

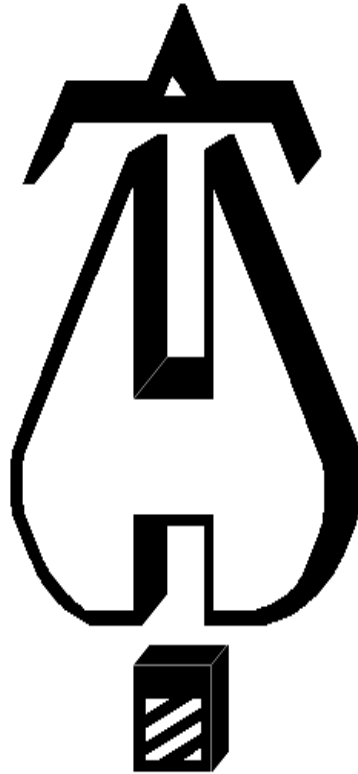


1731 Round Rock Drive, Raleigh, NC 27615 • (919) 872-3250 • fax (919) 877-5775 • www.flsamerica.com

OAK HAVEN LOT 34

HYDRAULIC CALCULATIONS

12/21/2021



Hydraulic calculations using HydraCALC

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

Job Name : OAK HAVEN LOT 34 - RA1
Drawing : FP1
Location : 63 BUCKHAVEN DRIVE
Remote Area : RA1
Contract : 22NC1556
Data File : RA1.WXF

HYDRAULIC CALCULATIONS
for

Project name: OAK HAVEN LOT 34 - RA1
Location: 63 BUCKHAVEN DRIVE
Drawing no: FP1
Date: 12/21/2021

Design

Remote area number: RA1
Remote area location: BEDROOM #3
Occupancy classification: RESIDENTIAL
Density: .05 - Gpm/SqFt
Area of application: 1 HEAD - SqFt
Coverage per sprinkler: 256 - 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): 19.974 - GPM @ 28.635 - 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.)

