ISO 9001: 2008 Certified

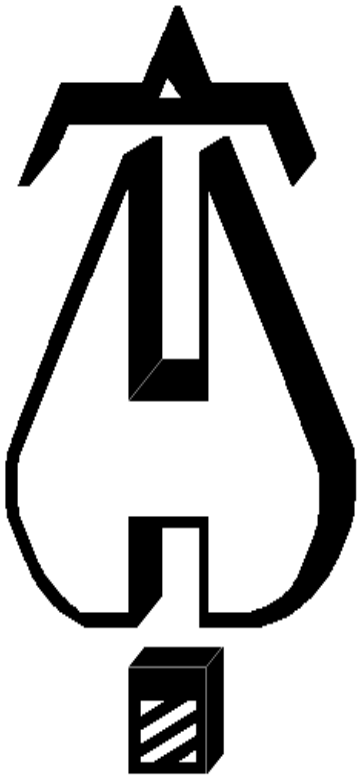
FLSA FIRE & LIFE SAFETY AMERICA PROTECTING AMERICA

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

OAKHAVEN LOT 22

HYDRAULIC CALCULATIONS

12/20/2021



Hydraulic calculations using HydraCALC

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

Job Name	:	Oakhaven Lot 22
Drawing	:	FP2
Location	:	70 Oakhaven Dr.
Remote Area	:	RA1
Contract	:	22NC1553
Data File	:	RA1- Master Bedroom.WXF

HYDRAULIC CALCULATIONS
for

Project name: Oakhaven Lot 22
Location: 70 Oakhaven Dr.
Drawing no: FP2
Date: 12/20/2021

Design

Remote area number: RA1
Remote area location: Master Bedroom
Occupancy classification: Residential
Density: .05 - Gpm/SqFt
Area of application: 221 - 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): 23.024 - GPM @ 29.276 - Psi
Type of system: WET, CPVC 13D
Volume of dry or preaction system: N/A - Gal

