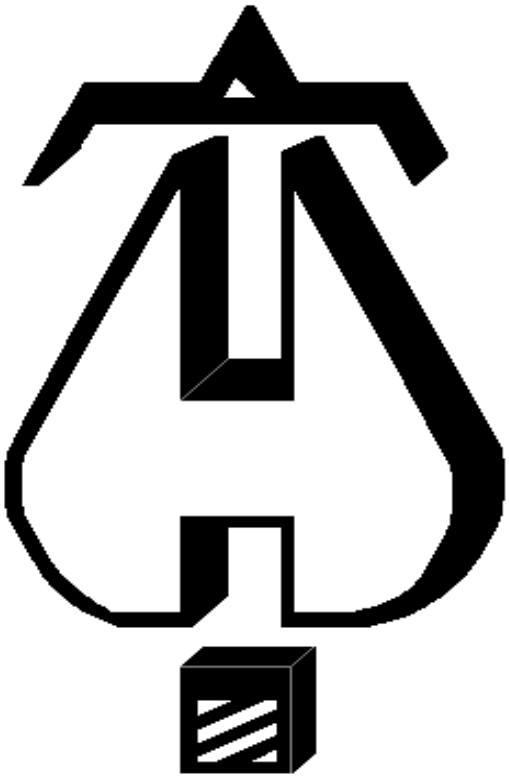


. . . Fire Protection by Computer Design

METROPOLITAN FIRE PROTECTION
460 PARKWAY BOULEVARD
BROOMALL, PA 19008
484-421-3021

Job Name	:	BERLIN CITY TOYOTA
Building	:	191 RIVERSIDE STREET
Location	:	PORTLAND, MAINE 04103
System	:	#1 AREA#1
Contract	:	
Data File	:	Berlin City Toyota HC.WXF

Hydraulic Design Information Sheet

Name - BERLIN CITY TOYOTA — Date - 4/4/12
Location - PORTLAND, MAINE 04103
Building - 191 RIVERSIDE STREET — System No. - #1 AREA#1
Contractor - — Contract No. -
Calculated By - TIM VESS — Drawing No. - FP-2
Construction: ( ) Combustible (X) Non-Combustible — Ceiling Height - VARIES
Occupancy - CAR DEALERSHIP

SYSTEM DESIGN

(X) NFPA 13 ( ) Lt. Haz. Ord.Haz.Gp. ( ) 1 (X) 2 ( ) 3 ( ) Ex.Haz.
( ) NFPA 231 ( ) NFPA 231C ( ) Figure Curve
Other
Specific Ruling — Made By — Date

Area of Sprinkler Operation	- 1500	System Type	Sprinkler/Nozzle
Density	- .20	(X) Wet	Make TYCO
Area Per Sprinkler	- 130.00	( ) Dry	Model TY-FRB
Elevation at Highest Outlet	- 20.00	( ) Deluge	Size 3/4"
Hose Allowance - Inside	-	( ) Preaction	K-Factor 8.0
Rack Sprinkler Allowance	-	( ) Other	Temp.Rat.155
Hose Allowance - Outside	- 250		

Note

Calculation Summary — Flow Required - 572.298 Press Required - 55.802 At Test
C-Factor Used: 120 Overhead 140 Underground

