ISO 9001: 2008 Certified

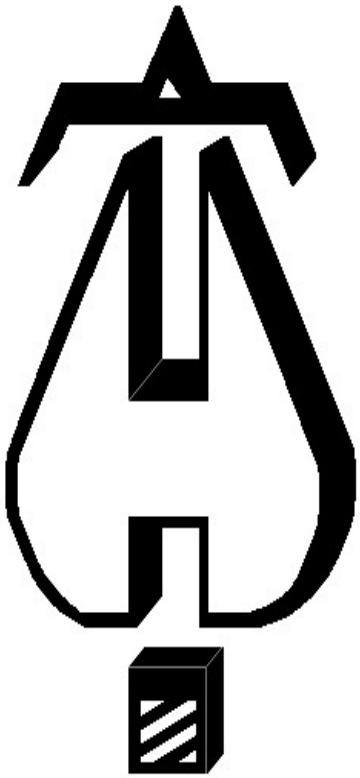
FLSA FIRE & LIFE SAFETY AMERICA PROTECTING AMERICA

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

OAKHAVEN LOT 01

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 01 - RA1
Drawing	:	FP1
Location	:	160 Oak Haven Drive
Remote Area	:	RA1
Contract	:	21NC1513
Data File	:	RA1.WXF

HYDRAULIC CALCULATIONS
for

Project name: Oak Haven Lot 01
Location: 160 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: 230 - 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 @ 29.52 - 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.)

