



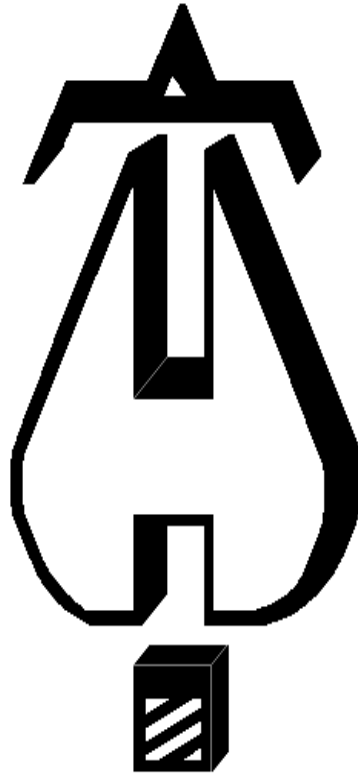
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1731 Round Rock Drive, Raleigh, NC 27615 • (919) 872-3250 • fax (919) 877-5775 • [www.flsamerica.com](http://www.flsamerica.com)

# OAKHAVEN LOT 37

## HYDRAULIC CALCULATIONS

12/20/2021



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 37- Bedroom #2  
Drawing : FP1  
Location : 177 Oakhaven Drive  
Remote Area : RA1  
Contract : 22NC1550  
Data File : RA1- Master Bedroom.WXF

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**HYDRAULIC CALCULATIONS**  
**for**

**Project name:** Oakhaven Lot 37  
**Location:** 177 Oakhaven Drive  
**Drawing no:** FP1  
**Date:** 12/20/2021

**Design**

**Remote area number:** RA1  
**Remote area location:** Bedroom #2  
**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):** 23.02 - GPM @ 31.90 - 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.)**

