Hydraulic Design Information Sheet

Name - Marquis Lofts
Date - 6-10-14
Location - Garage
Building -
System No. - 2 of 2
Contractor - Residential Fire Protection
Contract No. - C14015
Calculated By - JAL
Drawing No. - 1 of 2
Construction: (X) Combustible ( ) Non-Combustible
Ceiling Height - 8'-2"
Occupancy - Auto Parking

SYSTEM DESIGN

(X) NFPA 13 ( ) Lt. Haz. Ord.Haz.Gp. ( ) 1 ( ) 2 ( ) 3 ( ) Ex.Haz.
( ) NFPA 231 ( ) NFPA 231C ( ) Figure Curve
Other

Specific Ruling	Made By	Date

Area of Sprinkler Operation	- 900	System Type	Sprinkler/Nozzle
Density	- .15	( ) Wet	Make Viking
Area Per Sprinkler	- 130	(X) Dry	Model VK 300
Elevation at Highest Outlet	- 8	( ) Deluge	Size 1/2"
Hose Allowance - Inside	-	( ) Preaction	K-Factor 5.6
Rack Sprinkler Allowance	-	( ) Other	Temp.Rat.155
Hose Allowance - Outside	- 100		

Note Safety Margin: 7.617

DESIGN

Calculation Summary: Flow Required - 267.857 Press Required - 41.019
C-Factor Used: 100 Overhead 140 Underground

SUPPLY

Water Flow Test:		Pump Data:		Tank or Reservoir:
Date of Test	- 6-5-14			Cap. -
Time of Test	-	Rated Cap.-		Elev.-
Static Press	- 49	@ Press	-	
Residual Press	- 45	Elev.	-	Well
Flow	- 978			Proof Flow
Elevation	- 0			

Location -

Source of Information -

COMMODITY STORAGE

Commodity		Class	Location
Storage Ht.		Area	Aisle W.
Storage Method:	Solid Piled %	Palletized %	Rack

( ) Single Row	( ) Conven. Pallet	( ) Auto. Storage	( ) Encap.
( ) Double Row	( ) Slave Pallet	( ) Solid Shelf	( ) Non
( ) Mult. Row		( ) Open Shelf	

Flue Spacing	Clearance:Storage to Ceiling
Longitudinal	Transverse

Horizontal Barriers Provided:

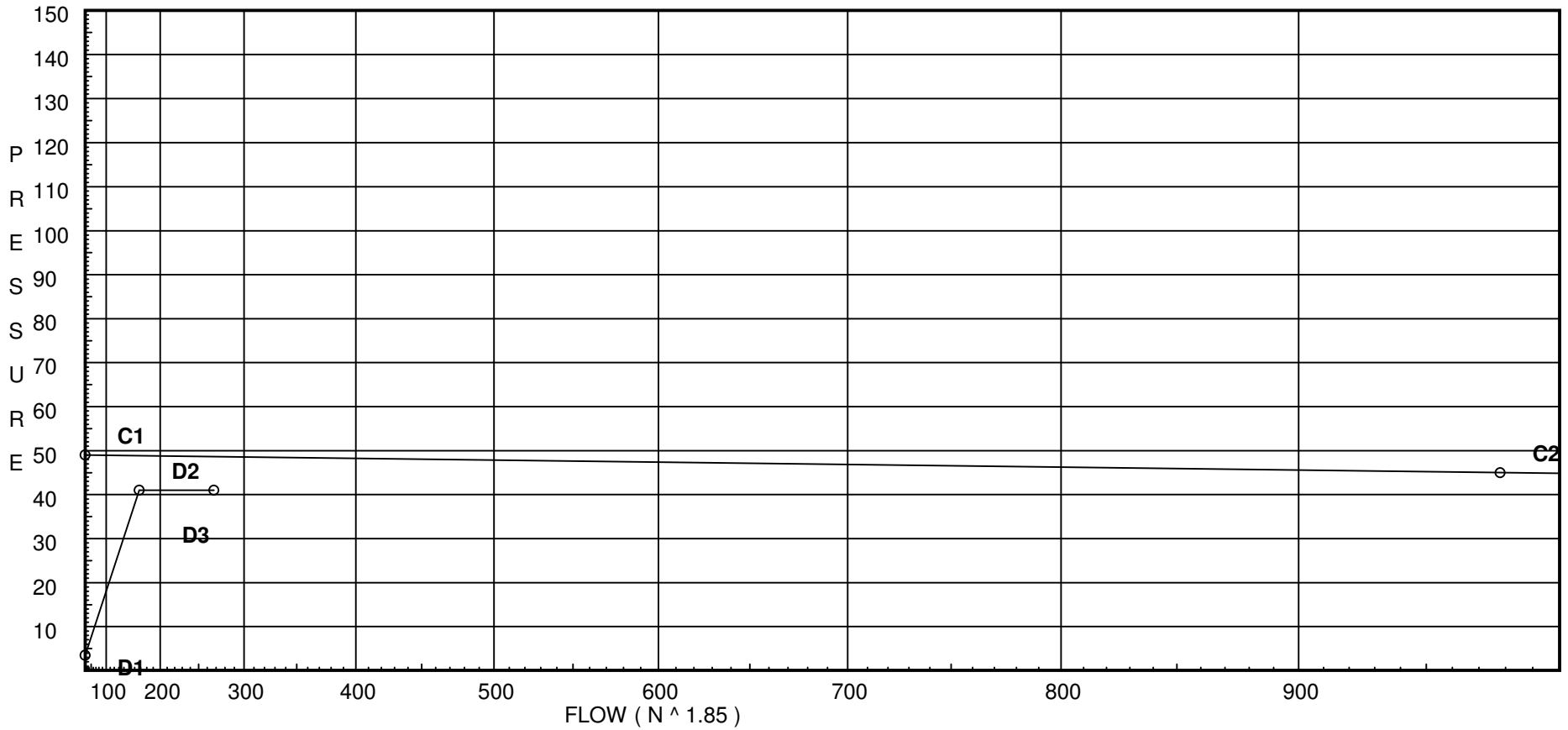
Water Supply Curve (C)

