HYDRAULIC DESIGN INFORMATION SHEET

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Name – Sheridan St Town Homes                    Date – 7-31-14
Location – Third Floor
Building –                               System No. – 1 of 2
Contractor – Residential Fire Protection Contract No. – C14018
Calculated By – JAL                      Drawing No. – 1 of 1
Construction: (X) Combustible  ( ) Non-Combustible   Ceiling Height 8'-11"
OCCUPANCY – Residential
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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 VK486
I   Elevation at Highest Outlet – 30  Feet  Size 1/2"      K-Factor 4.0
G   Note:Safety Margin: 13.664              Temperature Rating
N
    _____
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Calculation   Gpm Required 154.536   Psi Required 46.132   At Test
Summary       C-Factor Used:      Overhead 150          Underground 150
    _____
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W   Water Flow Test:         Pump Data:          Tank or Reservoir:
A   Date of Test   – 7-16-12  Rated Cap.          Cap.
T   Time of Test   –          @ Psi              Elev.
E   Static (Psi)   – 60       Elev.
R   Residual (Psi) – 55       Other                    Well
    Flow (Gpm)     – 871                         Proof Flow Gpm
S   Elevation      – 0
P   Location:
P
L   Source of Information:
Y
    _____
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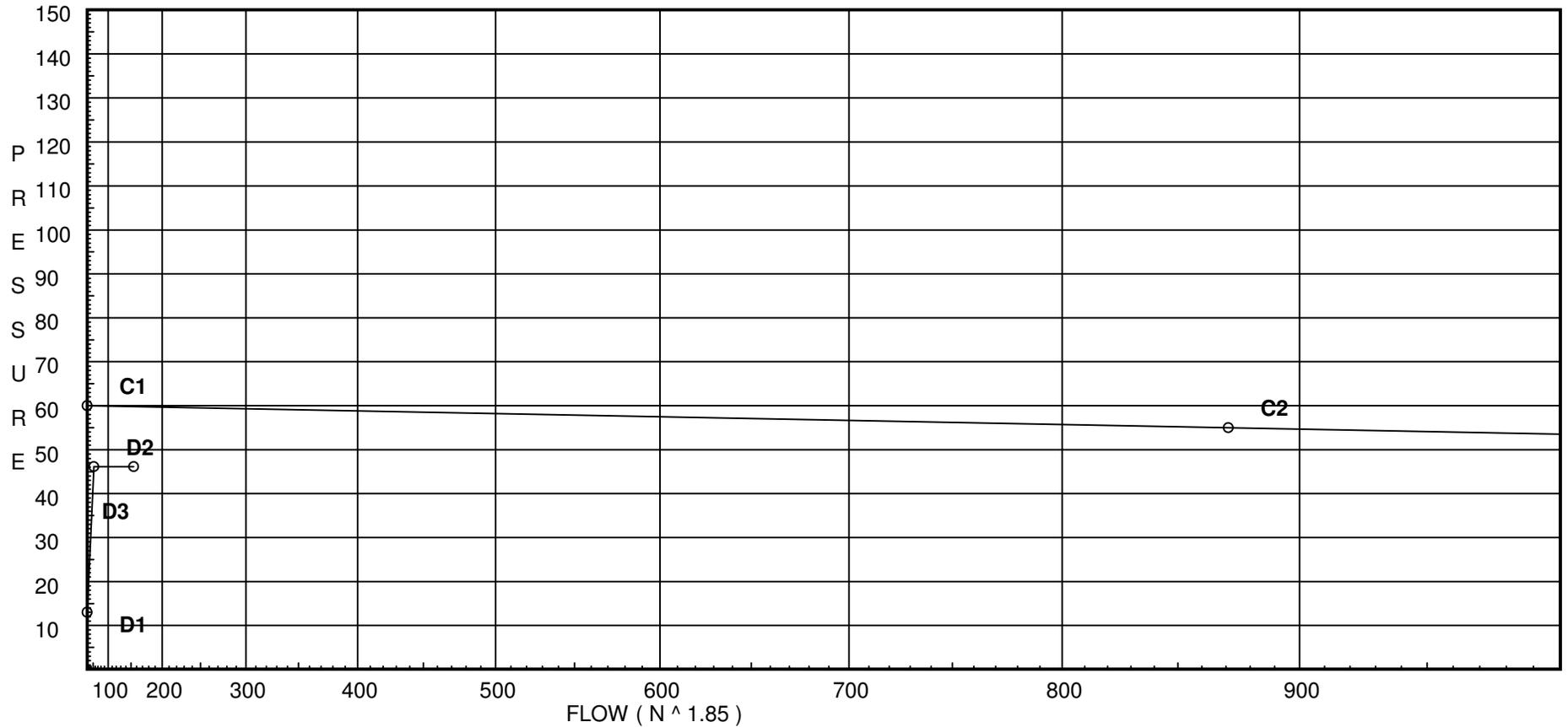
City Water Supply:
    C1 - Static Pressure   : 60
    C2 - Residual Pressure: 55
    C2 - Residual Flow   : 871

Demand:
    D1 - Elevation   : 12.993
    D2 - System Flow   : 54.536
    D2 - System Pressure : 46.132
    Hose (Adj City)   : _____
    Hose (Demand)   : 100
    D3 - System Demand : 154.536
    Safety Margin   : 13.664

