



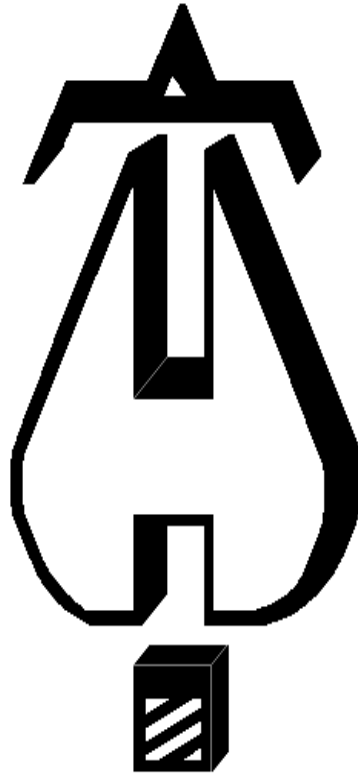
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1731 Round Rock Drive, Raleigh, NC 27615 • (919) 872-3250 • fax (919) 877-5775 • [www.flsamerica.com](http://www.flsamerica.com)

# OAK HAVEN LOT 35

## HYDRAULIC CALCULATIONS

12/22/2021



Hydraulic calculations using HydraCALC

FIRE & LIFE SAFETY AMERICA  
1731 ROUND ROCK DRIVE  
RALEIGH, NC 27615  
919-872-3250

Job Name : OAK HAVEN LOT 35  
Drawing : FP1  
Location : 49 BUCKHAVEN DR.  
Remote Area : RA1  
Contract : 22NC1557  
Data File : RA1.WXF

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**HYDRAULIC CALCULATIONS**  
**for**