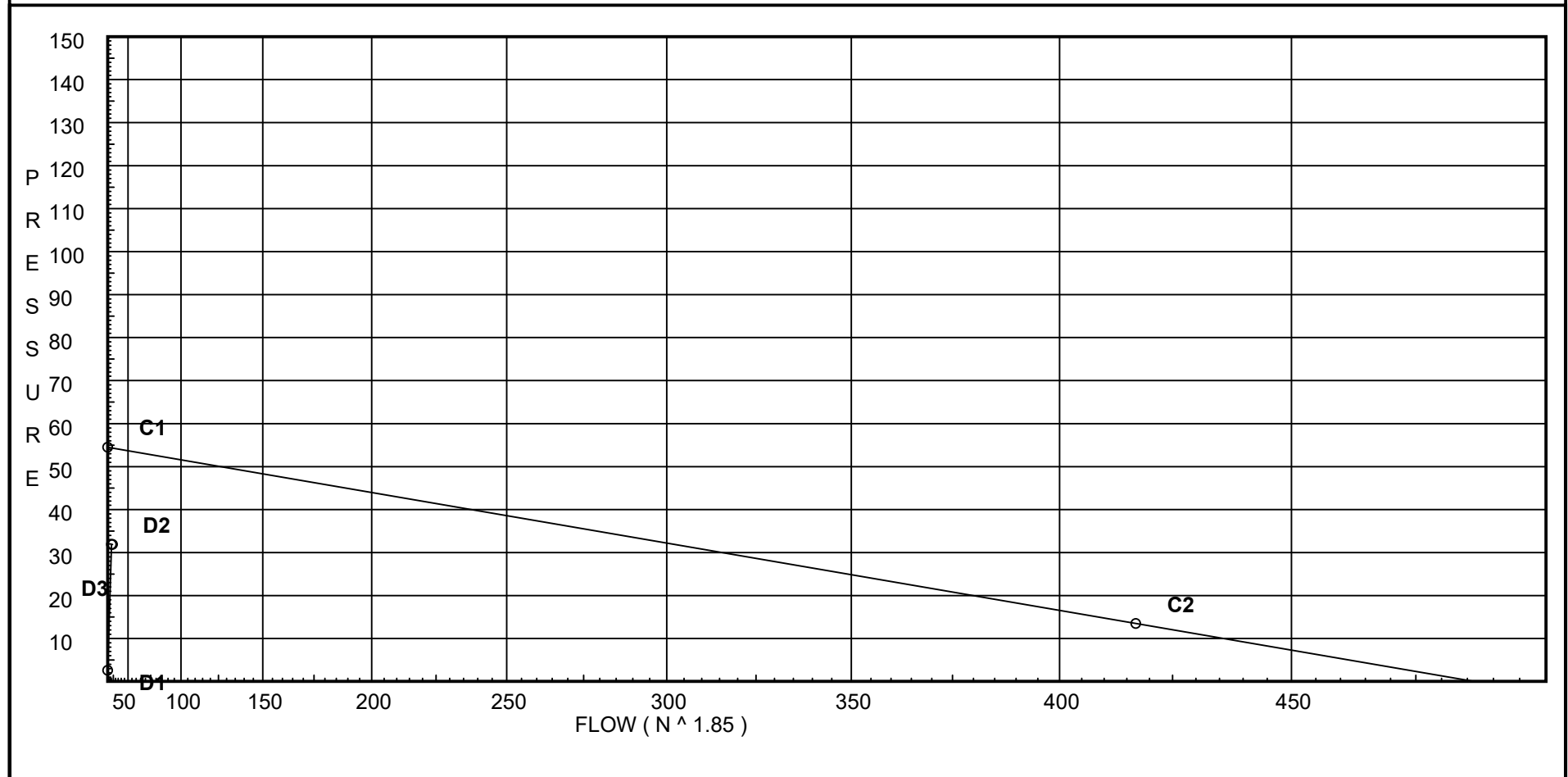
# Water Supply Curve C

Fire & Life Safety America  
Oakhaven Lot 37- Bedroom #2

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Date 12/20/2021

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 : 31.898  
Hose ( Demand ) : 3  
D3 - System Demand : 23.024  
Safety Margin : 22.409



# Fittings Used Summary

Fire & Life Safety America  
Oakhaven Lot 37- Bedroom #2

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## Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24	
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 37- Bedroom #2

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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	54.5	13.5	417.0	54.307	23.02	31.898

## NODE ANALYSIS

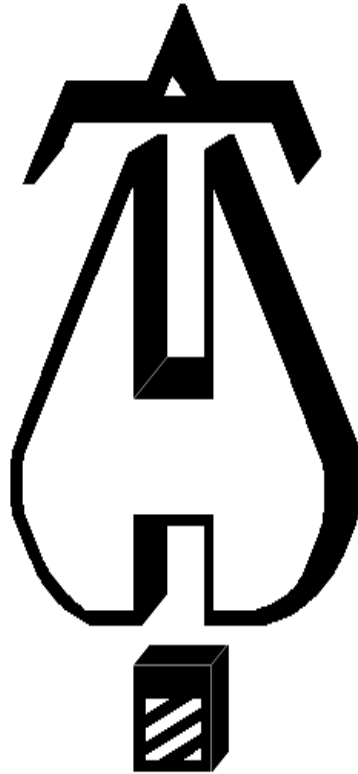
<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
S101	9.0	4.9	16.7	20.02	
101	10.0		16.81		
M101	10.0		18.62		
M102	10.0		21.13		
TOR	8.0		25.5		
BOR	3.0		28.99		
UG1	3.0		29.78	3.0	
UG2	-3.0		34.45		
UG3	-3.0		34.47		
TEST	3.0		31.9		

# Final Calculations : Hazen-Williams

Fire & Life Safety America  
Oakhaven Lot 37- Bedroom #2

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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	*****
S101 to 101	9 10	4.90	20.02 20.02	1 1.101	N O	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	N O	7.0 5.0 0.0	14.500 12.000 26.500	150 0.0682	16.812 0.0 1.808		Vel = 6.75	
M101 to M102	10 10		0.0 20.02	1 1.101	O O	5.0 0.0 0.0	31.750 5.000 36.750	150 0.0682	18.620 0.0 2.506		Vel = 6.75	
M102 to TOR	10 8		0.0 20.02	1 1.101	2O N	10.0 7.0 0.0	34.500 17.000 51.500	150 0.0682	21.126 0.866 3.512		Vel = 6.75	
TOR			0.0 20.02						25.504		K Factor = 3.96	
TOR to BOR	8 3		20.02 20.02	1 1.101	N Ball	7.0 4.303 0.0	8.000 11.303 19.303	150 0.0682	25.504 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	28.986 0.0 0.794		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	29.780 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	1022.667 95.581 1118.248	150 0	34.450 0.0 0.024		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	34.474 -2.599 0.023		Vel = 0.25	
TEST			0.0 23.02						31.898		K Factor = 4.08	



