

... Fire Protection by Computer Design

HIGH TECH FIRE PROTECTION
PO. BOX 156
MINOT, ME 04258-0258
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Job Name : Teen Sheter
Building : TEEN SHELTER
Location : 38 PREBLE ST
System : WET
Contract : 042712-1
Data File : Teen Shelter.WXF

Hydraulic Design Information Sheet

Name - TEEN SHELTER Date - 8-20-12
 Location - 38 PREBLE ST
 Building - TEEN SHELTER System No. - WET
 Contractor - HIGH TECH FIRE PROTECTION Contract No. - 042712-1
 Calculated By - Drawing No. - FP-01/FP-02
 Construction: (X) Combustible () Non-Combustible Ceiling Height - VARIES
 Occupancy - LIGHT HAZARD

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

S Other

T Specific Ruling Made By Date

	Specific Ruling	Made By	Date
M	Area of Sprinkler Operation - 900	System Type	Sprinkler/Nozzle
	Density - .1	(X) Wet	Make GLOBE
D	Area Per Sprinkler - 225	() Dry	Model GL5606
E	Elevation at Highest Outlet - 43	() Deluge	Size 1/2"
S	Hose Allowance - Inside -	() Preaction	K-Factor 5.6
I	Rack Sprinkler Allowance -	() Other	Temp.Rat.165
G	Hose Allowance - Outside - 100		

N Note

Calculation Flow Required - 310 Press Required - 75
 Summary C-Factor Used: 120 Overhead 140 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:
 A Date of Test - 10-10-97 Cap. -
 T Time of Test - Rated Cap.- Elev.-
 E Static Press - 102 @ Press -
 R Residual Press - 88 Elev. - Well
 Flow - 1342 Proof Flow
 S Elevation -

U Location - PORTLAND STREET AND PREBLE STREET

P Source of Information - PORTLAND WATER DISTRICT

Y

C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method:	%	Palletized % Rack
	() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S	() Double Row	() Slave Pallet	() Solid Shelf () Non
T	() Mult. Row		() Open Shelf

R K Flue Spacing Clearance:Storage to Ceiling
 A Longitudinal Transverse

G Horizontal Barriers Provided:

E

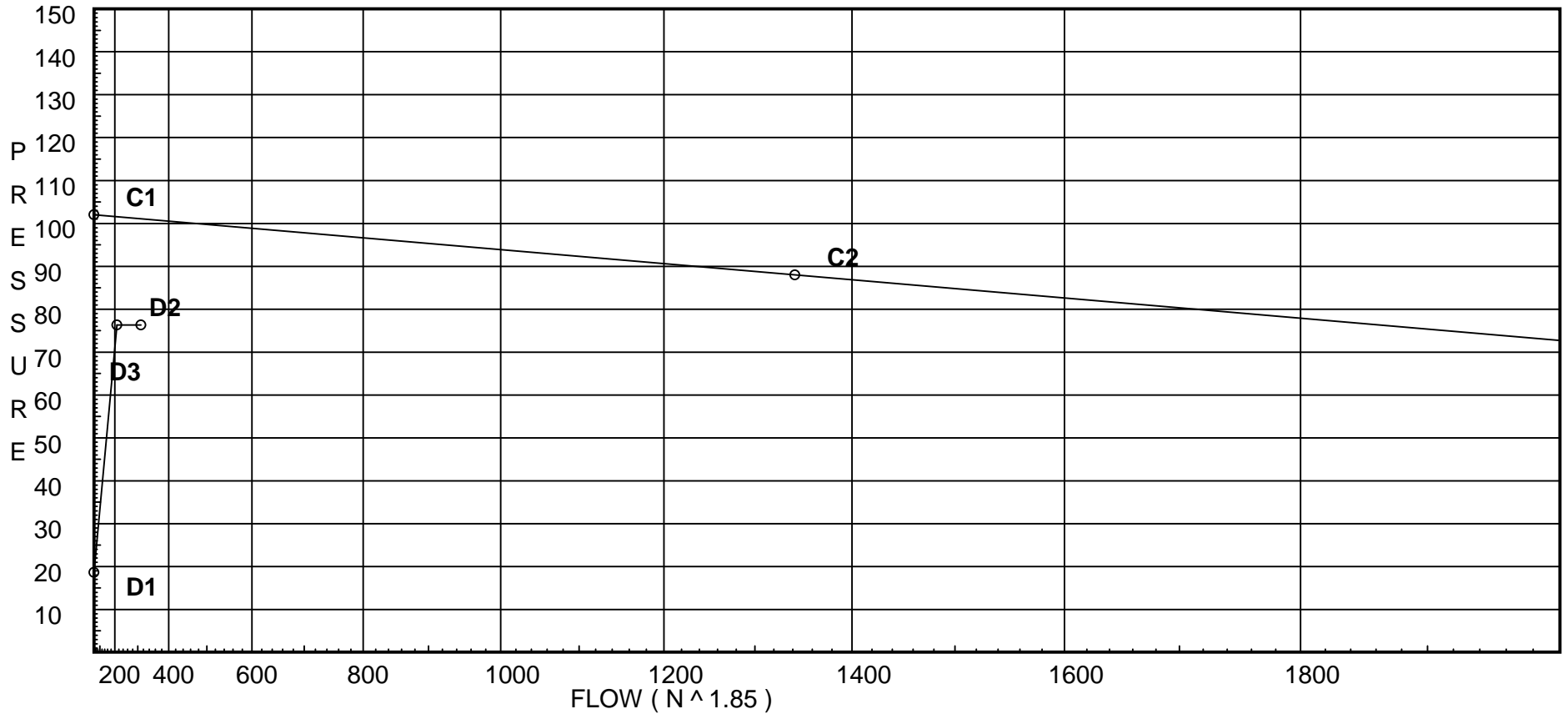
Water Supply Curve (C)