**Project name:** OAK HAVEN LOT 35 - RA1

**Location:** 49 BUCKHAVEN DR.

**Drawing no:** FP1

**Date:** 12/21/2021

**Design**

**Remote area number:** RA1

**Remote area location:** BEDROOM #2

**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):** 29.000 - GPM @ 29.526 - Psi

**Type of system:** WET CPVC 13D

**Volume of dry or preaction system:** N/A - Gal

**Water supply information**

**Date:** 4/21/2021

**Location:** NC42, NC 27540

**Source:** FIRE & LIFE SAFETY AMERICA

**Name of contractor:** FIRE & LIFE SAFETY AMERICA

**Address:** 1731 ROUND ROCK DRIVE / RALEIGH, NC 27615 / 919-872-3250

**Phone number:** (919) 872-3250

**Name of designer:** R. COLLINS

**Authority having jurisdiction:** HARNETT COUNTY

**Notes: (Include peaking information or gridded systems here.)**

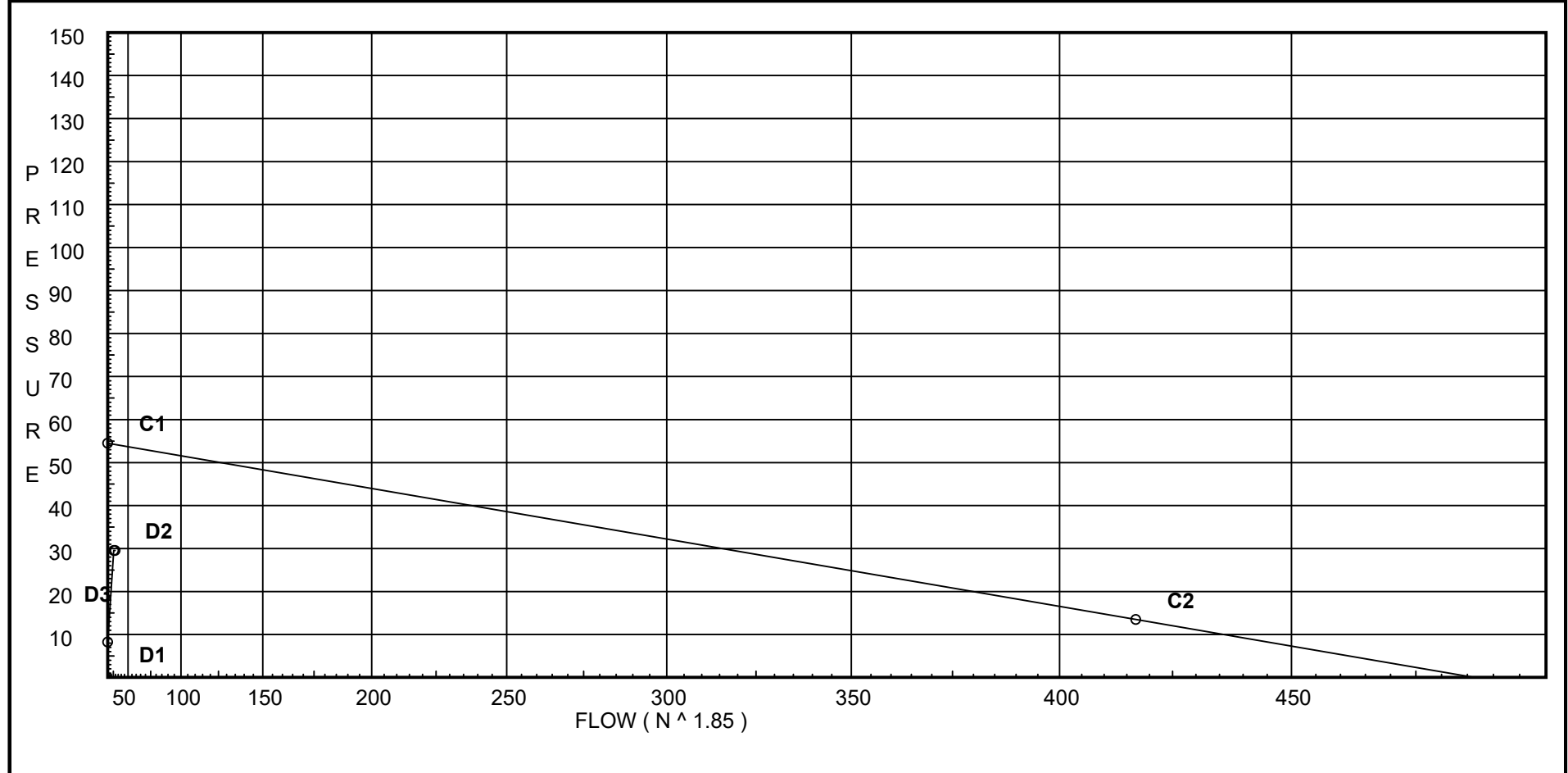
# Water Supply Curve C

FIRE & LIFE SAFETY AMERICA  
OAK HAVEN LOT 35

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

Demand:  
D1 - Elevation : 8.229  
D2 - System Flow : 26  
D2 - System Pressure : 29.526  
Hose ( Demand ) : 3  
D3 - System Demand : 29  
Safety Margin : 24.678



# Fittings Used Summary

FIRE & LIFE SAFETY AMERICA  
OAK HAVEN LOT 35

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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
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 35

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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	54.204	29.0	29.526

**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>
A1	22.0	4.9	7.08	13.04	
A2	22.0	4.9	7.0	12.96	
101	22.0		7.31		
102	22.0		7.23		
103	22.0		7.48		
104	22.0		9.47		
105	11.0		15.45		
M1	11.0		16.31		
M2	11.0		18.14		
TOR	11.0		19.85		
BOR	3.0		24.98		
UG1	3.0		26.27	3.0	
UG2	-3.0		32.04		
UG3	-3.0		32.05		
UG4	-3.0		32.09		
TEST	3.0		29.53		

