

Life Safety Fire Protection
Fire Sprinklers Save Lives
97 Lower Jaffrey Road - Dublin NH

H Y D R A U L I C C A L C U L A T I O N S

C O V E R S H E E T

Bramhall Row - 749 Congress Street

W A T E R S U P P L Y

STATIC PRESSURE (psi) 55
RESIDUAL PRESSURE (psi) 53
RESIDUAL FLOW (gpm) 1779

B O O S T E R P U M P S

NUMBER OF BOOSTER PUMPS 0

S P R I N K L E R S

MINIMUM FLOW PER SPRINKLER (gpm) 13
MINIMUM PRESSURE PER SPRINKLER (psi) 7.04

THIS SYSTEM OPERATES AT A FLOW OF 0.00 gpm AT A PRESSURE OF 0.00 psi
AT THE BASE OF THE RISER (REF. PT. 0)

PIPES USED FOR THIS SYSTEM

=====

111 DUCTILE IRON (350)
002 SCHEDULE 10
009 BLAZEMASTER CPVC

~~~~~  
SYSTEM ANALYSIS TO SHOW MAXIMUM FLOW  
WITH ZERO PRESSURE REMAINING  
~~~~~

THE FOLLOWING SPRINKLERS ARE OPERATING IN:

TEST AREA 1 TEST AREA 2 TEST AREA 3 REMOTE AREA

Elevation of sprinklers = Elevation above water test.

REF. PT.	K	ELEV. ft	FLOW gpm	PRESSURE psi
50	4.90	36.00	17.76	13.13
51	4.90	36.00	16.41	11.22
52	4.90	36.00	16.18	10.91

THE SPRINKLER SYSTEM FLOW IS 50.36 gpm

THE OUTSIDE HOSE FLOW AT REFERENCE POINT NO. 1 IS 0.00 gpm

THE INSIDE HOSE RACK SPKLR'S. IS 0.00 gpm

YARD HYDT. FLOW IS 0.00 gpm

THE FOLLOWING PRESSURES & FLOWS OCCUR
---> AT REF. PT. 1 <---

STATIC PRESSURE	55.00 psi	
RESIDUAL PRESSURE	53.00 psi	AT 1779.00 gpm
TOTAL SYSTEM FLOW	50.36 gpm	
AVAILABLE PRESSURE	55.00 psi	AT 50.36 gpm
OPERATING PRESSURE	55.00 psi	AT 50.36 gpm
PRESSURE REMAINING	0.00 psi	

THE ABOVE RESULTS INCLUDE 6.00 psi FRICTION LOSS AT REF. PT. # 2 FOR A

BACKFLOW PREVENTER METER
 DETECTOR CHECK VALVE OTHER DEVICE

Life Safety Fire Protection
Fire Sprinklers Save Lives

Bramhall Row - 749 Congress Street

PAGE 3

FITTING Equivalent Length per NFPA 13 1994, 6-4.3

'-' Indicates Equivalent Length. 'T' Indicates Threaded Fitting

1=45 Elbow, 2=90 Elbow, 3='T'/Cross, 4=Butterfly Valve, 5=Gate Valve, 6=Swing Check Valve