WATER SUPPLY

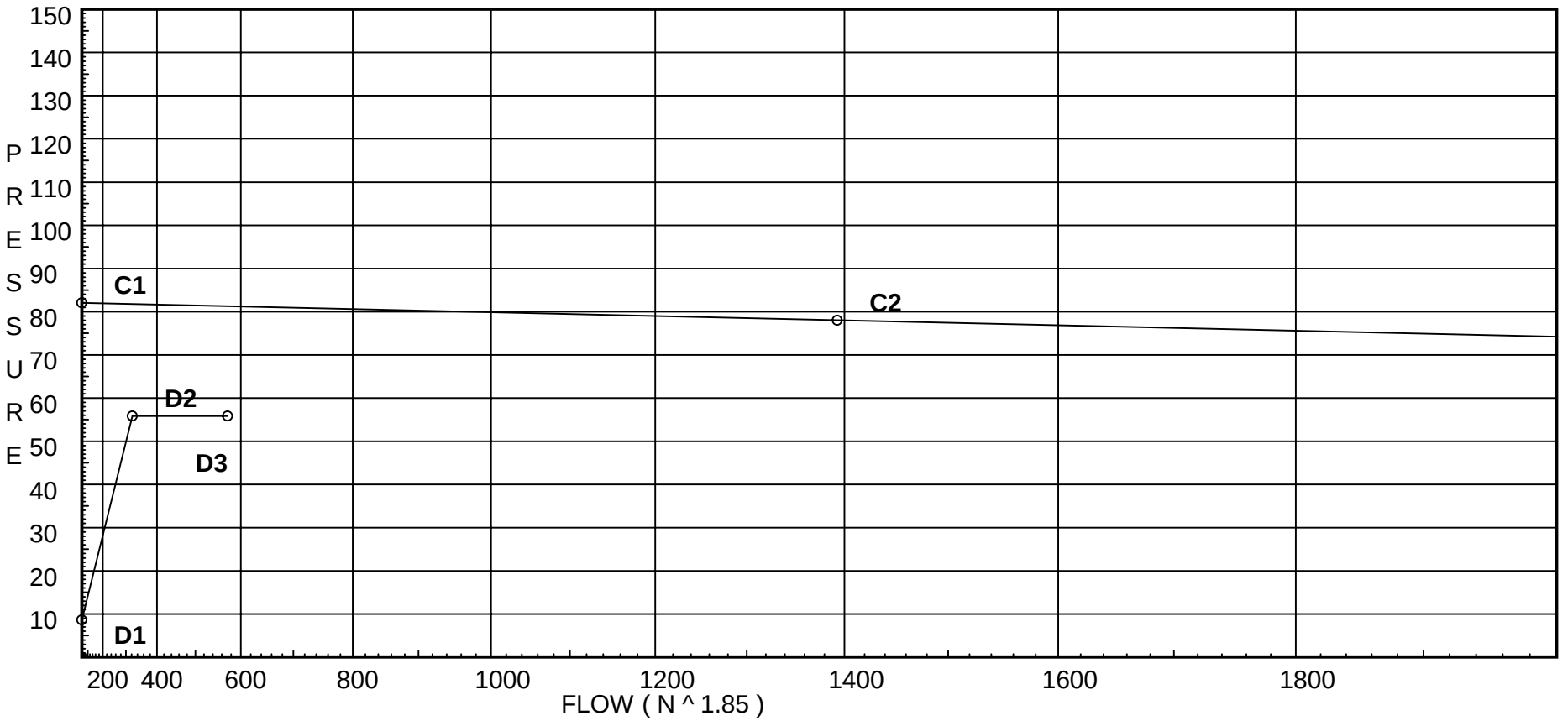
Water Flow Test:		Pump Data:		Tank or Reservoir:
Date of Test	- 9/8/2004			Cap. -
Time of Test	-	Rated Cap.-		Elev.-
Static Press	- 82	@ Press	-	
Residual Press	- 78	Elev.	-	Well
Flow	- 1393			Proof Flow
Elevation	- 0			

Location -

Source of Information - PORTLAND WATER DISTRICT

City Water Supply:
C1 - Static Pressure : 82
C2 - Residual Pressure: 78
C2 - Residual Flow : 1393

Demand:
D1 - Elevation : 8.662
D2 - System Flow : 322.298
D2 - System Pressure : 55.802
Hose (Adj City) :
Hose (Demand) : 250
D3 - System Demand : 572.298
Safety Margin : 25.427



