

HYDRAULIC DESIGN INFORMATION SHEET

Name - Marquis lofts Date - 6-10-14  
Location - 3rd floor living area  
Building - System No. - 1 of 2  
Contractor - Residential Fire Protection Contract No. - C14015  
Calculated By - JAL Drawing No. - 2 of 2  
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height 9'6  
OCCUPANCY - Residential

S Type of Calculation: ( )NFPA 13 Residential (X)NFPA 13R ( )NFPA 13D  
Y Number of Sprinklers Flowing: ( )1 ( )2 (X)4 ( )  
S ( )Other  
T ( )Specific Ruling Made by Date  
E  
M Listed Flow at Start Point - 13 Gpm System Type  
Listed Pres. at Start Point - 10.6 Psi (X) Wet ( ) Dry  
D MAXIMUM LISTED SPACING 16 x 16 ( ) Deluge ( ) PreAction  
E Domestic Flow Added - Gpm Sprinkler or Nozzle  
S Additional Flow Added - 100 Gpm Make Viking Model VK468  
I Elevation at Highest Outlet - 41.5 Feet Size 1/2" K-Factor 4.0  
G Note:Safety Margin: 6.170 Temperature Rating 155  
N

Calculation Gpm Required 154.012 Psi Required 42.699 At Test  
Summary C-Factor Used: Overhead 150 Underground 150

W Water Flow Test: Pump Data: Tank or Reservoir:  
A Date of Test - 6-5-14 Rated Cap. Cap.  
T Time of Test - @ Psi Elev.  
E Static (Psi) - 49 Elev.  
R Residual (Psi) - 45 Other Well  
Flow (Gpm) - 978 Proof Flow Gpm  
S Elevation - 0

P Location:

P  
L Source of Information:  
Y

# Water Supply Curve (C)

Residential Fire Protection  
Marquis Lofts sidewalls

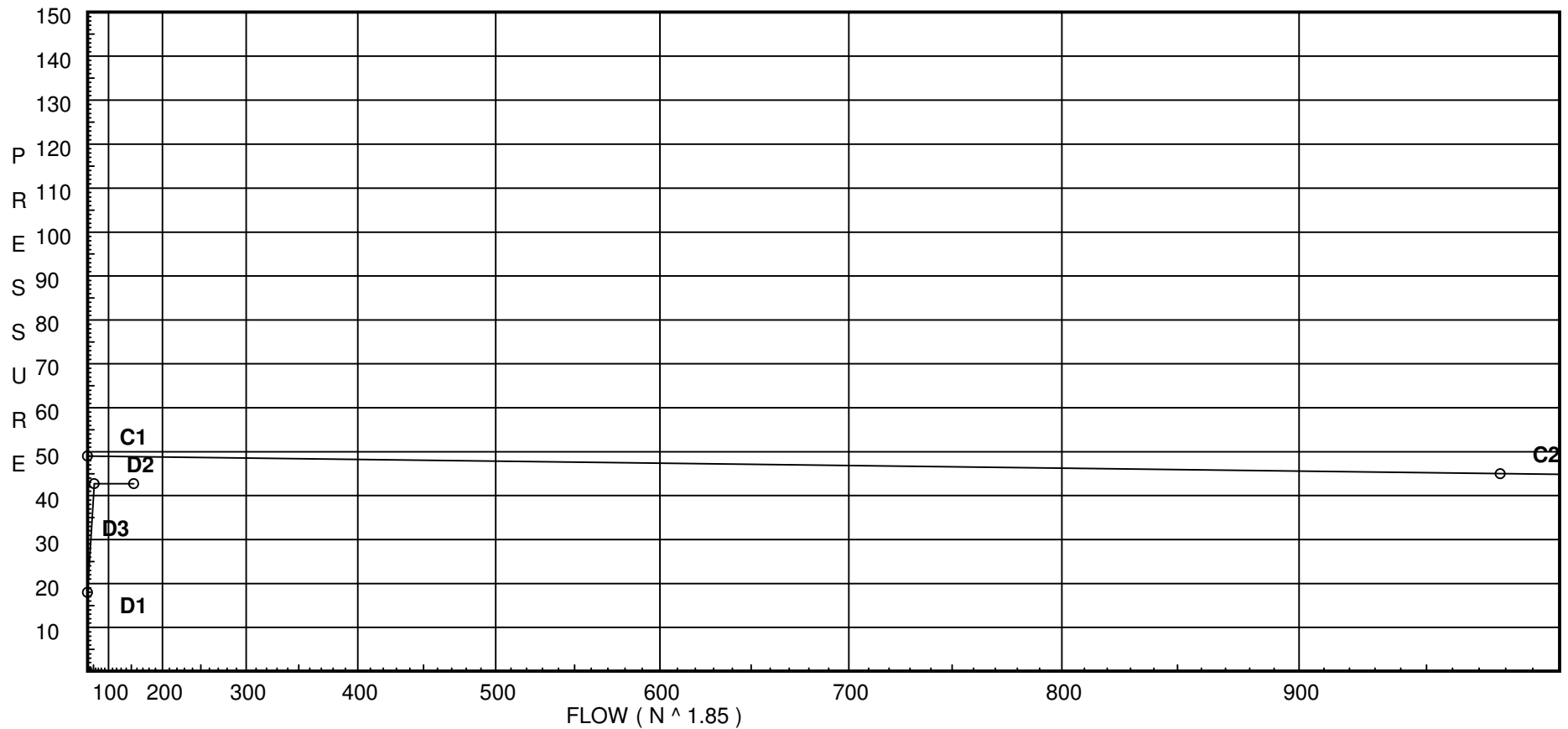
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### City Water Supply:

C1 - Static Pressure : 49  
C2 - Residual Pressure: 45  
C2 - Residual Flow : 978

### Demand:

D1 - Elevation : 17.974  
D2 - System Flow : 54.012  
D2 - System Pressure : 42.699  
Hose ( Adj City ) : \_\_\_\_\_  
Hose ( Demand ) : 100  
D3 - System Demand : 154.012  
Safety Margin : 6.170



# Fittings Used Summary

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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
G	Generic Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
I	90' Grvd-Vic Elbow #10	0	0	2	3	4	3.5	6	5	8	7	8.5	10	13	17	20	23	25	33	36	40
N	CPVC 90'Ell Harvel-Spears	7	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
S	Generic Swing Check Valve	4	5	5	7	9	11	14	16	19	22	27	32	45	55	65	76	87	98	109	130
T	90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Z	Generic Flow Switch	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Zia	Wilkins 350	Fitting generates a Fixed Loss Based on Flow																			

# Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	41.5	4.9	7.04	na	13.0	0.1	130	7.0
2	41.5	4.9	7.5	na	13.42	0.1	130	7.0
3	0.0		25.96	na				
10	0.0		31.2	na				
5	41.0	4	11.85	na	13.77	0.1	130	10.6
6	41.0	4	11.94	na	13.82	0.1	130	10.6
11	0.0		31.96	na				
7	0.0		31.97	na				
12	0.0		33.25	na				
8	0.0		32.08	na				
13	0.0		34.9	na				
14	0.0		35.5	na				
TRW	4.0		34.64	na				
HDR	1.0		36.26	na				
BR	0.0		42.62	na				
TEST	0.0		42.7	na	100.0			

The maximum velocity is 8.9 and it occurs in the pipe between nodes 3 and 10

# Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
1 to 3	13.00 13.0	0.874 150 0.0943		0.0 0.0 0.0	10.080 0.0 10.080	7.039 17.974 0.951			K Factor = 4.90 Vel = 6.95	
	0.0 13.00					25.964			K Factor = 2.55	
2 to 3	13.42 13.42	0.874 150 0.1000		0.0 0.0 0.0	4.920 0.0 4.920	7.498 17.974 0.492			K Factor = 4.90 Vel = 7.18	
3 to 10	13.00 26.42	1.101 150 0.1138	2N 2O	14.0 10.0 0.0	22.000 24.000 46.000	25.964 0.0 5.237			Vel = 8.90	
10 to 11	0.0 26.42	1.394 150 0.0361	1O	6.0 0.0 0.0	15.000 6.000 21.000	31.201 0.0 0.758			Vel = 5.55	
	0.0 26.42					31.959			K Factor = 4.67	
5 to 7	13.77 13.77	0.874 150 0.1050	1N 1O	7.0 3.0 0.0	12.500 10.000 22.500	11.852 17.757 2.362			K Factor = 4.00 Vel = 7.36	
	0.0 13.77					31.971			K Factor = 2.44	
6 to 8	13.82 13.82	0.874 150 0.1058	1N 1O	7.0 3.0 0.0	12.500 10.000 22.500	11.944 17.757 2.381			K Factor = 4.00 Vel = 7.39	
	0.0 13.82					32.082			K Factor = 2.44	
11 to 7	9.51 9.51	1.394 150 0.0053		0.0 0.0 0.0	2.250 0.0 2.250	31.959 0.0 0.012			Vel = 2.00	
	0.0 9.51					31.971			K Factor = 1.68	
11 to 8	16.90 16.9	1.394 150 0.0159		0.0 0.0 0.0	7.750 0.0 7.750	31.959 0.0 0.123			Vel = 3.55	
	0.0 16.90					32.082			K Factor = 2.98	
7 to 12	23.28 23.28	1.394 150 0.0286	2N 1O	16.0 6.0 0.0	22.920 22.000 44.920	31.971 0.0 1.284			Vel = 4.89	
12 to 13	0.0 23.28	1.394 150 0.0286	2O	12.0 0.0 0.0	45.500 12.000 57.500	33.255 0.0 1.642			Vel = 4.89	
	0.0 23.28					34.897			K Factor = 3.94	
8 to 13	30.73 30.73	1.394 150 0.0477	2N 1O	16.0 6.0 0.0	37.000 22.000 59.000	32.082 0.0 2.815			Vel = 6.46	

# Final Calculations - Standard

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Hyd. Ref. Point	Qa  Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
13	23.28	2.003	1N 11.0	15.000	34.897				
to		150	0.0	11.000	0.0				
14	54.01	0.0232	0.0	26.000	0.603		Vel = 5.50		
14	0.0	2.003	2N 22.0	15.500	35.500				
to		150	0.0	22.000	-1.732				
TRW	54.01	0.0232	0.0	37.500	0.870		Vel = 5.50		
TRW	0.0	2.469	1Z 6.0	4.500	34.638				
to		120	1S 14.0	21.000	1.299				
HDR	54.01	0.0126	1G 1.0	25.500	0.322		Vel = 3.62		
HDR	0.0	2.635	4I 32.948	8.000	36.259				
to		120	1Zia 0.0	32.948	5.983		* Fixed loss = 5.55		
BR	54.01	0.0092	0.0	40.948	0.378		Vel = 3.18		
BR	0.0	4.1	1G 2.186	50.000	42.620				
to		120	1T 21.855	24.041	0.0				
TEST	54.01	0.0011	0.0	74.041	0.079		Vel = 1.31		
	100.00						Qa = 100.00		
	154.01				42.699		K Factor = 23.57		