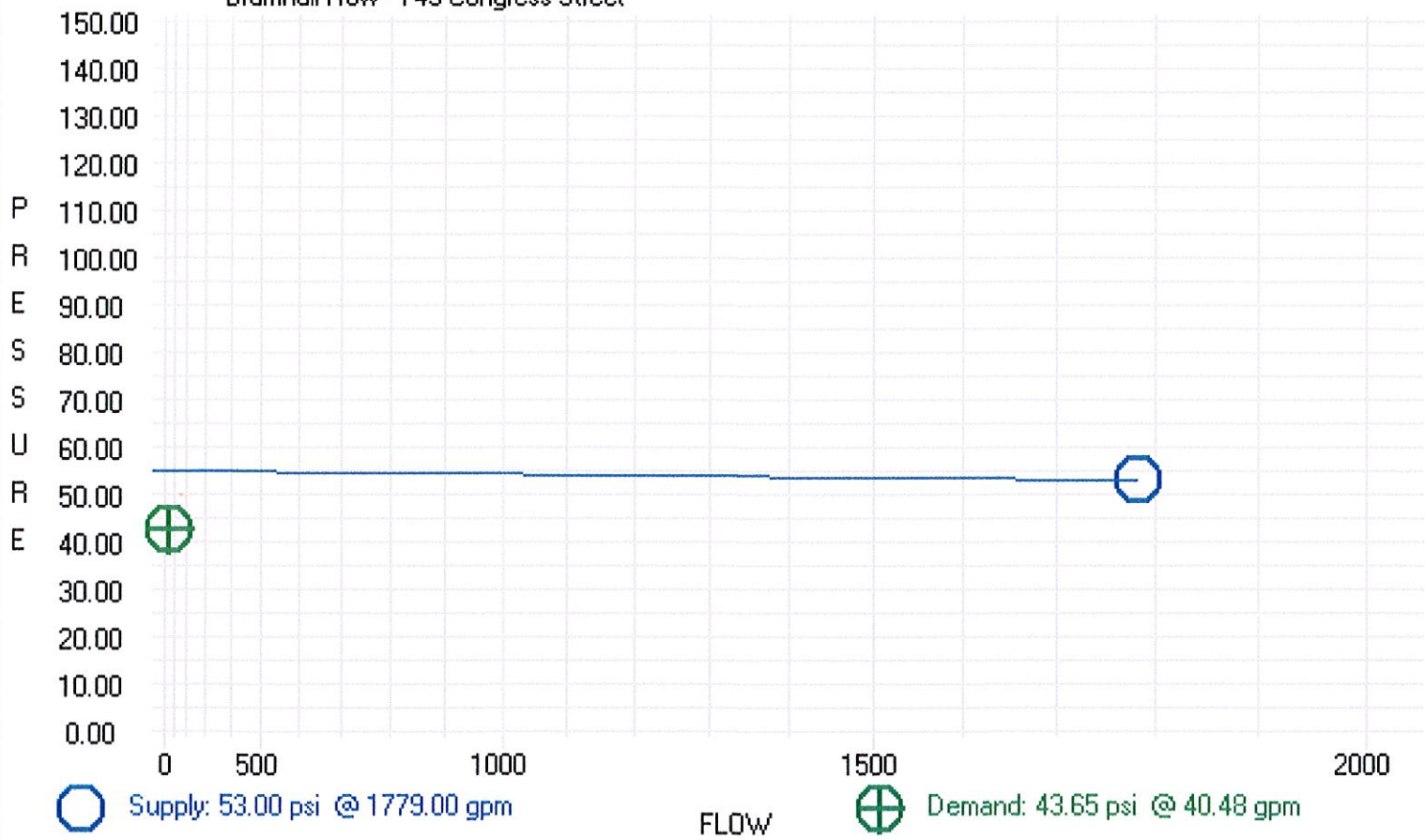
FROM	TO	FLOW (gpm)	PIPE (ft)	FITS	EQV. (ft)	H-W C	PIPE TYPE	DIA. (in)	FRIC. (psi)	ELEV. (psi)	FROM (psi)	TO (psi)	DIFF (psi)
1	2	40.48	226.00	2223	98.50	140	111	6.400	0.000	0.867	43.65	42.76	0.02
2	3	40.48	11.00	222	12.93	120	2	2.157	0.014	3.033	42.76	33.39	6.34
3	4	40.48	12.00	23	21.03	150	9	2.003	0.014	0.000	33.39	32.94	0.45
4	5	40.48	30.00	2222	44.05	150	9	2.003	0.014	3.900	32.94	28.03	1.01
5	6	40.48	40.00	2222	36.07	150	9	1.602	0.040	0.000	28.03	24.97	3.07
6	7	40.48	40.00	2222	36.07	150	9	1.602	0.040	0.000	24.97	21.90	3.07
7	8	40.48	3.50	22	18.04	150	9	1.602	0.040	0.000	21.90	21.03	0.87
8	9	40.48	9.00	0	0.00	150	9	1.602	0.040	0.000	21.03	20.67	0.36
9	60	0.00	4.00	2	8.01	150	9	1.400	0.000	0.000	20.67	20.67	0.00
60	61	0.00	11.00	0	0.00	150	9	1.400	0.000	0.000	20.67	20.67	0.00
61	10	0.00	12.00	0	0.00	150	9	1.109	0.000	0.000	20.67	20.67	0.00
10	62	0.00	4.00	3	5.01	150	9	1.109	0.000	0.000	20.67	20.67	0.00
10	63	0.00	7.50	3	5.01	150	9	1.109	0.000	0.000	20.67	20.67	0.00
63	11	0.00	7.00	22	14.03	150	9	1.109	0.000	0.000	20.67	20.67	0.00
11	12	0.00	14.50	22	14.03	150	9	1.109	0.000	-3.900	20.67	24.57	0.00
12	72	0.00	3.00	23	12.02	150	9	1.109	0.000	0.000	24.57	24.57	0.00
12	71	0.00	14.00	33	10.01	150	9	1.109	0.000	0.000	24.57	24.57	0.00
8	70	0.00	19.00	2223	26.05	150	9	1.109	0.000	-3.900	21.03	24.93	-0.00
9	13	40.48	21.00	23	14.02	150	9	1.400	0.078	7.800	20.67	10.15	2.72
13	50	40.48	5.00	22	16.02	150	9	1.400	0.078	0.000	10.15	8.51	1.63
50	14	26.18	10.00	0	0.00	150	9	1.109	0.108	0.000	8.51	7.44	1.08
14	51	13.18	1.50	3	5.01	150	9	1.109	0.030	0.000	7.44	7.24	0.20
14	52	13.00	8.50	3	5.01	150	9	1.109	0.029	0.000	7.44	7.04	0.40