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
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
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
33	18.5		22.98	na				
43	20.0		15.9	na				
106	20.0	8	13.44	na	29.33	0.2	130	7.0
105	20.0	8	11.63	na	27.28	0.2	130	7.0
104	20.0	8	10.8	na	26.29	0.2	130	7.0
103	20.0	8	10.57	na	26.01	0.2	130	7.0
102	20.0	8	10.57	na	26.01	0.2	130	7.0
101	20.0	8	10.81	na	26.31	0.2	130	7.0
23	20.0		27.38	na				
32	18.5		23.6	na				
42	20.0		23.29	na				
22	20.0		28.34	na				
31	18.5		23.92	na				
41	20.0		23.66	na				
21	20.0		28.52	na				
30	18.5		24.15	na				
40	20.0		23.71	na				
20	20.0		28.69	na				
29	18.5		24.4	na				
39	20.0		23.97	na				
19	20.0		29.04	na				
28	18.5		24.58	na				
38	20.0		24.34	na				
60	20.0		29.12	na				
18	20.0		30.3	na				
27	18.5		24.68	na				
37	20.0		24.31	na				
17	20.0		30.77	na				
26	18.5		24.73	na				
36	20.0		24.39	na				
16	20.0		31.49	na				
34	18.5		22.81	na				
25	18.5		24.76	na				
35	20.0		24.31	na				
15	20.0		32.35	na				
44	20.0		15.8	na				
112	20.0	8	13.38	na	29.26	0.2	130	7.0
111	20.0	8	11.59	na	27.24	0.2	130	7.0
110	20.0	8	10.78	na	26.26	0.2	130	7.0
109	20.0	8	10.56	na	26.0	0.2	130	7.0
108	20.0	8	10.56	na	26.0	0.2	130	7.0
107	20.0	8	10.81	na	26.31	0.2	130	7.0
24	20.0		27.69	na				
14	18.5		28.88	na				
13	18.5		28.95	na				
12	18.5		29.17	na				
11	18.5		29.37	na				
10	18.5		29.55	na				
9	18.5		29.91	na				
8	18.5		31.09	na				
7	18.5		31.7	na				
6	18.5		32.44	na				
5	18.5		33.35	na				
4	10.66		40.87	na				
3	7.66		43.28	na				
2	7.66		44.53	na				
1	2.0		47.44	na				

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
0	2.0		51.52	na				
TEST	0.0		55.8	na	250.0			

The maximum velocity is 17.09 and it occurs in the pipe between nodes 33 and 43

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
33	-108.43	1.61	2T	16.0	1.450	22.978		
to		120		0.0	16.000	-0.650		
43	-108.43	-0.3685		0.0	17.450	-6.431		Vel = 17.09
43	0.0	1.61		0.0	6.660	15.897		
to		120		0.0	0.0	0.0		
106	-108.43	-0.3685		0.0	6.660	-2.454		Vel = 17.09
106	29.33	1.61		0.0	8.830	13.443		K Factor = 8.00
to		120		0.0	0.0	0.0		
105	-79.1	-0.2055		0.0	8.830	-1.815		Vel = 12.47
105	27.28	1.61		0.0	8.830	11.628		K Factor = 8.00
to		120		0.0	0.0	0.0		
104	-51.82	-0.0941		0.0	8.830	-0.831		Vel = 8.17
104	26.29	1.61		0.0	8.830	10.797		K Factor = 8.00
to		120		0.0	0.0	0.0		
103	-25.53	-0.0254		0.0	8.830	-0.224		Vel = 4.02
103	26.01	1.61		0.0	8.830	10.573		K Factor = 8.00
to		120		0.0	0.0	0.0		
102	0.48	0.0		0.0	8.830	0.0		Vel = 0.08
102	26.01	1.61		0.0	8.830	10.573		K Factor = 8.00
to		120		0.0	0.0	0.0		
101	26.49	0.0272		0.0	8.830	0.240		Vel = 4.17
101	26.31	1.61	1T	8.0	162.160	10.813		K Factor = 8.00
to		120		0.0	8.000	0.0		
23	52.8	0.0973		0.0	170.160	16.563		Vel = 8.32
23	0.0	1.61	1T	8.0	1.450	27.376		
to		120		0.0	8.000	0.650		
13	52.8	0.0974		0.0	9.450	0.920		Vel = 8.32
	0.0							
	52.80					28.946		K Factor = 9.81
32	22.21	1.61	2T	16.0	1.450	23.601		
to		120		0.0	16.000	-0.650		
42	22.21	0.0197		0.0	17.450	0.343		Vel = 3.50
42	0.0	1.61	8E	32.0	217.000	23.294		
to		120	1T	8.0	40.000	0.0		
22	22.21	0.0196		0.0	257.000	5.042		Vel = 3.50
22	0.0	1.61	1T	8.0	1.450	28.336		
to		120		0.0	8.000	0.650		
12	22.21	0.0196		0.0	9.450	0.185		Vel = 3.50
	0.0							
	22.21					29.171		K Factor = 4.11
31	23.62	1.61	2T	16.0	1.450	23.924		
to		120		0.0	16.000	-0.650		
41	23.62	0.0220		0.0	17.450	0.384		Vel = 3.72

