HYDRAULIC DESIGN INFORMATION SHEET

Name - Munjoy heights Date - 2-21-14
Location - second floor
Building - A System No. - 1 of 1
Contractor - Residential Fire Protection Contract No. - C14005
Calculated By - JAL Drawing No. - 1 of 7
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height 9'-5"
OCCUPANCY - Residential

SYSTEM DESIGN

Type of Calculation: ( )NFPA 13 Residential (X)NFPA 13R ( )NFPA 13D
Number of Sprinklers Flowing: ( )1 ( )2 (X)4 ( )
( )Other
( )Specific Ruling Made by Date

Listed Flow at Start Point - 13 Gpm System Type
Listed Pres. at Start Point - 10.6 Psi (X) Wet ( ) Dry
MAXIMUM LISTED SPACING 16 x 16 ( ) Deluge ( ) PreAction
Domestic Flow Added - Gpm Sprinkler or Nozzle
Additional Flow Added - 100 Gpm Make Viking Model VK486
Elevation at Highest Outlet - Feet Size 1/2" K-Factor 4.0
Note:Safety Margin: 14.792 Temperature Rating

Calculation Summary: Gpm Required 155.748 Psi Required 48.065 At Test
C-Factor Used: Overhead 150 Underground 150

WATER SUPPLY

Water Flow Test:	Pump Data:	Tank or Reservoir:
Date of Test - 11-7-13	Rated Cap.	Cap.
Time of Test - 12:35 PM	@ Psi	Elev.
Static (Psi) - 63	Elev.	
Residual (Psi) - 58	Other	Well
Flow (Gpm) - 1061		Proof Flow Gpm
Elevation - 0		

Location:

Source of Information:

Water Supply Curve (C)

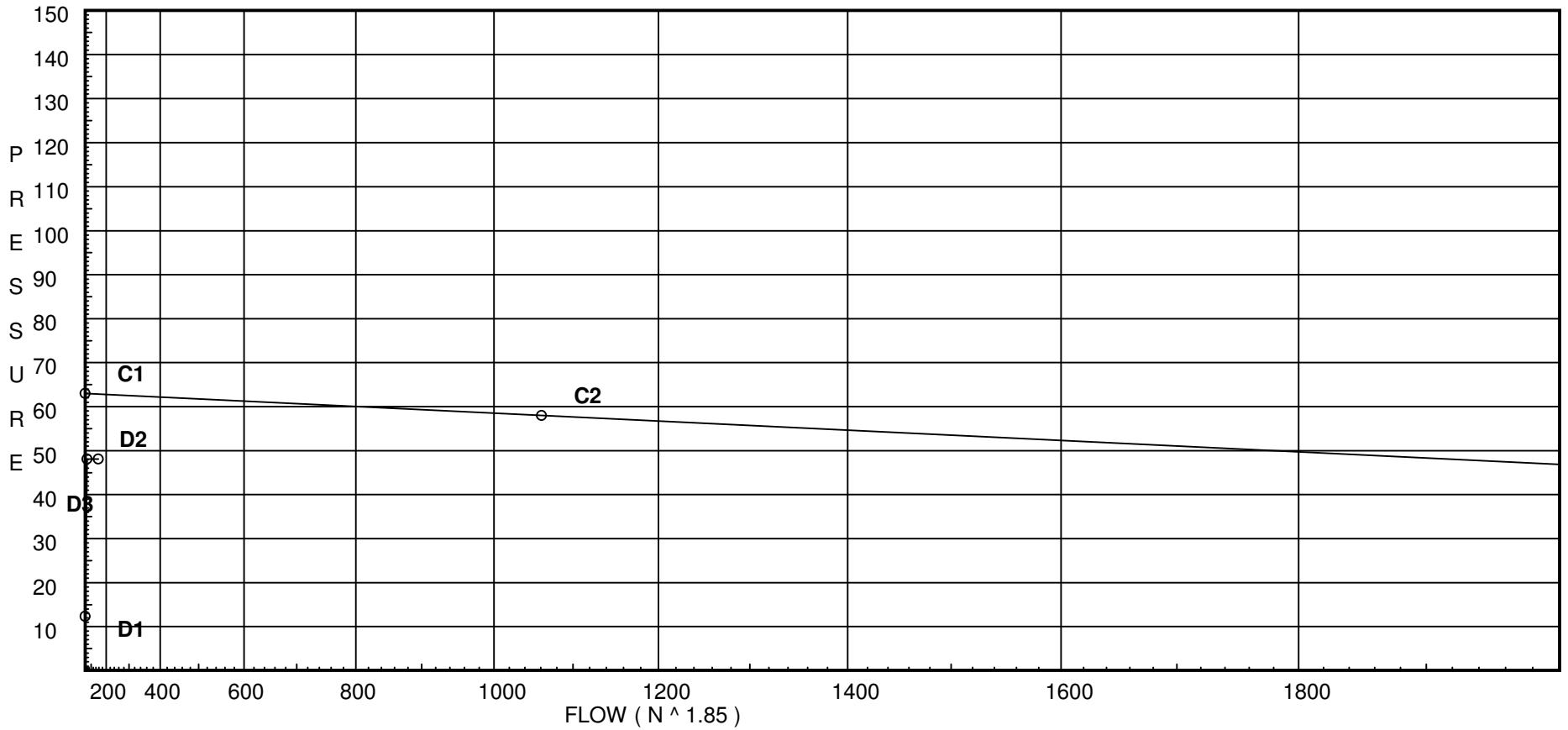
Residential Fire Protection
Munjoy Heights building A