A MAX. VELOCITY OF 8.69 ft./sec. OCCURS BETWEEN REF. PT. 50 AND 14

Sprinkler-CALC Release 7.2 Win
By Walsh Engineering Inc.
North Kingstown R.I. U.S.A.

WATER SUPPLY/DEMAND GRAPH

Bramhall Row - 749 Congress Street



Sprinkler-CALC 7.2 Win

Life Safety Fire Protection
Fire Sprinklers Save Lives
97 Lower Jaffrey Road - Dublin NH

H Y D R A U L I C C A L C U L A T I O N S

C O V E R S H E E T

Bramhall Row - 749 Congress Street

W A T E R S U P P L Y

STATIC PRESSURE (psi) 55
RESIDUAL PRESSURE (psi) 53
RESIDUAL FLOW (gpm) 1779

B O O S T E R P U M P S

NUMBER OF BOOSTER PUMPS 0

S P R I N K L E R S

MINIMUM FLOW PER SPRINKLER (gpm) 13
MINIMUM PRESSURE PER SPRINKLER (psi) 7.04

THIS SYSTEM OPERATES AT A FLOW OF 0.00 gpm AT A PRESSURE OF 0.00 psi
AT THE BASE OF THE RISER (REF. PT. 0)

PIPES USED FOR THIS SYSTEM

=====

111 DUCTILE IRON (350)
002 SCHEDULE 10
009 BLAZEMASTER CPVC

Life Safety Fire Protection
 Fire Sprinklers Save Lives

Bramhall Row - 749 Congress Street

~~~~~  
 SYSTEM ANALYSIS TO SHOW MAXIMUM FLOW  
 WITH ZERO PRESSURE REMAINING  
 ~~~~~

THE FOLLOWING SPRINKLERS ARE OPERATING IN:

TEST AREA 1 TEST AREA 2 TEST AREA 3 REMOTE AREA

Elevation of sprinklers = Elevation above water test.