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
41	0.0	1.61	1T	8.0	213.000	23.658		
to		120		0.0	8.000	0.0		
21	23.62	0.0220		0.0	221.000	4.858		Vel = 3.72
21	0.0	1.61	1T	8.0	1.450	28.516		
to		120		0.0	8.000	0.650		
11	23.62	0.0219		0.0	9.450	0.207		Vel = 3.72
	0.0							
	23.62					29.373		K Factor = 4.36
30	23.94	1.61	1T	8.0	1.450	24.147		
to		120		0.0	8.000	-0.650		
40	23.94	0.0226		0.0	9.450	0.214		Vel = 3.77
40	0.0	1.61	2E	8.0	213.000	23.711		
to		120		0.0	8.000	0.0		
20	23.94	0.0225		0.0	221.000	4.980		Vel = 3.77
20	0.0	1.61	1T	8.0	1.450	28.691		
to		120		0.0	8.000	0.650		
10	23.94	0.0225		0.0	9.450	0.213		Vel = 3.77
	0.0							
	23.94					29.554		K Factor = 4.40
29	24.19	1.61	1T	8.0	1.450	24.401		
to		120		0.0	8.000	-0.650		
39	24.19	0.0231		0.0	9.450	0.218		Vel = 3.81
39	0.0	1.61	2E	8.0	213.000	23.969		
to		120		0.0	8.000	0.0		
19	24.19	0.0230		0.0	221.000	5.075		Vel = 3.81
19	0.0	1.61	1T	8.0	1.450	29.044		
to		120		0.0	8.000	0.650		
9	24.19	0.0230		0.0	9.450	0.217		Vel = 3.81
	0.0							
	24.19					29.911		K Factor = 4.42
28	34.13	1.61	1T	8.0	1.450	24.583		
to		120		0.0	8.000	-0.650		
38	34.13	0.0435		0.0	9.450	0.411		Vel = 5.38
38	0.0	1.61	1E	4.0	106.040	24.344		
to		120		0.0	4.000	0.0		
60	34.13	0.0434		0.0	110.040	4.779		Vel = 5.38
60	0.0	2.157	1E	6.153	106.120	29.123		
to		120		0.0	6.153	0.0		
18	34.13	0.0104		0.0	112.273	1.173		Vel = 3.00
18	0.0	2.157	1T	12.307	1.450	30.296		
to		120		0.0	12.307	0.650		
8	34.13	0.0105		0.0	13.757	0.144		Vel = 3.00

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
	0.0							
	34.13					31.090		K Factor = 6.12
27	27.61	1.61	1T	8.0	1.450	24.682		
to		120		0.0	8.000	-0.650		
37	27.61	0.0294		0.0	9.450	0.278		Vel = 4.35
37	0.0	1.61	2E	8.0	212.160	24.310		
to		120		0.0	8.000	0.0		
17	27.61	0.0293		0.0	220.160	6.459		Vel = 4.35
17	0.0	1.61	1T	8.0	1.450	30.769		
to		120		0.0	8.000	0.650		
7	27.61	0.0293		0.0	9.450	0.277		Vel = 4.35
	0.0							
	27.61					31.696		K Factor = 4.90
26	29.06	1.61	1T	8.0	1.450	24.732		
to		120		0.0	8.000	-0.650		
36	29.06	0.0323		0.0	9.450	0.305		Vel = 4.58
36	0.0	1.61	2E	8.0	212.160	24.387		
to		120		0.0	8.000	0.0		
16	29.06	0.0322		0.0	220.160	7.100		Vel = 4.58
16	0.0	1.61	1T	8.0	1.450	31.487		
to		120		0.0	8.000	0.650		
6	29.06	0.0322		0.0	9.450	0.304		Vel = 4.58
	0.0							
	29.06					32.441		K Factor = 5.10
34	107.72	3.26		0.0	14.660	22.806		
to		120		0.0	0.0	0.0		
33	107.72	0.0117		0.0	14.660	0.172		Vel = 4.14
33	108.43	3.26		0.0	14.660	22.978		
to		120		0.0	0.0	0.0		
32	216.15	0.0425		0.0	14.660	0.623		Vel = 8.31
32	-22.21	3.26		0.0	9.290	23.601		
to		120		0.0	0.0	0.0		
31	193.94	0.0348		0.0	9.290	0.323		Vel = 7.45
31	-23.62	3.26		0.0	8.160	23.924		
to		120		0.0	0.0	0.0		
30	170.32	0.0273		0.0	8.160	0.223		Vel = 6.55
30	-23.95	3.26		0.0	12.290	24.147		
to		120		0.0	0.0	0.0		
29	146.37	0.0207		0.0	12.290	0.254		Vel = 5.63
29	-24.19	3.26		0.0	12.290	24.401		
to		120		0.0	0.0	0.0		
28	122.18	0.0148		0.0	12.290	0.182		Vel = 4.70