Final Calculations : Hazen-Williams

FIRE & LIFE SAFETY AMERICA  
OAK HAVEN LOT 35

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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	*****
A1 to 101	22 22	4.90	13.04 13.04	1 1.101	N	7.0 0.0 0.0	0.500 7.000 7.500	150 0.0308	7.077 0.0 0.231		Vel = 4.39	
101			0.0 13.04						7.308		K Factor = 4.82	
A2 to 102	22 22	4.90	12.96 12.96	1 1.101	N	7.0 0.0 0.0	0.500 7.000 7.500	150 0.0305	7.000 0.0 0.229		Vel = 4.37	
102			0.0 12.96						7.229		K Factor = 4.82	
101 to 103	22 22		13.04 13.04	1 1.101		0.0 0.0 0.0	5.583 0.0 5.583	150 0.0310	7.308 0.0 0.173		Vel = 4.39	
103			0.0 13.04						7.481		K Factor = 4.77	
102 to 103	22 22		12.96 12.96	1 1.101	O	5.0 0.0 0.0	3.250 5.000 8.250	150 0.0305	7.229 0.0 0.252		Vel = 4.37	
103 to 104	22 22		13.04 26.0	1 1.101		0.0 0.0 0.0	18.000 0.0 18.000	150 0.1105	7.481 0.0 1.989		Vel = 8.76	
104 to 105	22 11		0.0 26.0	1 1.101		0.0 0.0 0.0	11.000 0.0 11.000	150 0.1106	9.470 4.764 1.217		Vel = 8.76	
105 to M1	11 11		0.0 26.0	1 1.101	O	5.0 0.0 0.0	2.750 5.000 7.750	150 0.1105	15.451 0.0 0.856		Vel = 8.76	
M1 to M2	11 11		0.0 26.0	1 1.101		0.0 0.0 0.0	16.583 0.0 16.583	150 0.1106	16.307 0.0 1.834		Vel = 8.76	
M2 to TOR	11 11		0.0 26.0	1 1.101	N	7.0 0.0 0.0	8.500 7.000 15.500	150 0.1105	18.141 0.0 1.713		Vel = 8.76	
TOR			0.0 26.00						19.854		K Factor = 5.84	
TOR to BOR	11 3		26.00 26.0	1 1.101	N	7.0 0.0 0.0	8.000 7.000 15.000	150 0.1105	19.854 3.465 1.658		Vel = 8.76	
BOR to UG1	3 3		0.0 26.0	1 1.101	2E	7.65 0.0 0.0	4.000 7.650 11.650	150 0.1106	24.977 0.0 1.288		Vel = 8.76	
UG1 to UG2	3 -3	H3	3.00 29.0	1.25 1.394	T 2E	9.523 9.523 0.0	55.000 19.046 74.046	150 0.0429	26.265 2.599 3.175		Vel = 6.10	
UG2 to UG3	-3 -3		0.0 29.0	6 6.09	3E 2F	64.749 21.583 0.0	326.000 86.332 412.332	150 0	32.039 0.0 0.013		Vel = 0.32	
UG3 to UG4	-3 -3		0.0 29.0	6 6.09	2G 3F	9.25 32.374 0.0	1149.000 41.623 1190.623	150 0	32.052 0.0 0.039		Vel = 0.32	

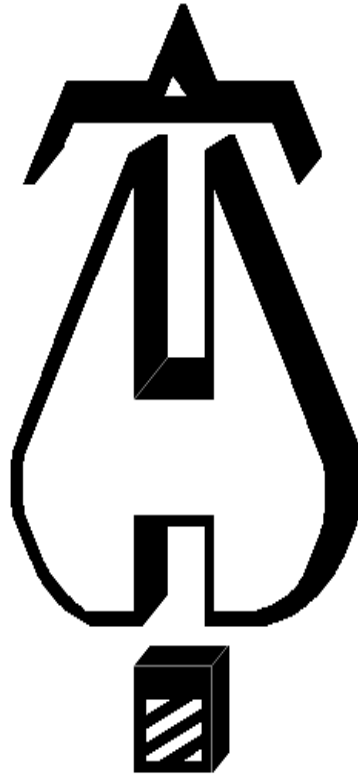
# Final Calculations : Hazen-Williams

FIRE & LIFE SAFETY AMERICA  
OAK HAVEN LOT 35

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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	*****
UG4 to TEST	-3 3		0.0 29.0	6 6.16	T 2E G	48.896 45.637 4.89	1000.000 99.422 1099.422	150 0	32.091 -2.599 0.034		Vel = 0.31	
TEST			0.0 29.00						29.526		K Factor = 5.34	





Hydraulic calculations using HydraCALC

FIRE & LIFE SAFETY AMERICA  
1731 ROUND ROCK DRIVE  
RALEIGH, NC 27615  
919-872-3250

Job Name : OAK HAVEN LOT 35 - RA2  
Drawing : FP1  
Location : 49 BUCKHAVEN DR.  
Remote Area : RA2  
Contract : 22NC1557  
Data File : RA2.WXF

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**HYDRAULIC CALCULATIONS**  
*for*

**Project name:** OAK HAVEN LOT 35 - RA2  
**Location:** 49 BUCKHAVEN DR.  
**Drawing no:** FP1  
**Date:** 12/21/2021

**Design**

**Remote area number:** RA2  
**Remote area location:** BEDROOM #2  
**Occupancy classification:** RESIDENTIAL  
**Density:** .05 - Gpm/SqFt  
**Area of application:** 2 HEADS - SqFt  
**Coverage per sprinkler:** 324 - 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):** 37.116 - GPM @ 34.223 - Psi  
**Type of system:** WET CPVC 13D  
**Volume of dry or preaction system:** N/A - Gal