REF. PT.	K	ELEV. ft	FLOW gpm	PRESSURE psi
60	4.90	18.00	18.60	14.41
61	4.90	18.00	17.77	13.15
62	4.90	18.00	16.14	10.85
63	4.90	18.00	16.02	10.69

THE SPRINKLER SYSTEM FLOW IS 68.53 gpm

THE OUTSIDE HOSE FLOW AT REFERENCE POINT NO. 1 IS 0.00 gpm
 THE INSIDE HOSE RACK SPKLR'S.
 YARD HYDT. FLOW IS 0.00 gpm

THE FOLLOWING PRESSURES & FLOWS OCCUR
 ---> AT REF. PT. 1 <---

STATIC PRESSURE 55.00 psi
 RESIDUAL PRESSURE 53.00 psi AT 1779.00 gpm
 TOTAL SYSTEM FLOW 68.53 gpm
 AVAILABLE PRESSURE 55.00 psi AT 68.53 gpm
 OPERATING PRESSURE 55.00 psi AT 68.53 gpm
 PRESSURE REMAINING 0.00 psi

THE ABOVE RESULTS INCLUDE 6.00 psi FRICTION LOSS AT REF. PT. # 2 FOR A

BACKFLOW PREVENTER METER
 DETECTOR CHECK VALVE OTHER DEVICE

HYDRAULIC CALCULATIONS AT SPECIFIED FLOW

THE FOLLOWING SPRINKLERS ARE OPERATING IN:

TEST AREA 1 TEST AREA 2 TEST AREA 3 REMOTE AREA

Elevation of sprinklers = Elevation above water test.

REF. PT.	K	ELEV. ft	FLOW gpm	PRESSURE psi
60	4.90	18.00	15.14	9.55
61	4.90	18.00	14.44	8.69
62	4.90	18.00	13.08	7.12
63	4.90	18.00	13.00	7.04

THE SPRINKLER SYSTEM FLOW IS 55.66 gpm

THE OUTSIDE HOSE FLOW AT REFERENCE POINT NO. 1 IS 0.00 gpm

THE INSIDE HOSE RACK SPKLR'S. IS

YARD HYDT. FLOW IS 0.00 gpm

THE FOLLOWING PRESSURES & FLOWS OCCUR

----> AT REF. PT. 1 <----

STATIC PRESSURE	55.00 psi	
RESIDUAL PRESSURE	53.00 psi	AT 1779.00 gpm
TOTAL SYSTEM FLOW	55.66 gpm	
AVAILABLE PRESSURE	55.00 psi	AT 55.66 gpm
OPERATING PRESSURE	41.58 psi	AT 55.66 gpm
PRESSURE REMAINING	13.41 psi	

THE ABOVE RESULTS INCLUDE 6.00 psi FRICTION LOSS AT REF. PT. # 2 FOR A

BACKFLOW PREVENTER METER
 DETECTOR CHECK VALVE OTHER DEVICE

Life Safety Fire Protection
Fire Sprinklers Save Lives

Bramhall Row - 749 Congress Street

PAGE 3

FITTING Equivalent Length per NFPA 13 1994, 6-4.3

'-' Indicates Equivalent Length. 'T' Indicates Threaded Fitting

1=45 Elbow, 2=90 Elbow, 3='T'/Cross, 4=Butterfly Valve, 5=Gate Valve, 6=Swing Check Valve