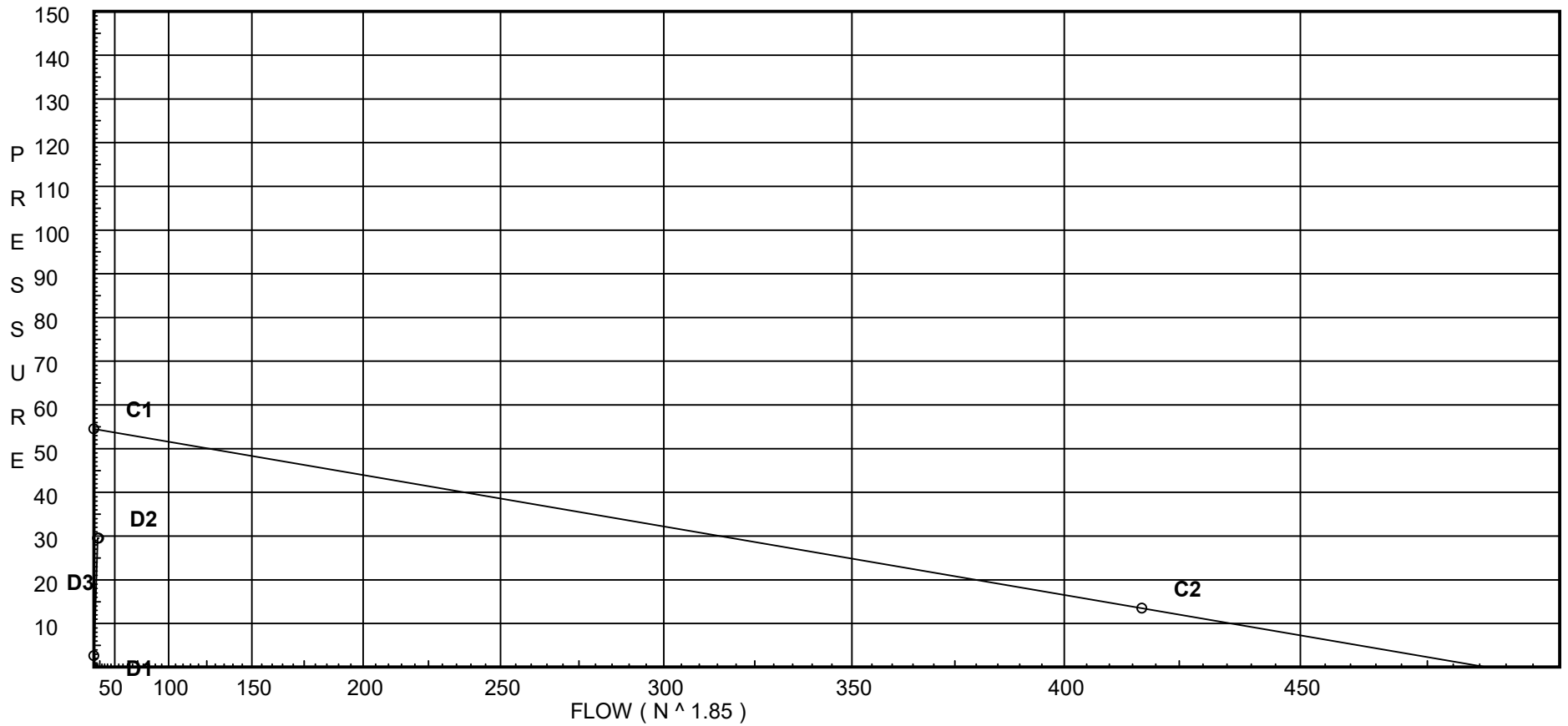
Water Supply Curve C

Fire & Life Safety America
Oak Haven Lot 01 - RA1

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 : 29.526
- Hose (Demand) : 3
- D3 - System Demand : 23.024
- Safety Margin : 24.782



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	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'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.

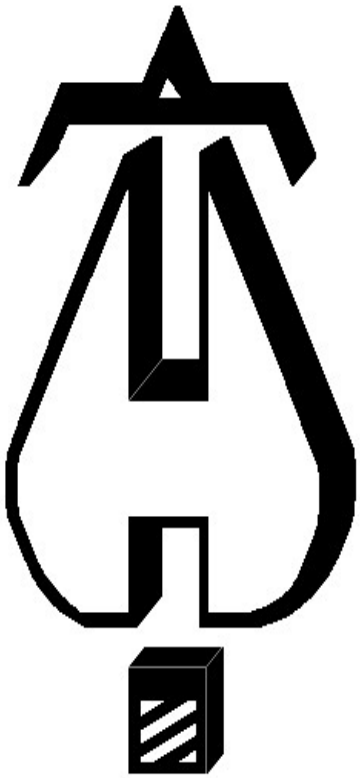
SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
TEST	54.5	13.5	417.0	54.307	23.02	29.526

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
S101	9.0	4.9	16.7	20.02	
101	10.0		17.32		
M101	10.0		18.16		
M102	10.0		19.28		
M103	10.0		20.77		
TOR	8.0		23.42		
BOR	3.0		26.61		
UG1	3.0		27.41	3.0	
UG2	-3.0		32.08		
UG3	-3.0		32.1		
TEST	3.0		29.53		

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	9	4.90	20.02	1	2N	14.0	1.500	150	16.700	
to						0.0	14.000		-0.433	
101	10		20.02	1.101		0.0	15.500	0.0682	1.057	Vel = 6.75
			0.0							
101			20.02						17.324	K Factor = 4.81
101	10		20.02	1	O	5.0	7.250	150	17.324	
to						0.0	5.000		0.0	
M101	10		20.02	1.101		0.0	12.250	0.0682	0.835	Vel = 6.75
			0.0							
M101			20.02						18.159	K Factor = 4.70
M101	10		20.02	1	O	5.0	11.375	150	18.159	
to						0.0	5.000		0.0	
M102	10		20.02	1.101		0.0	16.375	0.0682	1.117	Vel = 6.75
M102	10		0.0	1	O	5.0	16.917	150	19.276	
to						0.0	5.000		0.0	
M103	10		20.02	1.101		0.0	21.917	0.0682	1.494	Vel = 6.75
M103	10		0.0	1	2O	10.0	16.208	150	20.770	
to						0.0	10.000		0.866	
TOR	8		20.02	1.101		0.0	26.208	0.0682	1.788	Vel = 6.75
			0.0							
TOR			20.02						23.424	K Factor = 4.14
TOR	8		20.02	1	N	7.0	8.000	150	23.424	
to						0.0	7.000		2.166	
BOR	3		20.02	1.101		0.0	15.000	0.0681	1.022	Vel = 6.75
BOR	3		0.0	1	2E	7.65	4.000	150	26.612	
to						0.0	7.650		0.0	
UG1	3		20.02	1.101		0.0	11.650	0.0682	0.795	Vel = 6.75
UG1	3	H3	3.00	1.25	T	9.523	55.000	150	27.407	
to					2E	9.523	19.046		2.599	
UG2	-3		23.02	1.394		0.0	74.046	0.0280	2.071	Vel = 4.84
UG2	-3		0.0	6	2G	9.25	937.417	150	32.077	
to					3E	64.749	95.581		0.0	
UG3	-3		23.02	6.09	2F	21.583	1032.998	0	0.022	Vel = 0.25
UG3	-3		0.0	6	T	43.037	1000.000	140	32.099	
to					2E	40.168	87.509		-2.599	
TEST	3		23.02	6.16	G	4.304	1087.509	0	0.026	Vel = 0.25
			0.0							
TEST			23.02						29.526	K Factor = 4.24