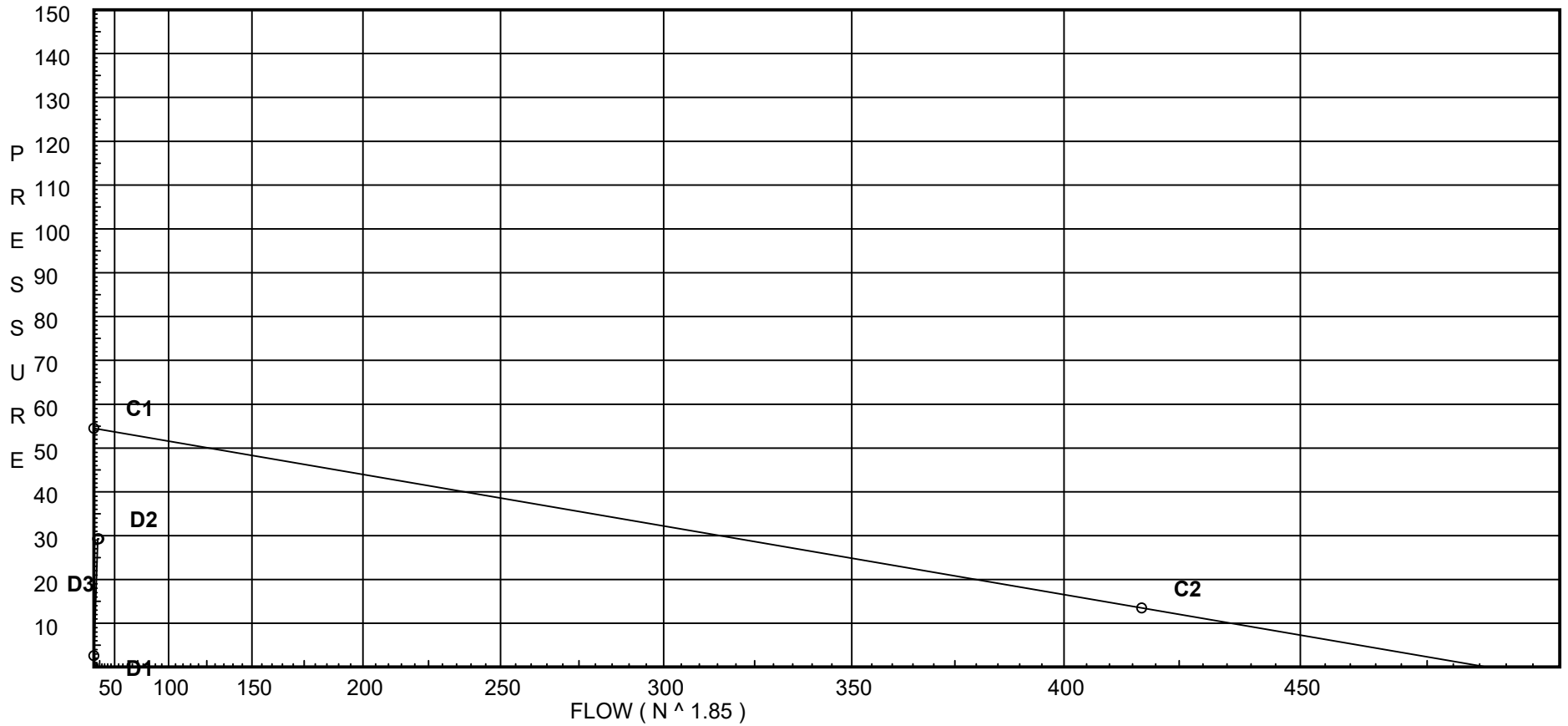
Water supply information

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: R. COLLINS
Authority having jurisdiction: Harnett County
Notes: (Include peaking information or gridded systems here.)

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 : 29.276
- Hose (Demand) : 3
- D3 - System Demand : 23.024
- Safety Margin : 25.031



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.

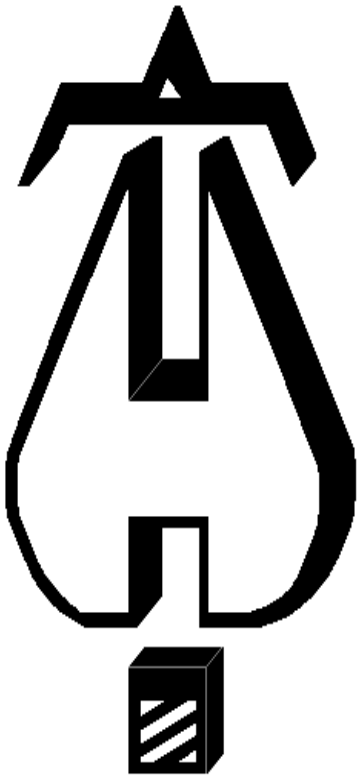
SUPPLY ANALYSIS

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	29.276

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		16.81		
M101	10.0		18.93		
M102	10.0		20.11		
TOR	8.0		23.17		
BOR	3.0		26.35		
UG1	3.0		27.15	3.0	
UG2	-3.0		31.82		
UG3	0.0		30.53		
UG4	-3.0		31.85		
TEST	3.0		29.28		

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	N	7.0	1.000	150	16.700	
to						0.0	7.000		-0.433	
101	10		20.02	1.101		0.0	8.000	0.0681	0.545	Vel = 6.75
			0.0							
101			20.02						16.812	K Factor = 4.88
101	10		20.02	1	N	7.0	19.125	150	16.812	
to					O	5.0	12.000		0.0	
M101	10		20.02	1.101		0.0	31.125	0.0682	2.123	Vel = 6.75
M101	10		0.0	1	O	5.0	12.292	150	18.935	
to						0.0	5.000		0.0	
M102	10		20.02	1.101		0.0	17.292	0.0682	1.179	Vel = 6.75
M102	10		0.0	1	O	5.0	13.042	150	20.114	
to					2N	14.0	19.000		0.866	
TOR	8		20.02	1.101		0.0	32.042	0.0682	2.185	Vel = 6.75
			0.0							
TOR			20.02						23.165	K Factor = 4.16
TOR	8		20.02	1	N	7.0	8.000	150	23.165	
to						0.0	7.000		2.166	
BOR	3		20.02	1.101		0.0	15.000	0.0682	1.023	Vel = 6.75
BOR	3		0.0	1	2E	7.65	4.000	150	26.354	
to						0.0	7.650		0.0	
UG1	3		20.02	1.101		0.0	11.650	0.0682	0.794	Vel = 6.75
UG1	3	H3	3.00	1.25	T	9.523	55.000	150	27.148	
to					2E	9.523	19.046		2.599	
UG2	-3		23.02	1.394		0.0	74.046	0.0280	2.072	Vel = 4.84
UG2	-3		0.0	6	3E	64.749	326.000	150	31.819	
to					2F	21.583	86.332		-1.299	
UG3	0		23.02	6.09		0.0	412.332	0	0.008	Vel = 0.25
UG3	0		0.0	6	2G	9.25	1149.000	150	30.528	
to					3F	32.374	41.623		1.299	
UG4	-3		23.02	6.09		0.0	1190.623	0	0.026	Vel = 0.25
UG4	-3		0.0	6	T	48.896	1000.000	150	31.853	
to					2E	45.637	99.422		-2.599	
TEST	3		23.02	6.16	G	4.89	1099.422	0	0.022	Vel = 0.25
			0.0							
TEST			23.02						29.276	K Factor = 4.25