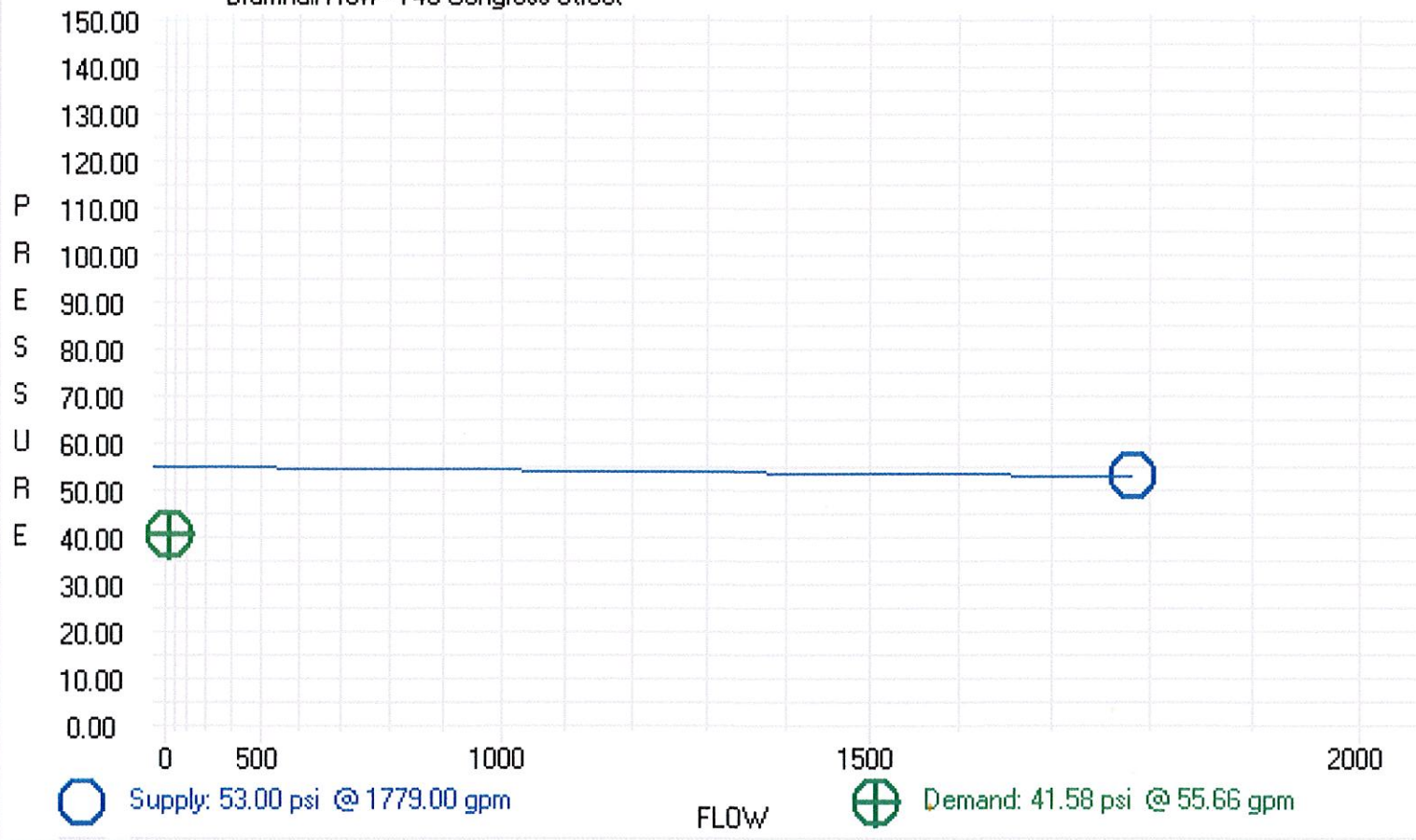
FROM	TO	FLOW (gpm)	PIPE (ft)	FITS	EQV. (ft)	H-W C	PIPE TYPE	DIA. (in)	FRIC. (psi)	ELEV. (psi)	FROM (psi)	TO (psi)	DIFF (psi)
1	2	55.66	226.00	2223	98.50	140	111	6.400	0.000	0.867	41.58	40.69	0.03
2	3	55.66	11.00	222	12.93	120	2	2.157	0.026	3.033	40.69	31.03	6.62
3	4	55.66	12.00	23	21.03	150	9	2.003	0.024	0.000	31.03	30.23	0.81
4	5	55.66	30.00	2222	44.05	150	9	2.003	0.024	3.900	30.23	24.51	1.81
5	6	55.66	40.00	2222	36.07	150	9	1.602	0.073	0.000	24.51	18.98	5.53
6	7	55.66	40.00	2222	36.07	150	9	1.602	0.073	0.000	18.98	13.45	5.53
7	8	55.66	3.50	22	18.04	150	9	1.602	0.073	0.000	13.45	11.88	1.57
8	9	55.66	9.00	0	0.00	150	9	1.602	0.073	0.000	11.88	11.23	0.65
9	60	55.66	4.00	2	8.01	150	9	1.400	0.140	0.000	11.23	9.55	1.68
60	61	40.52	11.00	0	0.00	150	9	1.400	0.078	0.000	9.55	8.69	0.86
61	10	26.08	12.00	0	0.00	150	9	1.109	0.107	0.000	8.69	7.40	1.28
10	62	13.08	4.00	3	5.01	150	9	1.109	0.030	0.000	7.40	7.12	0.28
10	63	13.00	7.50	3	5.01	150	9	1.109	0.029	0.000	7.40	7.04	0.37
63	11	0.00	7.00	22	14.03	150	9	1.109	0.000	0.000	7.04	7.04	0.00
11	12	0.00	14.50	22	14.03	150	9	1.109	0.000	-3.900	7.04	10.94	0.00
12	72	0.00	3.00	23	12.02	150	9	1.109	0.000	0.000	10.94	10.94	0.00
12	71	0.00	14.00	33	10.01	150	9	1.109	0.000	0.000	10.94	10.94	0.00
8	70	0.00	19.00	2223	26.05	150	9	1.109	0.000	-3.900	11.88	15.78	0.00
9	13	0.00	21.00	23	14.02	150	9	1.400	0.000	7.800	11.23	3.43	0.00
13	50	0.00	5.00	22	16.02	150	9	1.400	0.000	0.000	3.43	3.43	0.00
50	14	0.00	10.00	0	0.00	150	9	1.109	0.000	0.000	3.43	3.43	0.00
14	51	0.00	1.50	3	5.01	150	9	1.109	0.000	0.000	3.43	3.43	0.00
14	52	0.00	8.50	3	5.01	150	9	1.109	0.000	0.000	3.43	3.43	0.00