PRESSURE

150
140
130
120
110
100
90
80
70
60
50
40
30
20
10

C1
C2
D2
D3
D1

100 200 300 400 500 600 700 800 900

FLOW (N ^ 1.85)

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
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
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																			

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	30.0	4	10.6	na	13.02	0.1	130	10.6
2	30.0	4	11.37	na	13.49	0.1	130	10.6
3	30.0	4	12.52	na	14.15	0.1	130	10.6
4	30.0	4	12.03	na	13.87	0.1	130	10.6
10	0.0		27.19	na				
11	0.0		27.22	na				
12	0.0		27.61	na				
17	0.0		27.85	na				
16	0.0		27.94	na				
13	0.0		27.64	na				
14	0.0		27.71	na				
15	0.0		27.97	na				
20	0.0		31.13	na				
TR	0.0		39.24	na				
HDR	0.0		39.96	na				
BR	0.0		46.06	na				
UG1	0.0		46.1	na				
TEST	0.0		46.13	na	100.0			

The maximum velocity is 11.47 and it occurs in the pipe between nodes 15 and 20

Final Calculations - Hazen-Williams

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	13.02	0.874	2N	14.0	18.000	10.600			K Factor = 4.00	
to		150	2O	6.0	20.000	12.993				
10	13.02	0.0947		0.0	38.000	3.599			Vel = 6.96	
	0.0 13.02					27.192			K Factor = 2.50	
2	13.49	0.874	2N	14.0	11.250	11.369			K Factor = 4.00	
to		150	1O	3.0	17.000	12.993				
11	13.49	0.1011		0.0	28.250	2.855			Vel = 7.21	
	0.0 13.49					27.217			K Factor = 2.59	
3	14.15	0.874	1N	7.0	9.000	12.519			K Factor = 4.00	
to		150	1O	3.0	10.000	12.993				
12	14.15	0.1105		0.0	19.000	2.100			Vel = 7.57	
	0.0 14.15					27.612			K Factor = 2.69	
4	13.87	0.874	2N	14.0	10.420	12.029			K Factor = 4.00	
to		150	1O	3.0	17.000	12.993				
16	13.87	0.1065		0.0	27.420	2.919			Vel = 7.42	
	0.0 13.87					27.941			K Factor = 2.62	
10	13.02	1.101	1O	5.0	11.670	27.192				
to		150		0.0	5.000	0.0				
14	13.02	0.0308		0.0	16.670	0.513			Vel = 4.39	
	0.0 13.02					27.705			K Factor = 2.47	
11	13.49	1.101	1O	5.0	8.000	27.217				
to		150		0.0	5.000	0.0				
13	13.49	0.0328		0.0	13.000	0.427			Vel = 4.55	
	0.0 13.49					27.644			K Factor = 2.57	
12	14.15	1.101	1O	5.0	1.750	27.612				
to		150		0.0	5.000	0.0				
17	14.15	0.0359		0.0	6.750	0.242			Vel = 4.77	
17	0.0	1.394		0.0	7.680	27.854				
to		150		0.0	0.0	0.0				
16	14.15	0.0113		0.0	7.680	0.087			Vel = 2.97	
16	13.88	1.394		0.0	0.750	27.941				
to		150		0.0	0.0	0.0				
15	28.03	0.0400		0.0	0.750	0.030			Vel = 5.89	
	0.0 28.03					27.971			K Factor = 5.30	
13	13.49	1.394		0.0	5.920	27.644				
to		150		0.0	0.0	0.0				
14	13.49	0.0103		0.0	5.920	0.061			Vel = 2.84	
14	13.02	1.394		0.0	7.330	27.705				
to		150		0.0	0.0	0.0				
15	26.51	0.0363		0.0	7.330	0.266			Vel = 5.57	

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
15	28.03	1.394	2O	12.0	10.920	27.971		
to		150		0.0	12.000	0.0		
20	54.54	0.1380		0.0	22.920	3.162		Vel = 11.47
20	0.0	1.394	2N	16.0	42.750	31.133		
to		150		0.0	16.000	0.0		
TR	54.54	0.1379		0.0	58.750	8.104		Vel = 11.47
TR	0.0	2.157	1Z	6.153	8.000	39.237		
to		120	1G	1.231	20.921	0.0		
HDR	54.54	0.0249	1S	13.537	28.921	0.719		Vel = 4.79
HDR	0.0	2.635	2E	16.474	8.000	39.956		
to		120	2T	32.948	49.422	5.562		* Fixed loss = 5.562
BR	54.54	0.0094	1Zia	0.0	57.422	0.539		Vel = 3.21
BR	0.0	4.1	1G	2.907	25.000	46.057		
to		140	1T	29.067	31.974	0.0		
UG1	54.54	0.0008		0.0	56.974	0.047		Vel = 1.33
UG1	0.0	8.27	1G	6.326	1000.000	46.104		
to		140	1T	55.354	61.680	0.0		
TEST	54.54	0.0		0.0	1061.680	0.028		Vel = 0.33
	100.00							Qa = 100.00
	154.54					46.132		K Factor = 22.75