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 37 - Storage  
Drawing : FP1  
Location : 177 Oakhaven Dr.  
Remote Area : RA2  
Contract : 22NC1550  
Data File : RA2- Bonus Room.WXF



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**HYDRAULIC CALCULATIONS**  
**for**

**Project name:** Oakhaven Lot 37  
**Location:** 177 Oakhaven Dr.  
**Drawing no:** FP1  
**Date:** 12/20/2021

**Design**

**Remote area number:** RA2  
**Remote area location:** Storage  
**Occupancy classification:** Residential  
**Density:** .05 - Gpm/SqFt  
**Area of application:** 2 Heads - 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):** 29.42 - GPM @ 30.19 - 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  
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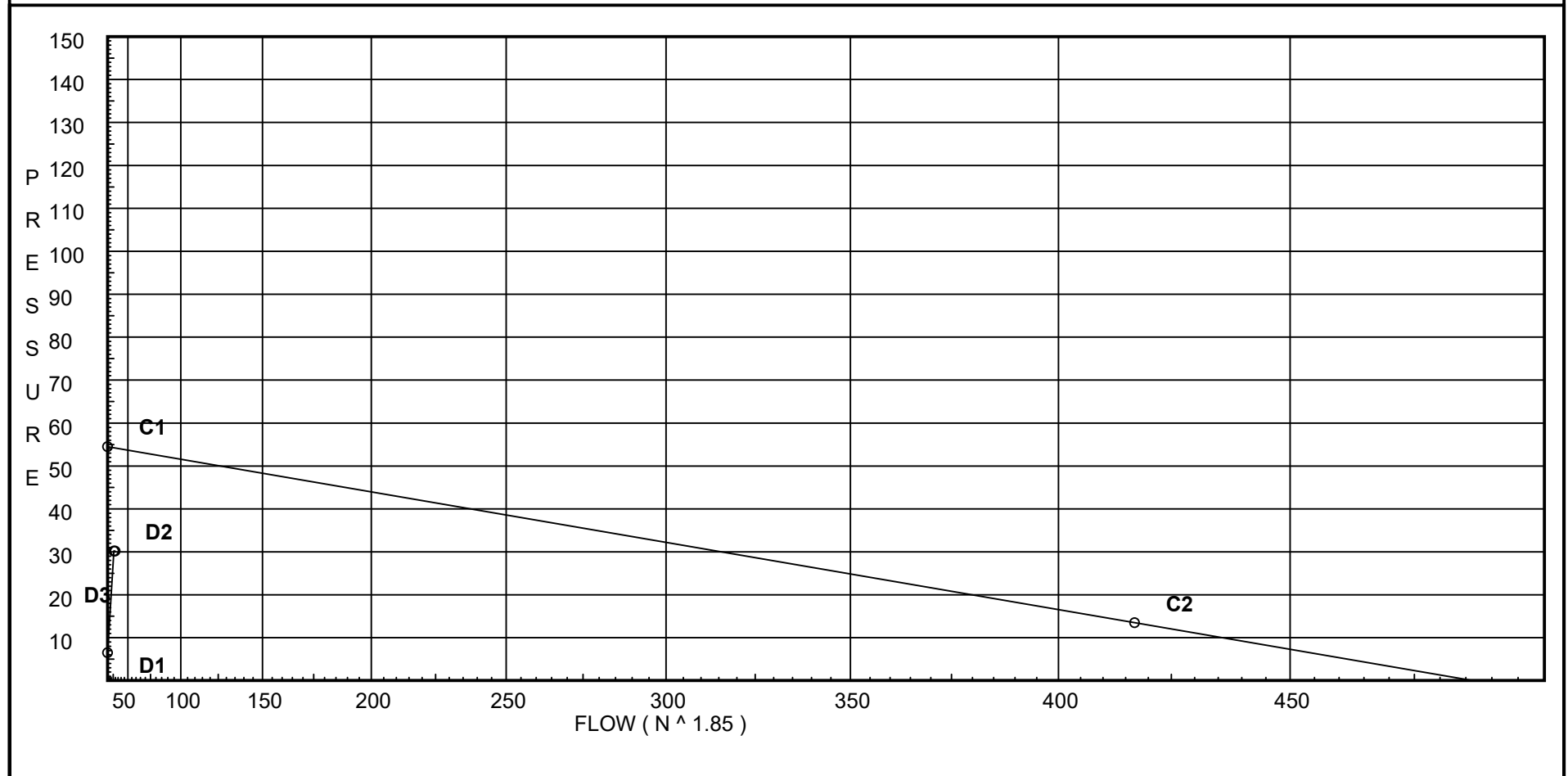
# Water Supply Curve C

