

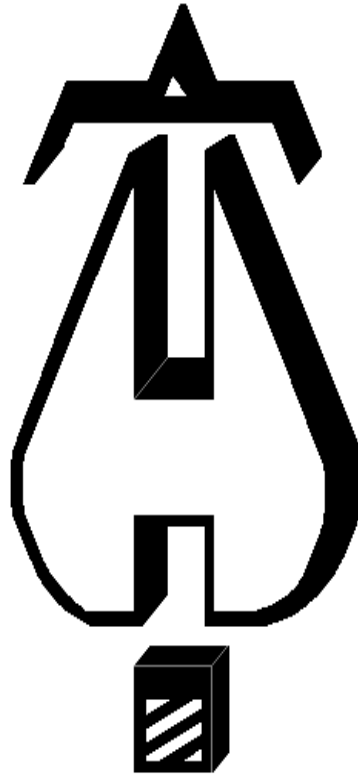


1731 Round Rock Drive, Raleigh, NC 27615 • (919) 872-3250 • fax (919) 877-5775 • www.flsamerica.com

OAKHAVEN LOT 8

HYDRAULIC CALCULATIONS

8/26/2021



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 8- Great Room
Drawing : FP1
Location : 294 Oakhaven Drive
Remote Area : RA1
Contract : 21NC1532
Data File : RA1.WXF

HYDRAULIC CALCULATIONS
for

Project name: Oak Haven Lot 08
Location: 294 Oakhaven Drive
Drawing no: FP1
Date: 8/26/2021

Design

Remote area number: RA1
Remote area location: Great Room
Occupancy classification: Residential
Density: .05 - Gpm/SqFt
Area of application: 324 - 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): 29.33 - GPM @ 36.68 - 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 8- Great Room

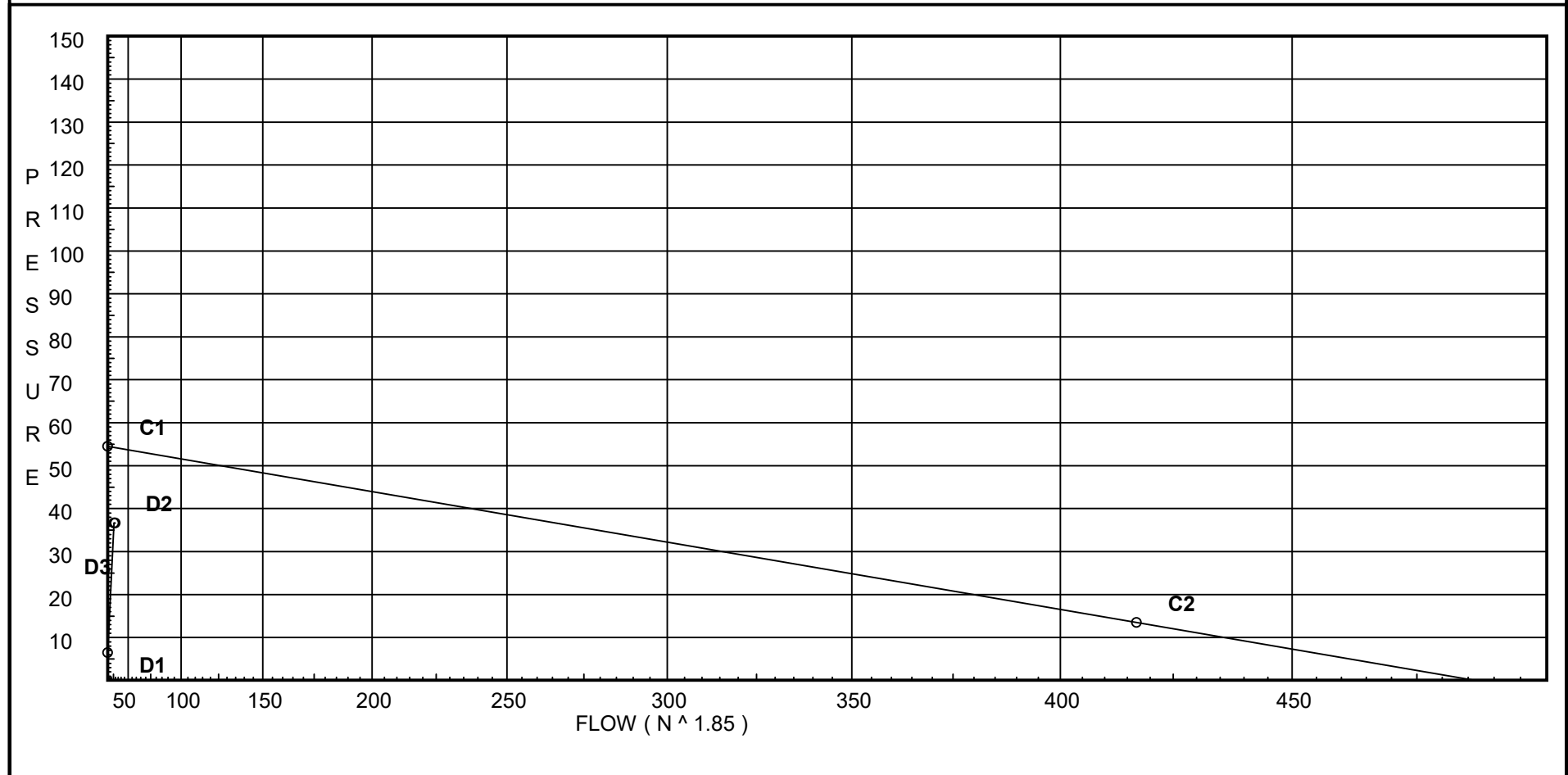
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City Water Supply:

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

Demand:

D1 - Elevation : 6.496
D2 - System Flow : 26.325
D2 - System Pressure : 36.684
Hose (Demand) : 3
D3 - System Demand : 29.325
Safety Margin : 17.514



Fittings Used Summary

Fire & Life Safety America
Oakhaven Lot 8- Great Room

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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'EII 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 8- Great Room

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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	54.198	29.32	36.684

NODE ANALYSIS

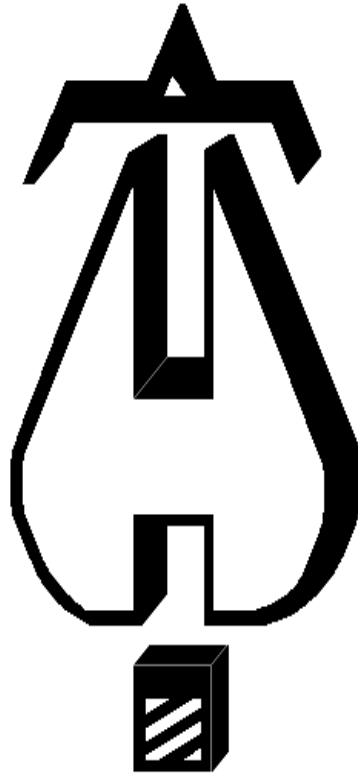
<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
S101	18.0	4.9	7.0	12.96	
S102	18.0	4.9	7.43	13.36	
101	19.0		6.81		
102	19.0		7.19		
M101	19.0		9.37		
M102	10.0		15.38		
M103	10.0		17.19		
M104	10.0		22.73		
TOR	8.0		27.68		
BOR	3.0		32.03		
UG1	3.0		33.35	3.0	
UG2	-3.0		39.19		
UG3	-3.0		39.24		
TEST	3.0		36.68		