A MAX. VELOCITY OF 11.6 ft./sec. OCCURS BETWEEN REF. PT. 9 AND 60

Sprinkler-CALC Release 7.2 Win
By Walsh Engineering Inc.
North Kingstown R.I. U.S.A.

WATER SUPPLY/DEMAND GRAPH

Bramhall Row - 749 Congress Street



Sprinkler-CALC 7.2 Win

Life Safety Fire Protection
Fire Sprinklers Save Lives
97 Lower Jaffrey Road - Dublin NH

H Y D R A U L I C C A L C U L A T I O N S

C O V E R S H E E T

Bramhall Row - 749 Congress Street

W A T E R S U P P L Y

STATIC PRESSURE (psi) 55
RESIDUAL PRESSURE (psi) 53
RESIDUAL FLOW (gpm) 1779

B O O S T E R P U M P S

NUMBER OF BOOSTER PUMPS 0

S P R I N K L E R S

MINIMUM FLOW PER SPRINKLER (gpm) 14
MINIMUM PRESSURE PER SPRINKLER (psi) 10.12

THIS SYSTEM OPERATES AT A FLOW OF 0.00 gpm AT A PRESSURE OF 0.00 psi
AT THE BASE OF THE RISER (REF. PT. 0)

PIPES USED FOR THIS SYSTEM

=====

111 DUCTILE IRON (350)
002 SCHEDULE 10
009 BLAZEMASTER CPVC

HYDRAULIC CALCULATIONS AT SPECIFIED FLOW

THE FOLLOWING SPRINKLERS ARE OPERATING IN:

- TEST AREA 1
- TEST AREA 2
- TEST AREA 3
- REMOTE AREA

Elevation of sprinklers = Elevation above water test.

REF. PT.	K	ELEV. ft	FLOW gpm	PRESSURE psi
70	4.40	9.00	18.94	18.54
71	4.40	9.00	14.00	10.12
72	4.40	9.00	14.20	10.41

THE SPRINKLER SYSTEM FLOW IS 47.14 gpm

THE OUTSIDE HOSE FLOW AT REFERENCE POINT NO. 1 IS 0.00 gpm

THE INSIDE HOSE RACK SPKLR'S.