Fire & Life Safety America  
Oakhaven Lot 37 - Storage

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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 : 26.416  
D2 - System Pressure : 30.192  
Hose ( Demand ) : 3  
D3 - System Demand : 29.416  
Safety Margin : 24.004



# Fittings Used Summary

Fire & Life Safety America  
Oakhaven Lot 37 - Storage

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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.

**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	54.196	29.42	30.192

**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	7.54	13.45	
201	19.0		6.81		
202	19.0		7.3		
M201	19.0		8.55		
M202	10.0		14.53		
M203	10.0		16.35		
M204	10.0		17.4		
TOR	8.0		21.17		
BOR	3.0		25.53		
UG1	3.0		26.86	3.0	
UG2	-3.0		32.72		
UG3	-3.0		32.76		
TEST	3.0		30.19		

# Final Calculations : Hazen-Williams

Fire & Life Safety America  
Oakhaven Lot 37 - Storage

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	13.45 13.45	1 1.101	O	5.0 0.0 0.0	1.000 5.000 6.000	150 0.0327	7.536 -0.433 0.196			Vel = 4.53
202			0.0 13.45						7.299		K Factor = 4.98	
201 to 202	19 19		12.96 12.96	1 1.101		0.0 0.0 0.0	16.000 0.0 16.000	150 0.0305	6.811 0.0 0.488			Vel = 4.37
202 to M201	19 19		13.46 26.42	1 1.101	O	5.0 0.0 0.0	6.000 5.000 11.000	150 0.1138	7.299 0.0 1.252			Vel = 8.90
M201 to M202	19 10		0.0 26.42	1 1.101	O N	5.0 7.0 0.0	6.250 12.000 18.250	150 0.1139	8.551 3.898 2.078			Vel = 8.90
M202 to M203	10 10		0.0 26.42	1 1.101	N	7.0 0.0 0.0	9.000 7.000 16.000	150 0.1139	14.527 0.0 1.822			Vel = 8.90
M203 to M204	10 10		0.0 26.42	1 1.101	O	5.0 0.0 0.0	4.250 5.000 9.250	150 0.1138	16.349 0.0 1.053			Vel = 8.90
M204 to TOR	10 8		0.0 26.42	1 1.101	O N	5.0 7.0 0.0	13.500 12.000 25.500	150 0.1138	17.402 0.866 2.903			Vel = 8.90
TOR			0.0 26.42						21.171		K Factor = 5.74	
TOR to BOR	8 3		26.42 26.42	1 1.101	N Ball	7.0 4.303 0.0	8.000 11.303 19.303	150 0.1138	21.171 2.166 2.197			Vel = 8.90
BOR to UG1	3 3		0.0 26.42	1 1.101	2E	7.65 0.0 0.0	4.000 7.650 11.650	150 0.1138	25.534 0.0 1.326			Vel = 8.90
UG1 to UG2	3 -3	H3	3.00 29.42	1.25 1.394	T 2E	9.523 9.523 0.0	55.000 19.046 74.046	150 0.0440	26.860 2.599 3.259			Vel = 6.18
UG2 to UG3	-3 -3		0.0 29.42	6 6.09	2G 3E 2F	9.25 64.749 21.583	1022.667 95.581 1118.248	150 0	32.718 0.0 0.038			Vel = 0.32
UG3 to TEST	-3 3		0.0 29.42	6 6.16	T 2E G	48.896 45.637 4.89	1000.000 99.422 1099.422	150 0	32.756 -2.599 0.035			Vel = 0.32
TEST			0.0 29.42						30.192		K Factor = 5.35	