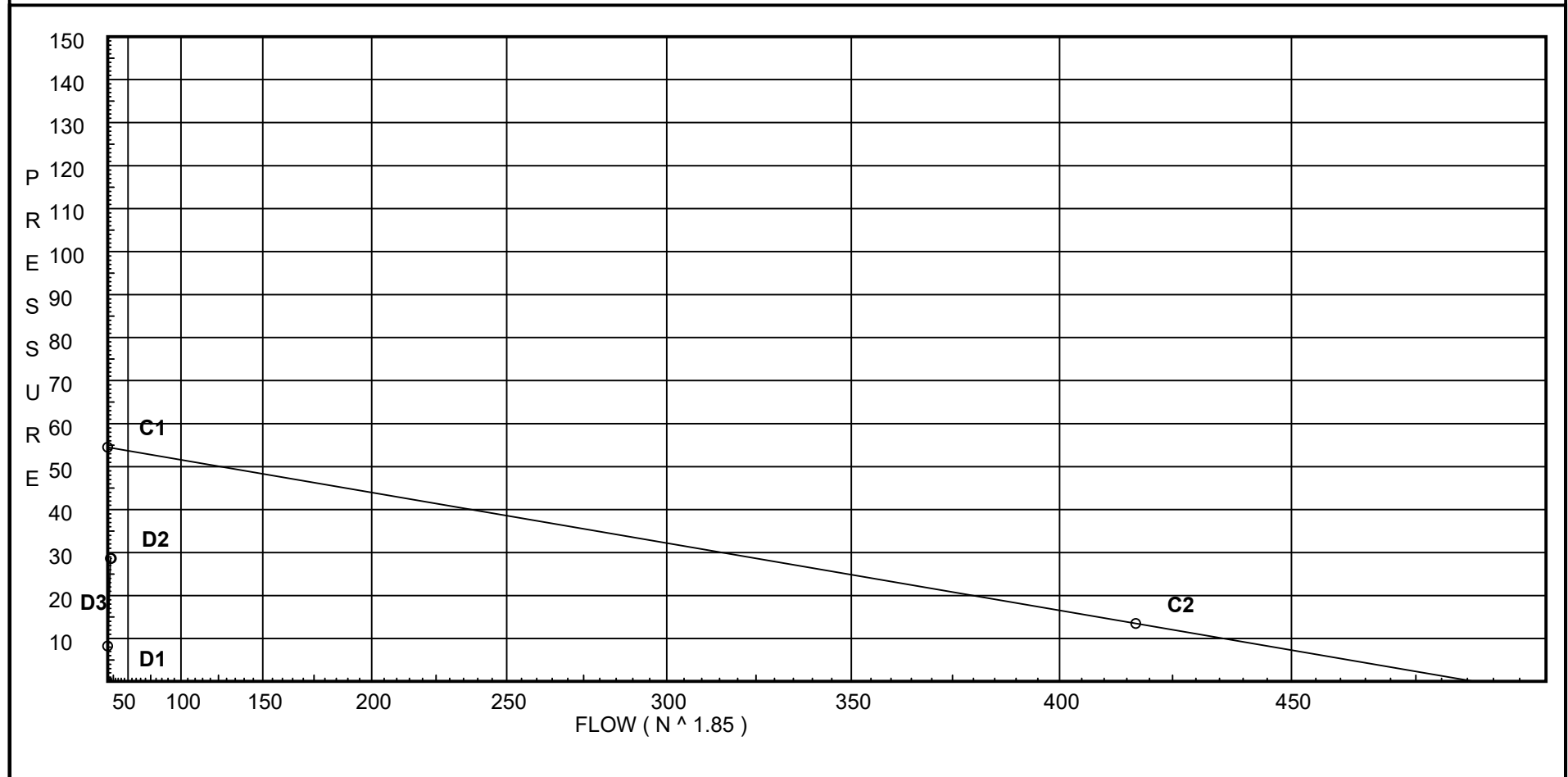
Water Supply Curve C

FIRE & LIFE SAFETY AMERICA
OAK HAVEN LOT 34 - RA1

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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 : 16.974
D2 - System Pressure : 28.635
Hose (Demand) : 3
D3 - System Demand : 19.974
Safety Margin : 25.717



Fittings Used Summary

FIRE & LIFE SAFETY AMERICA
OAK HAVEN LOT 34 - RA1

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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 34 - RA1

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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	54.352	19.97	28.635

NODE ANALYSIS

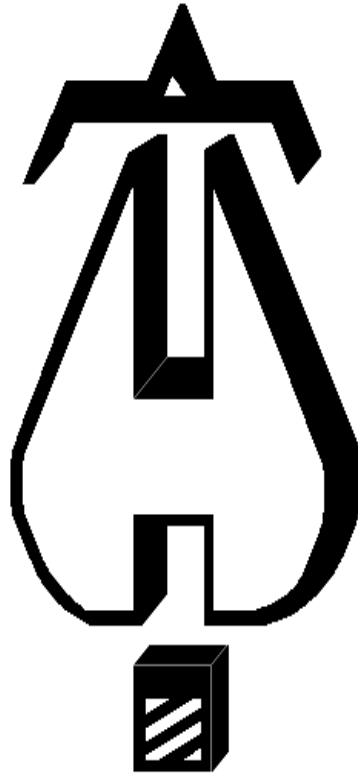
<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
A1	22.0	4.9	12.0	16.97	
101	22.0		12.03		
102	22.0		12.62		
103	22.0		13.68		
104	11.0		19.25		
M1	11.0		20.39		
M2	11.0		21.44		
TOR	11.0		22.2		
BOR	3.0		26.41		
UG1	3.0		27.0	3.0	
UG2	-3.0		31.19		
UG3	-3.0		31.2		
UG4	-3.0		31.22		
TEST	3.0		28.63		