YARD HYDT. FLOW IS 0.00 gpm

THE FOLLOWING PRESSURES & FLOWS OCCUR
---> AT REF. PT. 1 <---

STATIC PRESSURE	55.00 psi	
RESIDUAL PRESSURE	53.00 psi	AT 1779.00 gpm
TOTAL SYSTEM FLOW	47.14 gpm	
AVAILABLE PRESSURE	55.00 psi	AT 47.14 gpm
OPERATING PRESSURE	42.79 psi	AT 47.14 gpm
PRESSURE REMAINING	12.21 psi	

THE ABOVE RESULTS INCLUDE 6.00 psi FRICTION LOSS AT REF. PT. # 2 FOR A

- BACKFLOW PREVENTER METER
- DETECTOR CHECK VALVE OTHER DEVICE

Life Safety Fire Protection
Fire Sprinklers Save Lives

Bramhall Row - 749 Congress Street

PAGE 3

FITTING Equivalent Length per NFPA 13 1994, 6-4.3

'-' Indicates Equivalent Length. 'T' Indicates Threaded Fitting

1=45 Elbow, 2=90 Elbow, 3='T'/Cross, 4=Butterfly Valve, 5=Gate Valve, 6=Swing Check Valve

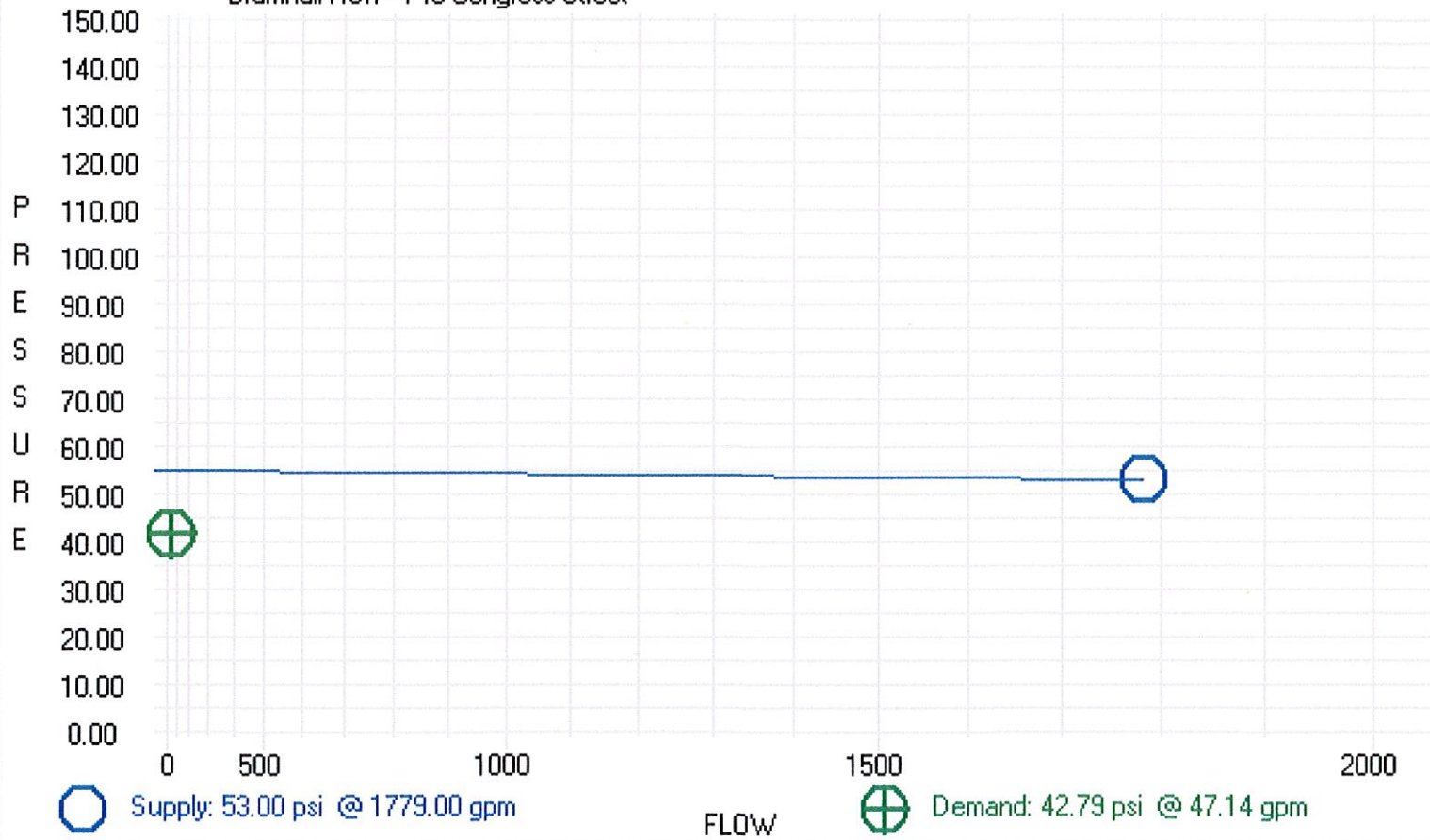
FROM	TO	FLOW (gpm)	PIPE (ft)	FITS	EQV. (ft)	H-W C	PIPE TYPE	DIA. (in)	FRIC. (psi)	ELEV. (psi)	FROM (psi)	TO (psi)	DIFF (psi)
1	2	47.14	226.00	2223	98.50	140	111	6.400	0.000	0.867	42.79	41.90	0.02
2	3	47.14	11.00	222	12.93	120	2	2.157	0.019	3.033	41.90	32.41	6.45
3	4	47.14	12.00	23	21.03	150	9	2.003	0.018	0.000	32.41	31.81	0.59
4	5	47.14	30.00	2222	44.05	150	9	2.003	0.018	3.900	31.81	26.58	1.33
5	6	47.14	40.00	2222	36.07	150	9	1.602	0.053	0.000	26.58	22.52	4.06
6	7	47.14	40.00	2222	36.07	150	9	1.602	0.053	0.000	22.52	18.46	4.07