Final Calculations : Hazen-Williams

Fire & Life Safety America
Oakhaven Lot 8- Great Room

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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	18 19	4.90	12.96 12.96	1 1.101	N 0.0	7.0 0.0 8.000	150 0.0305	7.000 -0.433 0.244		Vel = 4.37	
101			0.0 12.96					6.811		K Factor = 4.97	
S102 to 102	18 19	4.90	13.36 13.36	1 1.101	O 0.0	5.0 0.0 6.000	150 0.0323	7.434 -0.433 0.194		Vel = 4.50	
102			0.0 13.36					7.195		K Factor = 4.98	
101 to 102	19 19		12.96 12.96	1 1.101		0.0 0.0 12.583	150 0.0305	6.811 0.0 0.384		Vel = 4.37	
102 to M101	19 19		13.36 26.32	1 1.101	O N 0.0	5.0 7.0 19.250	150 0.1131	7.195 0.0 2.177		Vel = 8.87	
M101 to M102	19 10		0.0 26.32	1 1.101	O N 0.0	5.0 7.0 18.667	150 0.1131	9.372 3.898 2.112		Vel = 8.87	
M102 to M103	10 10		0.0 26.32	1 1.101	N 0.0	7.0 0.0 16.000	150 0.1131	15.382 0.0 1.810		Vel = 8.87	
M103 to M104	10 10		0.0 26.32	1 1.101	N 2O 0.0	7.0 10.0 48.917	150 0.1131	17.192 0.0 5.533		Vel = 8.87	
M104 to TOR	10 8		0.0 26.32	1 1.101	3N 0.0	21.0 0.0 36.167	150 0.1131	22.725 0.866 4.092		Vel = 8.87	
TOR			0.0 26.32					27.683		K Factor = 5.00	
TOR to BOR	8 3		26.32 26.32	1 1.101	N Ball 0.0	7.0 4.303 11.303 19.303	150 0.1131	27.683 2.166 2.183		Vel = 8.87	
BOR to UG1	3 3		0.0 26.32	1 1.101	2E 0.0	7.65 0.0 11.650	150 0.1131	32.032 0.0 1.318		Vel = 8.87	
UG1 to UG2	3 -3	H3	3.00 29.32	1.25 1.394	T 2E 0.0	9.523 9.523 74.046	150 0.0438	33.350 2.599 3.240		Vel = 6.16	
UG2 to UG3	-3 -3		0.0 29.32	6 6.09	2G 3E 2F	9.25 64.749 21.583 1642.831	150 0	39.189 0.0 0.055		Vel = 0.32	
UG3 to TEST	-3 3		0.0 29.32	6 6.16	T 2E G	43.037 40.168 4.304 1087.509	140 0	39.244 -2.599 0.039		Vel = 0.32	
TEST			0.0 29.32					36.684		K Factor = 4.84	



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 8- Bonus Room
Drawing : FP1
Location : 294 Oakhaven Drive
Remote Area : RA2
Contract : 21NC1532
Data File : RA2.WXF

HYDRAULIC CALCULATIONS
for

Project name: Oak Haven Lot 08
Location: 294 Oakhaven Drive
Drawing no: FP1
Date: 8/26/2021

Design

Remote area number: RA2
Remote area location: Bonus Room
Occupancy classification: Residential
Density: .05 - Gpm/SqFt
Area of application: 200 - 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 @ 35.71 - 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.)