Final Calculations : Hazen-Williams

FIRE & LIFE SAFETY AMERICA
OAK HAVEN LOT 34 - RA1

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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	16.97	1		0.0	0.500	150	12.000			
			0.0			0.0	0.0		0.0			
			16.97	1.101		0.0	0.500	0.0500	0.025		Vel = 5.72	
101			0.0						12.025		K Factor = 4.89	
101 to 102	22 22		16.97	1	N	7.0	4.750	150	12.025			
			0.0			0.0	7.000		0.0			
			16.97	1.101		0.0	11.750	0.0502	0.590		Vel = 5.72	
102 to 103	22 22		0.0	1	O	5.0	16.167	150	12.615			
			0.0			0.0	5.000		0.0			
			16.97	1.101		0.0	21.167	0.0503	1.064		Vel = 5.72	
103 to 104	22 11		0.0	1	O	5.0	11.000	150	13.679			
			0.0			0.0	5.000		4.764			
			16.97	1.101		0.0	16.000	0.0502	0.803		Vel = 5.72	
104 to M1	11 11		0.0	1	N O	7.0	10.750	150	19.246			
			0.0			5.0	12.000		0.0			
			16.97	1.101		0.0	22.750	0.0502	1.143		Vel = 5.72	
M1 to M2	11 11		0.0	1	O	5.0	15.875	150	20.389			
			0.0			0.0	5.000		0.0			
			16.97	1.101		0.0	20.875	0.0503	1.049		Vel = 5.72	
M2 to TOR	11 11		0.0	1	N	7.0	8.083	150	21.438			
			0.0			0.0	7.000		0.0			
			16.97	1.101		0.0	15.083	0.0502	0.757		Vel = 5.72	
TOR			0.0						22.195		K Factor = 3.60	
TOR to BOR	11 3		16.97	1	N	7.0	8.000	150	22.195			
			0.0			0.0	7.000		3.465			
			16.97	1.101		0.0	15.000	0.0503	0.754		Vel = 5.72	
BOR to UG1	3 3		0.0	1	2E	7.65	4.000	150	26.414			
			0.0			0.0	7.650		0.0			
			16.97	1.101		0.0	11.650	0.0502	0.585		Vel = 5.72	
UG1 to UG2	3 -3	H3	3.00	1.25	T 2E	9.523	55.000	150	26.999			
			0.0			9.523	19.046		2.599			
			19.97	1.394		0.0	74.046	0.0215	1.592		Vel = 4.20	
UG2 to UG3	-3 -3		0.0	6	3E 2F	64.749	326.000	150	31.190			
			0.0			21.583	86.332		0.0			
			19.97	6.09		0.0	412.332	0	0.007		Vel = 0.22	
UG3 to UG4	-3 -3		0.0	6	2G 3F	9.25	1149.000	150	31.197			
			0.0			32.374	41.623		0.0			
			19.97	6.09		0.0	1190.623	0	0.019		Vel = 0.22	
UG4 to TEST	-3 3		0.0	6	T 2E	48.896	1000.000	150	31.216			
			0.0			45.637	99.422		-2.599			
			19.97	6.16	G	4.89	1099.422	0	0.018		Vel = 0.21	
TEST			0.0						28.635		K Factor = 3.73	
TEST			19.97									



Hydraulic calculations using HydraCALC

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

Job Name : OAK HAVEN LOT 34 - RA2
Drawing : FP1
Location : 63 BUCKHAVEN DRIVE
Remote Area : RA2
Contract : 22NC1556
Data File : RA2.WXF

HYDRAULIC CALCULATIONS
for

Project name: OAK HAVEN LOT 34 - RA1
Location: 63 BUCKHAVEN DRIVE
Drawing no: FP1
Date: 12/21/2021

Design

Remote area number: RA2
Remote area location: BEDROOM #3
Occupancy classification: RESIDENTIAL
Density: .05 - Gpm/SqFt
Area of application: 2 HEADS - SqFt
Coverage per sprinkler: 324-400 - 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): 42.389 - GPM @ 37.753 - 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.)