7	8	47.14	3.50	22	18.04	150	9	1.602	0.053	0.000	18.46	17.31	1.15
8	9	28.20	9.00	0	0.00	150	9	1.602	0.021	0.000	17.31	17.12	0.19
9	60	28.20	4.00	2	8.01	150	9	1.400	0.040	0.000	17.12	16.64	0.48
60	61	28.20	11.00	0	0.00	150	9	1.400	0.040	0.000	16.64	16.20	0.44
61	10	28.20	12.00	0	0.00	150	9	1.109	0.124	0.000	16.20	14.71	1.49
10	62	0.00	4.00	3	5.01	150	9	1.109	0.000	0.000	14.71	14.71	0.00
10	63	28.20	7.50	3	5.01	150	9	1.109	0.124	0.000	14.71	13.17	1.55
63	11	28.20	7.00	22	14.03	150	9	1.109	0.124	0.000	13.17	10.56	2.60
11	12	28.20	14.50	22	14.03	150	9	1.109	0.124	-3.900	10.56	10.94	3.53
12	72	14.20	3.00	23	12.02	150	9	1.109	0.035	0.000	10.94	10.41	0.53
12	71	14.00	14.00	33	10.01	150	9	1.109	0.034	0.000	10.94	10.12	0.81
8	70	18.94	19.00	2223	26.05	150	9	1.109	0.059	-3.900	17.31	18.54	2.67
9	13	0.00	21.00	23	14.02	150	9	1.400	0.000	7.800	17.12	9.32	0.00
13	50	0.00	5.00	22	16.02	150	9	1.400	0.000	0.000	9.32	9.32	0.00
50	14	0.00	10.00	0	0.00	150	9	1.109	0.000	0.000	9.32	9.32	0.00
14	51	0.00	1.50	3	5.01	150	9	1.109	0.000	0.000	9.32	9.32	0.00
14	52	0.00	8.50	3	5.01	150	9	1.109	0.000	0.000	9.32	9.32	0.00

A MAX. VELOCITY OF 9.36 ft./sec. OCCURS BETWEEN REF. PT. 11 AND 12

Sprinkler-CALC Release 7.2 Win
By Walsh Engineering Inc.
North Kingstown R.I. U.S.A.

WATER SUPPLY/DEMAND GRAPH

Bramhall Row - 749 Congress Street



Sprinkler-CALC 7.2 Win