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City Water Supply:
C1 - Static Pressure : 102
C2 - Residual Pressure: 88
C2 - Residual Flow : 1342

Demand:
D1 - Elevation : 18.623
D2 - System Flow : 211.684
D2 - System Pressure : 76.286
Hose (Adj City) :
Hose (Demand) : 100
D3 - System Demand : 311.684
Safety Margin : 24.774



Fittings Used Summary

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Fitting Legend		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
Abbrev.	Name																				
B	Generic Butterfly Valve	0	0	0	5	6	7.5	7	10	0	12	9	10	12	19	21	0	0	0	0	0
Cv	Check Viking D1-G1							6	10		13		20	23							
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
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
V	90' Ell Firelock #001	0	0	0	0	0	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
Zib	Wilkins 350A	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units Inches
 Length Units Feet
 Flow Units US Gallons per Minute
 Pressure Units Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
DP1	41.0	5.6	16.14	na	22.5	0.1	225	7.0
10	43.0	K = K @ EQO1	35.36	na	22.5			
11	43.0	K = K @ EQO1	35.54	na	22.56			
12	43.0	K = K @ EQO1	36.7	na	22.92			
13	43.0	K = K @ EQO1	38.98	na	23.63			
14	43.0	K = K @ EQO1	41.02	na	24.23			
20	43.0	K = K @ EQO1	39.21	na	23.7			
21	43.0	K = K @ EQO1	39.46	na	23.77			
22	43.0	K = K @ EQO1	40.31	na	24.02			
23	43.0	K = K @ EQO1	41.43	na	24.36			
M1	43.0		41.42	na				
M2	43.0		41.84	na				
M3	43.0		43.2	na				
M4	43.0		46.98	na				
R3	43.0		53.13	na				
R2	28.0		59.76	na				
R1	18.0		64.22	na				
R	8.0		68.66	na				
B1	3.0		71.28	na				
B2	3.0		71.33	na				
UND	-4.0		77.83	na				
U1	-4.0		77.87	na				
U2	-10.0		80.5	na				
U3	-16.0		83.11	na				
TEST	0.0		76.29	na	100.0			