**Water supply information**

**Date:** 4/21/2021  
**Location:** NC42, NC 27540  
**Source:** FIRE & LIFE SAFETY AMERICA

**Name of contractor:** FIRE & LIFE SAFETY AMERICA  
**Address:** 1731 ROUND ROCK DRIVE / RALEIGH, NC 27615 / 919-872-3250  
**Phone number:** (919) 872-3250  
**Name of designer:** R. COLLINS  
**Authority having jurisdiction:** HARNETT COUNTY  
**Notes: (Include peaking information or gridded systems here.)**

# Water Supply Curve C

FIRE & LIFE SAFETY AMERICA  
OAK HAVEN LOT 35 - RA2

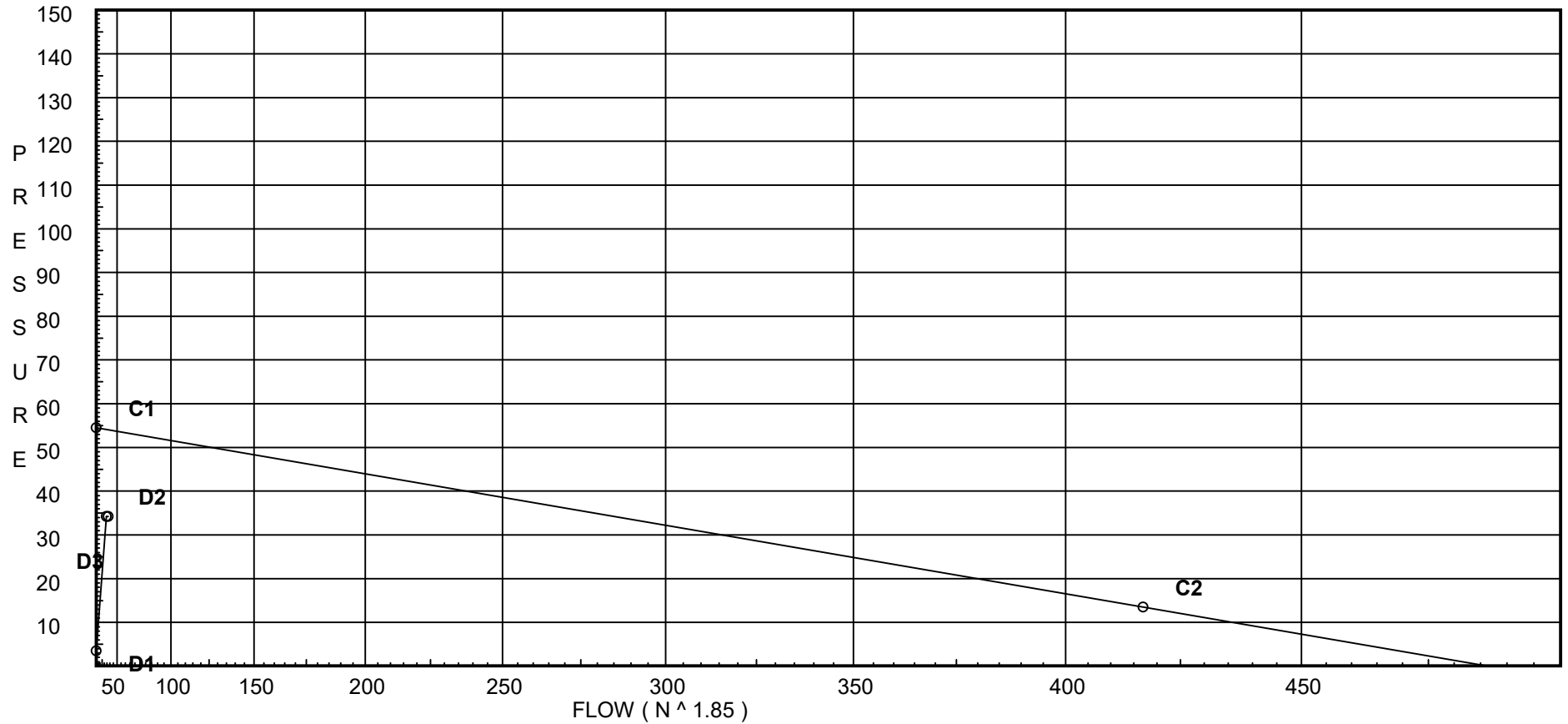
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### City Water Supply:

C1 - Static Pressure : 54.5  
C2 - Residual Pressure: 13.5  
C2 - Residual Flow : 417

### Demand:

D1 - Elevation : 3.465  
D2 - System Flow : 34.116  
D2 - System Pressure : 34.223  
Hose ( Demand ) : 3  
D3 - System Demand : 37.116  
Safety Margin : 19.810



# Fittings Used Summary

FIRE & LIFE SAFETY AMERICA  
OAK HAVEN LOT 35 - RA2

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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
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 35 - RA2

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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	54.033	37.12	34.223

**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>
B1	11.0	4.9	12.24	17.14	
B2	11.0	4.9	12.0	16.97	
201	11.0		12.62		
202	11.0		12.38		
203	11.0		12.9		
M2	11.0		17.91		
TOR	11.0		20.74		
BOR	3.0		26.95		
UG1	-3.0		31.67	3.0	
UG2	-3.0		36.68		
UG3	-3.0		36.71		
UG4	-3.0		36.77		
TEST	3.0		34.22		

# Final Calculations : Hazen-Williams

FIRE & LIFE SAFETY AMERICA  
OAK HAVEN LOT 35 - RA2

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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	*****
B1 to 201	11 11	4.90	17.14 17.14	1 1.101	N	7.0 0.0 0.0	0.500 7.000 7.500	150 0.0512	12.239 0.0 0.384		Vel = 5.78	
201			0.0 17.14						12.623		K Factor = 4.82	
B2 to 202	11 11	4.90	16.97 16.97	1 1.101	N	7.0 0.0 0.0	0.500 7.000 7.500	150 0.0503	12.000 0.0 0.377		Vel = 5.72	
202			0.0 16.97						12.377		K Factor = 4.82	
201 to 203	11 11		17.14 17.14	1 1.101		0.0 0.0 0.0	5.500 0.0 5.500	150 0.0511	12.623 0.0 0.281		Vel = 5.78	
203			0.0 17.14						12.904		K Factor = 4.77	
202 to 203	11 11		16.97 16.97	1 1.101	O	5.0 0.0 0.0	5.500 5.000 10.500	150 0.0502	12.377 0.0 0.527		Vel = 5.72	
203			0.0 16.97						12.904		K Factor = 4.72	
203 to M2	11 11		34.12 34.12	1 1.101	O	5.0 0.0 0.0	22.375 5.000 27.375	150 0.1828	12.904 0.0 5.003		Vel = 11.50	
M2 to TOR	11 11		0.0 34.12	1 1.101	N	7.0 0.0 0.0	8.500 7.000 15.500	150 0.1827	17.907 0.0 2.832		Vel = 11.50	
TOR			0.0 34.12						20.739		K Factor = 7.49	
TOR to BOR	11 3		34.12 34.12	1 1.101	N	7.0 0.0 0.0	8.000 7.000 15.000	150 0.1827	20.739 3.465 2.741		Vel = 11.50	
BOR to UG1	3 -3		0.0 34.12	1 1.101	2E	7.65 0.0 0.0	4.000 7.650 11.650	150 0.1827	26.945 2.599 2.129		Vel = 11.50	
UG1 to UG2	-3 -3	H3	3.00 37.12	1.25 1.394	T 2E	9.523 9.523 0.0	55.000 19.046 74.046	150 0.0677	31.673 0.0 5.012		Vel = 7.80	
UG2 to UG3	-3 -3		0.0 37.12	6 6.09	3E 2F	64.749 21.583 0.0	326.000 86.332 412.332	150 0.0001	36.685 0.0 0.021		Vel = 0.41	
UG3 to UG4	-3 -3		0.0 37.12	6 6.09	2G 3F	9.25 32.374 0.0	1149.000 41.623 1190.623	150 0.0001	36.706 0.0 0.062		Vel = 0.41	
UG4 to TEST	-3 3		0.0 37.12	6 6.16	T 2E G	48.896 45.637 4.89	1000.000 99.422 1099.422	150 0	36.768 -2.599 0.054		Vel = 0.40	
TEST			0.0 37.12						34.223		K Factor = 6.35	

# Final Calculations : Hazen-Williams

FIRE & LIFE SAFETY AMERICA  
OAK HAVEN LOT 35 - RA2

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Node1	Elev1	K	Qa	Nom	Fitting		Pipe	CFact	Pt			
to					or		Ftngs		Pe	*****	Notes	*****
Node2	Elev2	Fact	Qt	Act	Equiv	Len	Total	Pf/Ft	Pf			

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