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	:	160 Oak Haven Drive
Remote Area	:	RA2
Contract	:	21NC1513
Data File	:	RA2.WXF

HYDRAULIC CALCULATIONS
for

Project name: Oak Haven Lot 01
Location: 160 Oak Haven Drive
Drawing no: FP1
Date: 4/22/2021

Design

Remote area number: RA2
Remote area location: KITCHEN/NOOK
Occupancy classification: Residential
Density: .05 - Gpm/SqFt
Area of application: 333 - 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): 28.99 - GPM @ 23.86 - 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.)

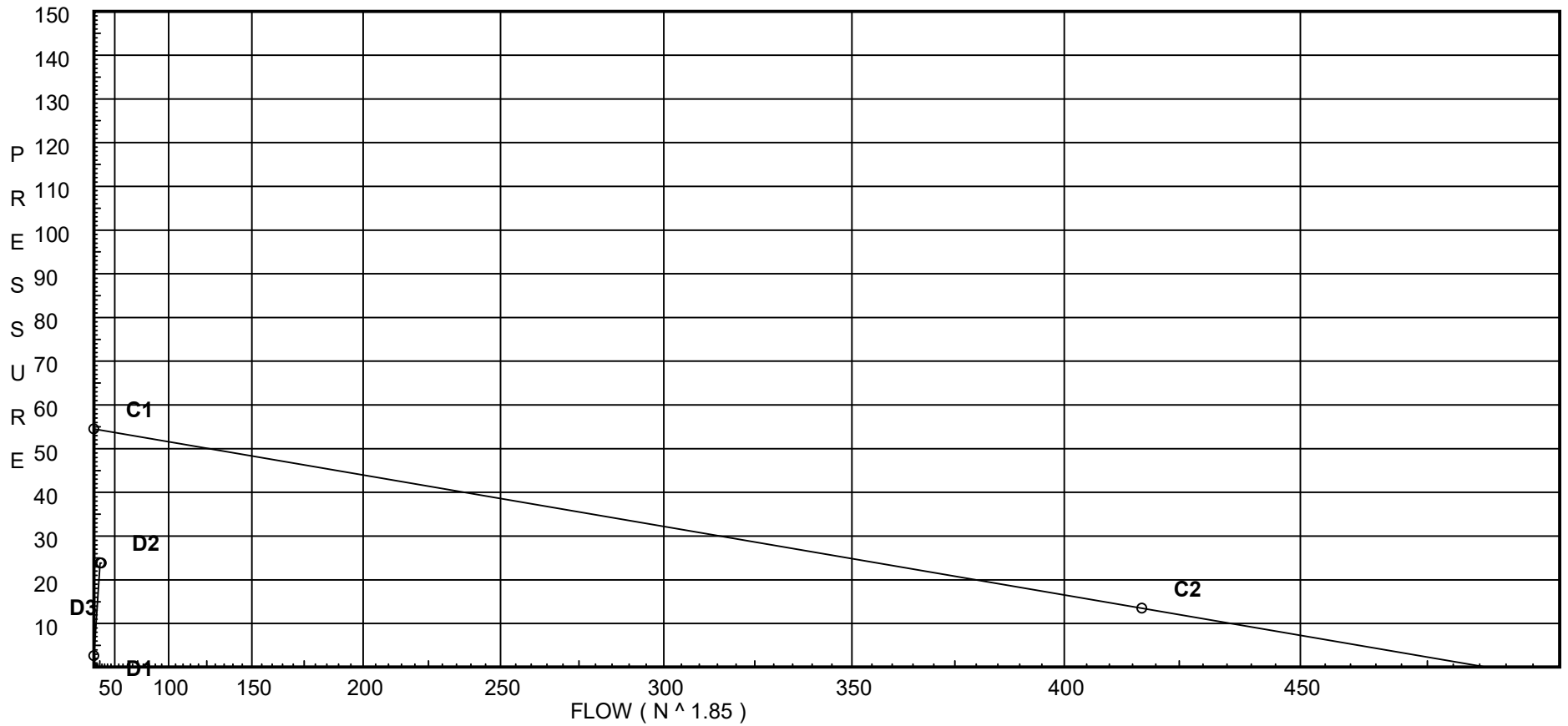
Water Supply Curve C

Fire & Life Safety America
Oak Haven Lot 06 - RA2

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 : 25.993
- D2 - System Pressure : 23.860
- Hose (Demand) : 3
- D3 - System Demand : 28.993
- Safety Margin : 30.345



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	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'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

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
TEST	54.5	13.5	417.0	54.204	28.99	23.86

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
S201	9.0	4.9	7.0	12.96	
S202	9.0	4.9	7.07	13.03	
201	10.0		6.81		
202	10.0		6.88		
M201	10.0		7.09		
M102	10.0		8.88		
M103	10.0		11.3		
TOR	8.0		15.5		
BOR	3.0		19.33		
UG1	3.0		20.61	3.0	
UG2	-3.0		26.39		
UG3	-3.0		26.42		
TEST	3.0		23.86		

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	9	4.90	12.96	1	N	7.0	1.000	150	7.000	
to						0.0	7.000		-0.433	
201	10		12.96	1.101		0.0	8.000	0.0305	0.244	Vel = 4.37
			0.0							
201			12.96						6.811	K Factor = 4.97
S202	9	4.90	13.03	1	N	7.0	1.000	150	7.070	