The maximum velocity is 13.23 and it occurs in the pipe between nodes 13 and M1

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftnng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
DP1	22.50	1.049	1E 2.0	2.000	16.143			K Factor = 5.60	
to		120.0	1T 5.0	7.000	17.757				
EQO1	22.5	0.1619	0.0	9.000	1.457			Vel = 8.35	
	0.0								
	22.50				35.357			K Factor = 3.78	
10	22.50	1.682	0.0	11.000	35.357			K Factor @ node EQO1	
to		120.0	0.0	0.0	0.0				
11	22.5	0.0162	0.0	11.000	0.178			Vel = 3.25	
11	22.56	1.682	2E 9.9	9.900	35.535			K Factor @ node EQO1	
to		120.0	0.0	9.900	0.0				
12	45.06	0.0587	0.0	19.800	1.162			Vel = 6.51	
12	22.92	1.682	2E 9.9	8.300	36.697			K Factor @ node EQO1	
to		120.0	0.0	9.900	0.0				
13	67.98	0.1255	0.0	18.200	2.284			Vel = 9.82	
13	23.62	1.682	1T 9.9	1.300	38.981			K Factor @ node EQO1	
to		120.0	0.0	9.900	0.0				
M1	91.6	0.2180	0.0	11.200	2.442			Vel = 13.23	
	0.0								
	91.60				41.423			K Factor = 14.23	
14	24.23	1.682	1T 9.9	11.900	41.017			K Factor @ node EQO1	
to		120.0	0.0	9.900	0.0				
M1	24.23	0.0186	0.0	21.800	0.406			Vel = 3.50	
	0.0								
	24.23				41.423			K Factor = 3.76	
20	23.70	1.682	0.0	14.000	39.213			K Factor @ node EQO1	
to		120.0	0.0	0.0	0.0				
21	23.7	0.0179	0.0	14.000	0.250			Vel = 3.42	
21	23.77	1.682	0.0	13.100	39.463			K Factor @ node EQO1	
to		120.0	0.0	0.0	0.0				
22	47.47	0.0646	0.0	13.100	0.846			Vel = 6.85	
22	24.02	1.682	1T 9.9	1.200	40.309			K Factor @ node EQO1	
to		120.0	0.0	9.900	0.0				
M2	71.49	0.1378	0.0	11.100	1.530			Vel = 10.32	
	0.0								
	71.49				41.839			K Factor = 11.05	
23	24.36	1.682	1T 9.9	11.900	41.429			K Factor @ node EQO1	
to		120.0	0.0	9.900	0.0				
M2	24.36	0.0188	0.0	21.800	0.410			Vel = 3.52	
	0.0								
	24.36				41.839			K Factor = 3.77	
M1	115.84	2.635	0.0	11.000	41.423				
to		120.0	0.0	0.0	0.0				
M2	115.84	0.0378	0.0	11.000	0.416			Vel = 6.82	

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	*****
M2	95.84	2.635		11.800	41.839				
to		120.0		0.0	0.0				
M3	211.68	0.1153		11.800	1.361		Vel = 12.45		
M3	0.0	2.635	1V	5.903	26.900	43.200			
to		120.0		0.0	5.903	0.0			
M4	211.68	0.1153		0.0	32.803	3.783	Vel = 12.45		
M4	0.0	2.635	1V	5.903	3.500	46.983			
to		120.0	1B	9.61	23.750	3.000	* Fixed loss = 3		
R3	211.68	0.1153	1Fsp 1Cv	0.0 8.237	27.250	3.143	Vel = 12.45		
	0.0								
	211.68				53.126		K Factor = 29.04		
R3	211.68	4.26		12.000	53.126				
to		120.0		0.0	6.496				
R2	211.68	0.0112		12.000	0.134		Vel = 4.76		
R2	0.0	4.26		12.000	59.756				
to		120.0		0.0	4.331				
R1	211.68	0.0111		12.000	0.133		Vel = 4.76		
R1	0.0	4.26		10.000	64.220				
to		120.0		0.0	4.331				
R	211.68	0.0112		10.000	0.112		Vel = 4.76		
R	0.0	4.26		40.500	68.663				
to		120.0		0.0	2.166				
B1	211.68	0.0111		40.500	0.449		Vel = 4.76		
B1	0.0	4.26		5.000	71.278				
to		120.0		0.0	0.0				
B2	211.68	0.0112		5.000	0.056		Vel = 4.76		
B2	0.0	4.26	1V	8.954	3.000	71.334			
to		120.0	1Zib	0.0	8.954	6.364	* Fixed loss = 3.333		
UND	211.68	0.0111		0.0	11.954	0.133	Vel = 4.76		
UND	0.0	6.16	1V	10.786	10.000	77.831			
to		120.0		0.0	10.786	0.0			
U1	211.68	0.0018		0.0	20.786	0.038	Vel = 2.28		
U1	0.0	8.27	1E	28.468	20.000	77.869			
to		140.0	1G	6.326	90.148	2.599			
U2	211.68	0.0003	1T	55.354	110.148	0.036	Vel = 1.26		
U2	0.0	16.41	1T	166.859	200.000	80.504			
to		140.0		0.0	166.860	2.599			
U3	211.68	0.0		0.0	366.860	0.004	Vel = 0.32		
U3	0.0	6.16	1T	43.037	35.000	83.107			
to		140.0		0.0	43.037	-6.930			
TEST	211.68	0.0014		0.0	78.037	0.109	Vel = 2.28		

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	*****
	100.00								Qa = 100.00
	311.68				76.286				K Factor = 35.69