Date 2-21-14

City Water Supply:
- C1 - Static Pressure : 63
- C2 - Residual Pressure: 58
- C2 - Residual Flow : 1061

Demand:

D1 - Elevation	:	12.343
D2 - System Flow	:	55.748
D2 - System Pressure	:	48.065
Hose (Adj City)	:	_____
Hose (Demand)	:	100
D3 - System Demand	:	155.748
Safety Margin	:	14.792



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	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	Generic 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	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	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

Pressure / Flow Summary - STANDARD

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	28.5	4	14.84	na	15.41	0.1	130	10.6
2	28.5	4	11.12	na	13.34	0.1	130	10.6
3	28.5	4	12.2	na	13.97	0.1	130	10.6
4	28.5	4	10.6	na	13.02	0.1	130	10.6
13	0.0		25.12	na				
12	0.0		25.42	na				
11	0.0		25.75	na				
10	0.0		28.16	na				
15	0.0		28.49	na				
16	0.0		29.56	na				
17	0.0		30.06	na				
26	0.0		30.1	na				
27	0.0		30.59	na				
28	0.0		34.5	na				
TR	1.0		34.82	na				
BR	5.0		39.72	na				
UNG1	0.0		44.02	na	100.0			
TEST	0.0		48.06	na				

The maximum velocity is 13.59 and it occurs in the pipe between nodes 11 and 15

Final Calculations - Hazen-Williams

Residential Fire Protection
Munjoy Heights building A

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	15.41	1.101	1N	7.0	11.250	14.844		K Factor = 4.00
to		150	1O	5.0	12.000	12.343		
10	15.41	0.0420		0.0	23.250	0.977		Vel = 5.19
	0.0							
	15.41					28.164		K Factor = 2.90
2	13.34	0.874	1N	7.0	13.000	11.125		K Factor = 4.00
to		150	1O	3.0	10.000	12.343		
11	13.34	0.0990		0.0	23.000	2.278		Vel = 7.13
	0.0							
	13.34					25.746		K Factor = 2.63
3	13.97	1.101	1O	5.0	13.000	12.201		K Factor = 4.00
to		150	1N	7.0	12.000	12.343		
12	13.97	0.0350		0.0	25.000	0.876		Vel = 4.71
	0.0							
	13.97					25.420		K Factor = 2.77
4	13.02	0.874	1O	3.0	13.000	10.600		K Factor = 4.00
to		150	1N	7.0	10.000	12.343		
13	13.02	0.0947		0.0	23.000	2.179		Vel = 6.96
13	0.0	1.101		0.0	9.700	25.122		
to		150		0.0	0.0	0.0		
12	13.02	0.0307		0.0	9.700	0.298		Vel = 4.39
12	13.98	1.101		0.0	2.750	25.420		
to		150		0.0	0.0	0.0		
11	27.0	0.1185		0.0	2.750	0.326		Vel = 9.10
11	13.34	1.101	1O	5.0	6.000	25.746		
to		150		0.0	5.000	0.0		
15	40.34	0.2491		0.0	11.000	2.740		Vel = 13.59
	0.0							
	40.34					28.486		K Factor = 7.56
10	15.41	1.101	1O	5.0	2.680	28.164		
to		150		0.0	5.000	0.0		
15	15.41	0.0419		0.0	7.680	0.322		Vel = 5.19
15	40.34	1.394		0.0	7.500	28.486		
to		150		0.0	0.0	0.0		
16	55.75	0.1437		0.0	7.500	1.078		Vel = 11.72
16	-27.88	1.598	2O	16.0	10.000	29.564		
to		150		0.0	16.000	0.0		
26	27.87	0.0205		0.0	26.000	0.533		Vel = 4.46
	0.0							
	27.87					30.097		K Factor = 5.08
16	27.87	1.598		0.0	24.000	29.564		
to		150		0.0	0.0	0.0		
17	27.87	0.0205		0.0	24.000	0.492		Vel = 4.46
17	0.0	1.598	2O	16.0	10.000	30.056		
to		150		0.0	16.000	0.0		
27	27.87	0.0205		0.0	26.000	0.532		Vel = 4.46
	0.0							
	27.87					30.588		K Factor = 5.04

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
26	27.87	1.598		0.0	24.000	30.097		
to		150		0.0	0.0	0.0		
27	27.87	0.0205		0.0	24.000	0.491		Vel = 4.46
27	27.88	1.598	1N	9.0	44.000	30.588		
to		150		0.0	9.000	0.0		
28	55.75	0.0739		0.0	53.000	3.916		Vel = 8.92
28	0.0	2.067	2E	10.0	3.500	34.504		
to		120	1T	10.0	20.000	-0.433		
TR	55.75	0.0319		0.0	23.500	0.749		Vel = 5.33
TR	0.0	2.067	1E	5.0	10.000	34.820		
to		120	1Z	5.0	10.000	4.268		* Fixed loss = 6
BR	55.75	0.0319		0.0	20.000	0.637		Vel = 5.33
BR	0.0	1.92	1T	10.55	60.000	39.725		
to		150		0.0	10.550	2.166		
UNG1	55.75	0.0302		0.0	70.550	2.131		Vel = 6.18
UNG1	100.00	8.27	1T	55.354	110.000	44.022		Qa = 100
to		140	1G	6.326	118.616	4.000		* Fixed loss = 4
TEST	155.75	0.0002	4F	56.936	228.616	0.043		Vel = 0.93
	0.0							
	155.75					48.065		K Factor = 22.47