T 2E	9.523 9.523	55.000 19.046 74.046	150	26.148 2.599 3.270		Vel = 6.20	
UG2 to UG3	-3 -3		0.0 29.47	6 6.09	2G 3E 2F	9.25 64.749 21.583	1350.333 95.581 1445.914	150	32.017 0.0 0.049		Vel = 0.32	
UG3 to TEST	-3 3		0.0 29.47	6 6.16	T 2E G	43.037 40.168 4.304	1000.000 87.509 1087.509	140	32.066 -2.599 0.039		Vel = 0.32	
TEST			0.0 29.47						29.506		K Factor = 5.43	