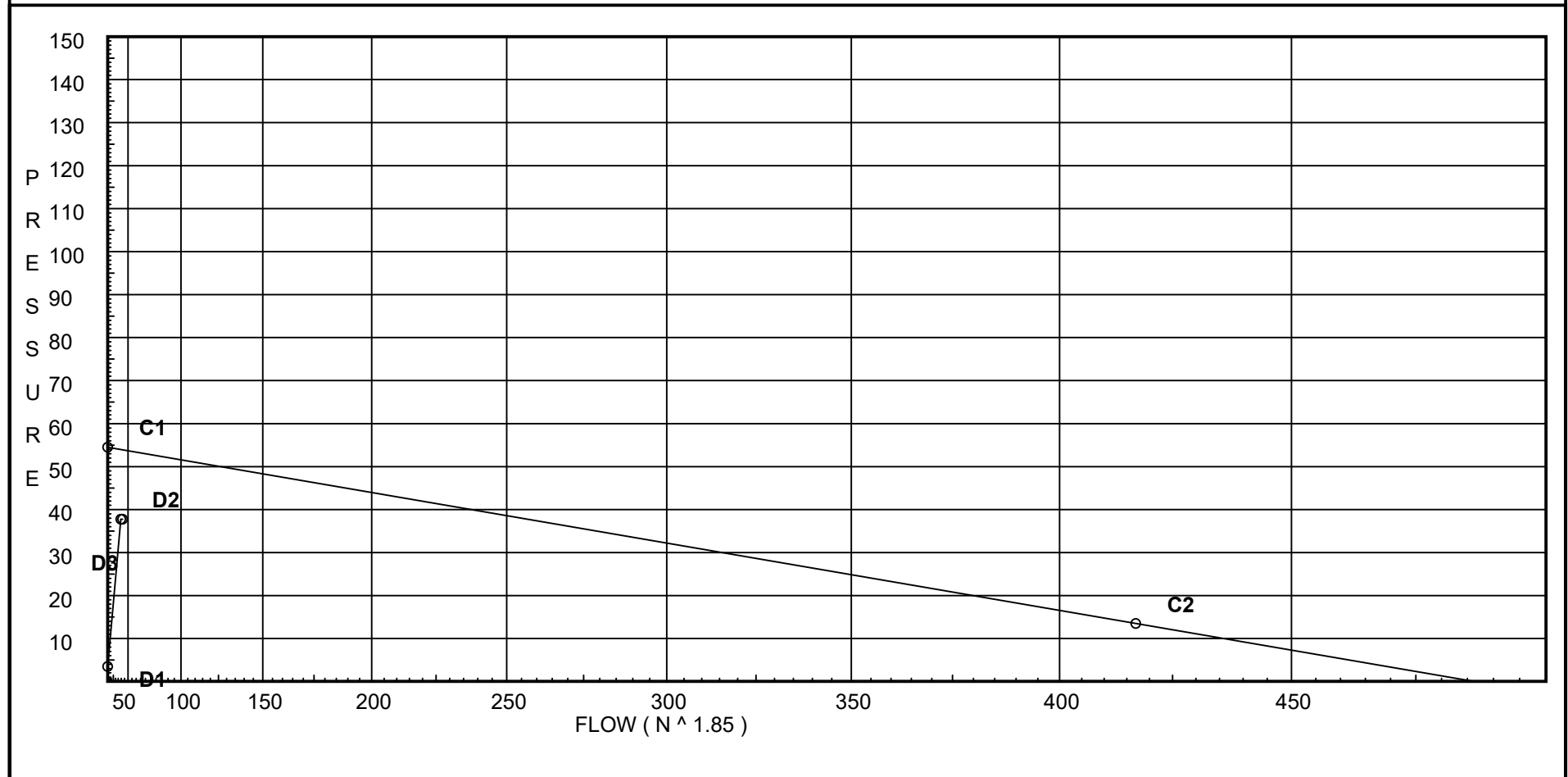
Water Supply Curve C

FIRE & LIFE SAFETY AMERICA
OAK HAVEN LOT 34 - 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 : 39.389
D2 - System Pressure : 37.753
Hose (Demand) : 3
D3 - System Demand : 42.389
Safety Margin : 16.150