Hydraulic calculations using HydraCALC

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

Job Name	:	Oakhaven Lot 22
Drawing	:	FP2
Location	:	70 BUCKHAVEN DR.
Remote Area	:	RA2
Contract	:	22NC1553
Data File	:	RA2- Kitchen.WXF

HYDRAULIC CALCULATIONS
for

Project name: Oakhaven Lot 22
Location: 70 BUCKHAVEN DR.
Drawing no: FP2
Date: 12/20/2021

Design

Remote area number: RA2
Remote area location: Kitchen
Occupancy classification: Residential
Density: .05 - Gpm/SqFt
Area of application: 314 - 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): 29.050 - GPM @ 25.882 - Psi
Type of system: WET CPVC 13D
Volume of dry or preaction system: N/A - Gal

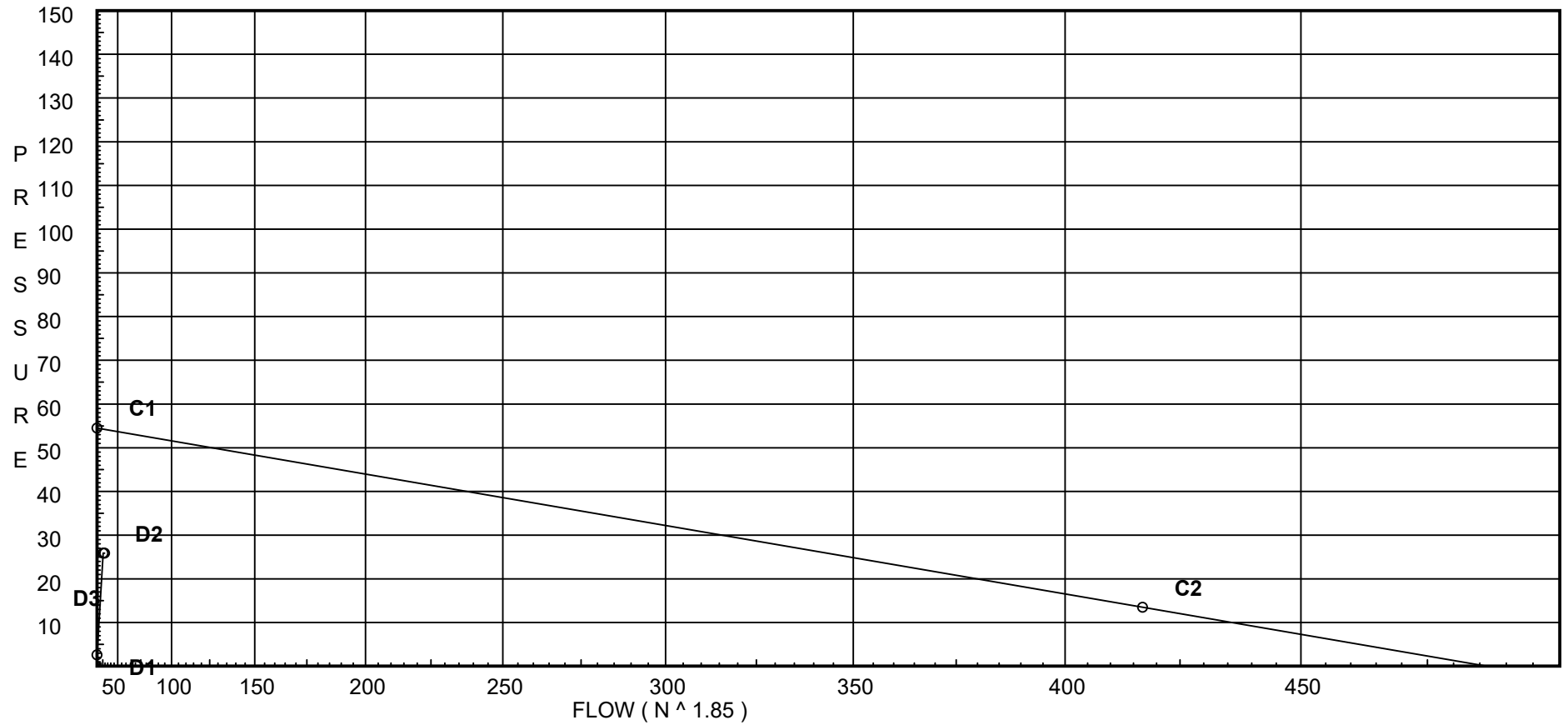
Water supply information

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: R. COLLINS
Authority having jurisdiction: Harnett County
Notes: (Include peaking information or gridded systems here.)

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 : 26.05
- D2 - System Pressure : 25.882
- Hose (Demand) : 3
- D3 - System Demand : 29.05
- Safety Margin : 28.321



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	54.203	29.05	25.882

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	7.13	13.09	
201	10.0		6.81		
202	10.0		6.95		
M201	10.0		7.31		
M202	10.0		8.83		
M101	10.0		11.15		
M102	10.0		13.07		
TOR	8.0		17.49		
BOR	3.0		21.32		
UG1	3.0		22.61	3.0	
UG2	-3.0		28.39		
UG3	0.0		27.11		
UG4	-3.0		28.45		
TEST	3.0		25.88		

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	13.09	1	N	7.0	1.000	150	7.132	
to						0.0	7.000		-0.433	
202	10		13.09	1.101		0.0	8.000	0.0310	0.248	Vel = 4.41
			0.0							
202			13.09						6.947	K Factor = 4.97
201	10		12.96	1	N	7.0	9.417	150	6.811	