Residential Fire Protection
Marquis Lofts Dry

City Water Supply:
- C1 - Static Pressure : 49
- C2 - Residual Pressure: 45
- C2 - Residual Flow : 978

Demand:

D1 - Elevation	:	3.465
D2 - System Flow	:	167.857
D2 - System Pressure	:	41.019
Hose (Adj City)	:	_____
Hose (Demand)	:	100
D3 - System Demand	:	267.857
Safety Margin	:	7.617



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
B	Generic Butterfly Valve	0	0	0	0	0	0	7	10	0	12	9	10	12	19	21	0	0	0	0	0
D	Generic Dry Pipe Valve	0	0	0	0	0	0	9.5	17	0	28	0	47	0	0	0	0	0	0	0	0
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
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
Zia	Wilkins 350	Fitting generates a Fixed Loss Based on Flow																			

Pressure / Flow Summary - STANDARD

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
20	8.0	5.6	12.64	na	19.91	0.15	70	7.0
21	8.0	5.6	15.35	na	21.94	0.15	70	7.0
22	8.0	5.6	12.13	na	19.5	0.15	130	7.0
23	8.0	5.6	13.87	na	20.85	0.15	130	7.0
24	8.0	5.6	15.62	na	22.13	0.15	130	7.0
25	8.0	5.6	12.53	na	19.82	0.15	130	7.0
26	8.0	5.6	14.33	na	21.2	0.15	130	7.0
27	8.0	5.6	16.14	na	22.5	0.15	130	7.0
30	0.0		20.74	na				
31	0.0		20.8	na				
32	0.0		21.37	na				
33	0.0		29.5	na				
TRD	4.0		28.65	na				
HDR	1.0		31.07	na	100.0			
BR	0.0		39.74	na				
TEST	0.0		41.02	na				

The maximum velocity is 10.3 and it occurs in the pipe between nodes HDR and BR

Final Calculations - Hazen-Williams

Residential Fire Protection
Marquis Lofts Dry

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
20	19.91	1.049		0.0	15.000	12.642		K Factor = 5.60
to		100		0.0	0.0	0.0		
21	19.91	0.1808		0.0	15.000	2.712		Vel = 7.39
21	21.94	1.38	1T	4.282	5.920	15.354		K Factor = 5.60
to		100		0.0	4.282	3.465		
30	41.85	0.1880		0.0	10.202	1.918		Vel = 8.98
	0.0							
	41.85					20.737		K Factor = 9.19
22	19.50	1.049		0.0	10.000	12.125		K Factor = 5.60
to		100		0.0	0.0	0.0		
23	19.5	0.1740		0.0	10.000	1.740		Vel = 7.24
23	20.85	1.38		0.0	10.000	13.865		K Factor = 5.60
to		100		0.0	0.0	0.0		
24	40.35	0.1757		0.0	10.000	1.757		Vel = 8.66
24	22.14	1.61	1T	5.71	3.500	15.622		K Factor = 5.60
to		100		0.0	5.710	3.465		
31	62.49	0.1862		0.0	9.210	1.715		Vel = 9.85
	0.0							
	62.49					20.802		K Factor = 13.70
25	19.82	1.049		0.0	10.000	12.532		K Factor = 5.60
to		100		0.0	0.0	0.0		
26	19.82	0.1794		0.0	10.000	1.794		Vel = 7.36
26	21.20	1.38		0.0	10.000	14.326		K Factor = 5.60
to		100		0.0	0.0	0.0		
27	41.02	0.1811		0.0	10.000	1.811		Vel = 8.80
27	22.50	1.61	1T	5.71	3.500	16.137		K Factor = 5.60
to		100		0.0	5.710	3.465		
32	63.52	0.1920		0.0	9.210	1.768		Vel = 10.01
	0.0							
	63.52					21.370		K Factor = 13.74
30	41.85	2.635		0.0	8.100	20.737		
to		100		0.0	0.0	0.0		
31	41.85	0.0080		0.0	8.100	0.065		Vel = 2.46
31	62.49	2.635		0.0	13.000	20.802		
to		100		0.0	0.0	0.0		
32	104.34	0.0437		0.0	13.000	0.568		Vel = 6.14
32	63.52	2.635	3E	17.636	47.920	21.370		
to		100	1T	11.758	29.394	0.0		
33	167.86	0.1052		0.0	77.314	8.134		Vel = 9.88
33	0.0	2.635	1E	5.879	2.500	29.504		
to		100		0.0	5.879	-1.732		
TRD	167.86	0.1053		0.0	8.379	0.882		Vel = 9.88
TRD	0.0	3.26	1B	9.592	4.000	28.654		
to		100	1D	16.306	25.898	1.299		
HDR	167.86	0.0373		0.0	29.898	1.116		Vel = 6.45
HDR	100.00	3.26	3E	20.143	6.000	31.069		Qa = 100
to		100	1Zia	0.0	20.143	6.358		* Fixed loss = 5.925
BR	267.86	0.0886		0.0	26.143	2.316		Vel = 10.30

Final Calculations - Standard

Residential Fire Protection
Marquis Lofts Dry

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*******	Notes	******
BR	0.0	4.1	1G	2.907	50.000	39.743				
to		140	1T	29.067	31.974	0.0				
TEST	267.86	0.0156		0.0	81.974	1.276		Vel = 6.51		
	0.0									
	267.86					41.019		K Factor = 41.82		