Fittings Used Summary

FIRE & LIFE SAFETY AMERICA
OAK HAVEN LOT 34 - 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 34 - RA2

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SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
TEST	54.5	13.5	417.0	53.903	42.39	37.753

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
B1	11.0	4.9	15.62	19.36	
B2	11.0	4.9	16.7	20.02	
201	11.0		16.1		
202	11.0		17.08		
M1	11.0		16.74		
M2	11.0		17.76		
TOR	11.0		21.35		
BOR	3.0		28.39		
UG1	3.0		31.17	3.0	
UG2	-3.0		40.18		
UG3	-3.0		40.2		
UG4	-3.0		40.28		
TEST	3.0		37.75		

Final Calculations : Hazen-Williams

FIRE & LIFE SAFETY AMERICA
OAK HAVEN LOT 34 - 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	19.36 19.36	1 1.101	N	7.0 0.0 0.0	0.500 7.000 7.500	150 0.0641	15.618 0.0 0.481			Vel = 6.52
201			0.0 19.36						16.099			K Factor = 4.83
B2 to 202	11 11	4.90	20.02 20.02	1 1.101	O	5.0 0.0 0.0	0.500 5.000 5.500	150 0.0682	16.700 0.0 0.375			Vel = 6.75
202			0.0 20.02						17.075			K Factor = 4.84
201 to M1	11 11		19.36 19.36	1 1.101	O	5.0 0.0 0.0	5.000 5.000 10.000	150 0.0641	16.099 0.0 0.641			Vel = 6.52
M1			0.0 19.36						16.740			K Factor = 4.73
202 to M2	11 11		20.02 20.02	1 1.101	O	5.0 0.0 0.0	5.000 5.000 10.000	150 0.0682	17.075 0.0 0.682			Vel = 6.75
M2			0.0 20.02						17.757			K Factor = 4.75
M1 to M2	11 11		19.36 19.36	1 1.101		0.0 0.0 0.0	15.875 0.0 15.875	150 0.0641	16.740 0.0 1.017			Vel = 6.52
M2 to TOR	11 11		20.03 39.39	1 1.101	N	7.0 0.0 0.0	8.083 7.000 15.083	150 0.2384	17.757 0.0 3.596			Vel = 13.27
TOR			0.0 39.39						21.353			K Factor = 8.52
TOR to BOR	11 3		39.39 39.39	1 1.101	N	7.0 0.0 0.0	8.000 7.000 15.000	150 0.2384	21.353 3.465 3.576			Vel = 13.27
BOR to UG1	3 3		0.0 39.39	1 1.101	2E	7.65 0.0 0.0	4.000 7.650 11.650	150 0.2384	28.394 0.0 2.777			Vel = 13.27
UG1 to UG2	3 -3	H3	3.00 42.39	1.25 1.394	T 2E	9.523 9.523 0.0	55.000 19.046 74.046	150 0.0865	31.171 2.599 6.408			Vel = 8.91
UG2 to UG3	-3 -3		0.0 42.39	6 6.09	3E 2F	64.749 21.583 0.0	326.000 86.332 412.332	150 0.0001	40.178 0.0 0.027			Vel = 0.47
UG3 to UG4	-3 -3		0.0 42.39	6 6.09	2G 3F	9.25 32.374 0.0	1149.000 41.623 1190.623	150 0.0001	40.205 0.0 0.078			Vel = 0.47
UG4 to TEST	-3 3		0.0 42.39	6 6.16	T 2E G	48.896 45.637 4.89	1000.000 99.422 1099.422	150 0.0001	40.283 -2.599 0.069			Vel = 0.46
TEST			0.0 42.39						37.753			K Factor = 6.90

Final Calculations : Hazen-Williams

FIRE & LIFE SAFETY AMERICA
OAK HAVEN LOT 34 - 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			