to						0.0	7.000		-0.433	
202	10		13.03	1.101		0.0	8.000	0.0308	0.246	Vel = 4.39
			0.0							
202			13.03						6.883	K Factor = 4.97
201	10		12.96	1	O	5.0	4.208	150	6.811	
to						0.0	5.000		0.0	
M201	10		12.96	1.101		0.0	9.208	0.0305	0.281	Vel = 4.37
			0.0							
M201			12.96						7.092	K Factor = 4.87
202	10		13.03	1		0.0	6.792	150	6.883	
to						0.0	0.0		0.0	
M201	10		13.03	1.101		0.0	6.792	0.0308	0.209	Vel = 4.39
			0.0							
M201			13.03						7.092	K Factor = 4.89
M201	10		25.99	1	O	5.0	11.167	150	7.092	
to						0.0	5.000		0.0	
M102	10		25.99	1.101		0.0	16.167	0.1105	1.786	Vel = 8.76
M102	10		0.0	1	O	5.0	16.917	150	8.878	
to						0.0	5.000		0.0	
M103	10		25.99	1.101		0.0	21.917	0.1105	2.422	Vel = 8.76
M103	10		0.0	1	2N	14.0	16.208	150	11.300	
to						0.0	14.000		0.866	
TOR	8		25.99	1.101		0.0	30.208	0.1105	3.338	Vel = 8.76
			0.0							
TOR			25.99						15.504	K Factor = 6.60
TOR	8		25.99	1	N	7.0	8.000	150	15.504	
to						0.0	7.000		2.166	
BOR	3		25.99	1.101		0.0	15.000	0.1105	1.657	Vel = 8.76
BOR	3		0.0	1	2E	7.65	4.000	150	19.327	
to						0.0	7.650		0.0	
UG1	3		25.99	1.101		0.0	11.650	0.1105	1.287	Vel = 8.76
UG1	3	H3	3.00	1.25	T	9.523	55.000	150	20.614	
to					2E	9.523	19.046		2.599	
UG2	-3		28.99	1.394		0.0	74.046	0.0429	3.173	Vel = 6.09
UG2	-3		0.0	6	2G	9.25	937.417	150	26.386	
to					3E	64.749	95.581		0.0	
UG3	-3		28.99	6.09	2F	21.583	1032.998	0	0.034	Vel = 0.32
UG3	-3		0.0	6	T	43.037	1000.000	140	26.420	
to					2E	40.168	87.509		-2.599	
TEST	3		28.99	6.16	G	4.304	1087.509	0	0.039	Vel = 0.31
			0.0							
TEST			28.99						23.860	K Factor = 5.93

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	******