to						0.0	7.000		0.0	
M201	10		12.96	1.101		0.0	16.417	0.0305	0.501	Vel = 4.37
			0.0							
M201			12.96						7.312	K Factor = 4.79
202	10		13.09	1	O	5.0	6.750	150	6.947	
to						0.0	5.000		0.0	
M201	10		13.09	1.101		0.0	11.750	0.0311	0.365	Vel = 4.41
			0.0							
M201			13.09						7.312	K Factor = 4.84
M201	10		26.05	1	O	5.0	8.667	150	7.312	
to						0.0	5.000		0.0	
M202	10		26.05	1.101		0.0	13.667	0.1109	1.516	Vel = 8.78
M202	10		0.0	1	O	5.0	15.917	150	8.828	
to						0.0	5.000		0.0	
M101	10		26.05	1.101		0.0	20.917	0.1110	2.321	Vel = 8.78
M101	10		0.0	1	O	5.0	12.292	150	11.149	
to						0.0	5.000		0.0	
M102	10		26.05	1.101		0.0	17.292	0.1109	1.918	Vel = 8.78
M102	10		0.0	1	O	5.0	13.042	150	13.067	
to					2N	14.0	19.000		0.866	
TOR	8		26.05	1.101		0.0	32.042	0.1109	3.555	Vel = 8.78
			0.0							
TOR			26.05						17.488	K Factor = 6.23
TOR	8		26.05	1	N	7.0	8.000	150	17.488	
to						0.0	7.000		2.166	
BOR	3		26.05	1.101		0.0	15.000	0.1109	1.664	Vel = 8.78
BOR	3		0.0	1	2E	7.65	4.000	150	21.318	
to						0.0	7.650		0.0	
UG1	3		26.05	1.101		0.0	11.650	0.1109	1.292	Vel = 8.78
UG1	3	H3	3.00	1.25	T	9.523	55.000	150	22.610	
to					2E	9.523	19.046		2.599	
UG2	-3		29.05	1.394		0.0	74.046	0.0430	3.185	Vel = 6.11
UG2	-3		0.0	6	3E	64.749	326.000	150	28.394	
to					2F	21.583	86.332		-1.299	
UG3	0		29.05	6.09		0.0	412.332	0	0.013	Vel = 0.32
UG3	0		0.0	6	2G	9.25	1149.000	150	27.108	
to					3F	32.374	41.623		1.299	
UG4	-3		29.05	6.09		0.0	1190.623	0	0.040	Vel = 0.32

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	-3		0.0	6	T	48.896	1000.000	150	28.447			
to					2E	45.637	99.422		-2.599			
TEST	3		29.05	6.16	G	4.89	1099.422	0	0.034	Vel = 0.31		
			0.0									
TEST			29.05						25.882	K Factor = 5.71		