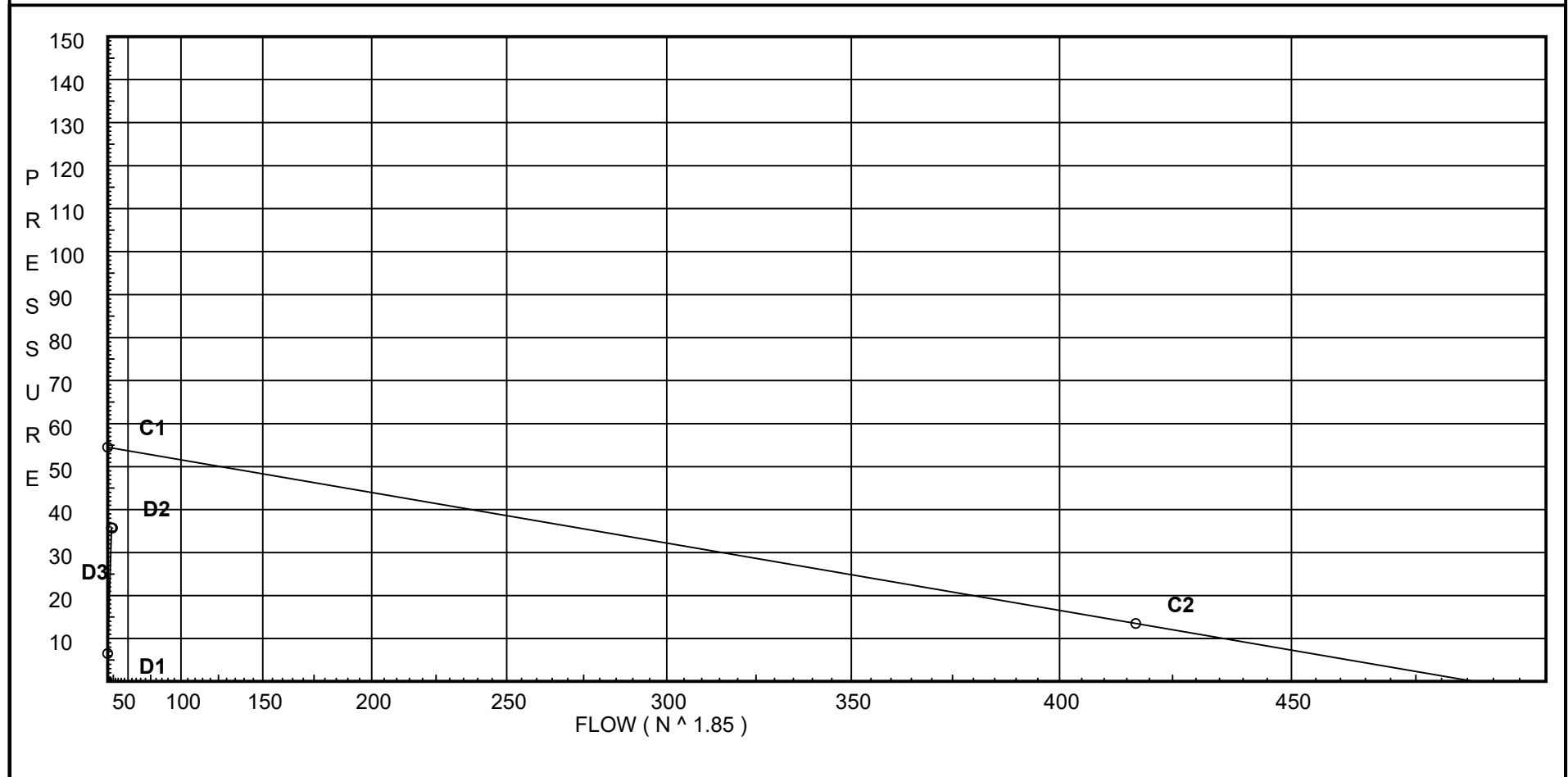
Water Supply Curve C

Fire & Life Safety America
Oakhaven Lot 8- Bonus Room

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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 : 20.024
D2 - System Pressure : 35.704
Hose (Demand) : 3
D3 - System Demand : 23.024
Safety Margin : 18.602



Fittings Used Summary

Fire & Life Safety America
Oakhaven Lot 8- Bonus Room

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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

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Flow Summary - NFPA

Fire & Life Safety America
Oakhaven Lot 8- Bonus Room

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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	35.704

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	16.7	20.02	
201	19.0		16.81		
M201	10.0		21.91		
M202	10.0		22.87		
M104	10.0		25.96		
TOR	8.0		29.3		
BOR	3.0		32.78		
UG1	3.0		33.57	3.0	
UG2	-3.0		38.24		
UG3	-3.0		38.28		
TEST	3.0		35.7		

Final Calculations : Hazen-Williams

Fire & Life Safety America
Oakhaven Lot 8- Bonus Room

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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	*****
S201 to 201	18 19	4.90	20.02	1	N	7.0 0.0	1.000 7.000	150	16.700 -0.433			
			20.02	1.101		0.0	8.000	0.0681	0.545	Vel =	6.75	
			0.0 20.02						16.812	K Factor =	4.88	
201 to M201	19 10		20.02	1	N O	7.0 5.0	5.625 12.000	150	16.812 3.898			
			20.02	1.101		0.0	17.625	0.0682	1.202	Vel =	6.75	
M201 to M202	10 10		0.0	1	O	5.0 0.0	9.000 5.000	150	21.912 0.0			
			20.02	1.101		0.0	14.000	0.0682	0.955	Vel =	6.75	
M202 to M104	10 10		0.0	1	N 2O	7.0 10.0	28.333 17.000	150	22.867 0.0			
			20.02	1.101		0.0	45.333	0.0682	3.091	Vel =	6.75	
M104 to TOR	10 8		0.0	1	3N	21.0 0.0	15.250 21.000	150	25.958 0.866			
			20.02	1.101		0.0	36.250	0.0682	2.473	Vel =	6.75	
			0.0 20.02						29.297	K Factor =	3.70	
TOR to BOR	8 3		20.02	1	N Ball	7.0 4.303	8.000 11.303	150	29.297 2.166			
			20.02	1.101		0.0	19.303	0.0681	1.315	Vel =	6.75	
BOR to UG1	3 3		0.0	1	2E	7.65 0.0	4.000 7.650	150	32.778 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	33.573 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	1547.250 95.581	150	38.243 0.0			
			23.02	6.09	2F	21.583	1642.831	0	0.035	Vel =	0.25	
UG3 to TEST	-3 3		0.0	6	T 2E	43.037 40.168	1000.000 87.509	140	38.278 -2.599			
			23.02	6.16	G	4.304	1087.509	0	0.025	Vel =	0.25	
			0.0 23.02						35.704	K Factor =	3.85	