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
28	-34.13	3.26		0.0	12.290	24.583		
to		120		0.0	0.0	0.0		
27	88.05	0.0081		0.0	12.290	0.099		Vel = 3.38
27	-27.61	3.26		0.0	12.290	24.682		
to		120		0.0	0.0	0.0		
26	60.44	0.0041		0.0	12.290	0.050		Vel = 2.32
26	-29.06	3.26	1E	9.408	12.290	24.732		
to		120		0.0	9.408	0.0		
25	31.38	0.0012		0.0	21.698	0.026		Vel = 1.21
25	0.0	1.61	1E	4.0	1.450	24.758		
to		120		0.0	4.000	-0.650		
35	31.38	0.0372		0.0	5.450	0.203		Vel = 4.95
35	0.0	1.61	1E	4.0	212.160	24.311		
to		120		0.0	4.000	0.0		
15	31.38	0.0372		0.0	216.160	8.035		Vel = 4.95
15	0.0	1.61	1T	8.0	1.450	32.346		
to		120		0.0	8.000	0.650		
5	31.38	0.0371		0.0	9.450	0.351		Vel = 4.95
	0.0							
	31.38					33.347		K Factor = 5.43
34	-107.72	1.61	2T	16.0	1.450	22.806		
to		120		0.0	16.000	-0.650		
44	-107.72	-0.3641		0.0	17.450	-6.353		Vel = 16.98
44	0.0	1.61		0.0	6.660	15.803		
to		120		0.0	0.0	0.0		
112	-107.72	-0.3640		0.0	6.660	-2.424		Vel = 16.98
112	29.26	1.61		0.0	8.830	13.379		K Factor = 8.00
to		120		0.0	0.0	0.0		
111	-78.46	-0.2026		0.0	8.830	-1.789		Vel = 12.36
111	27.24	1.61		0.0	8.830	11.590		K Factor = 8.00
to		120		0.0	0.0	0.0		
110	-51.22	-0.0921		0.0	8.830	-0.813		Vel = 8.07
110	26.26	1.61		0.0	8.830	10.777		K Factor = 8.00
to		120		0.0	0.0	0.0		
109	-24.96	-0.0243		0.0	8.830	-0.215		Vel = 3.93
109	26.00	1.61		0.0	8.830	10.562		K Factor = 8.00
to		120		0.0	0.0	0.0		
108	1.04	0.0001		0.0	8.830	0.001		Vel = 0.16
108	26.00	1.61		0.0	8.830	10.563		K Factor = 8.00
to		120		0.0	0.0	0.0		
107	27.04	0.0282		0.0	8.830	0.249		Vel = 4.26

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
107	26.30	1.61	1T	8.0	162.160	10.812		K Factor = 8.00
to		120		0.0	8.000	0.0		
24	53.34	0.0992		0.0	170.160	16.881		Vel = 8.41
24	0.0	1.61	1E	4.0	1.450	27.693		
to		120		0.0	4.000	0.650		
14	53.34	0.0991		0.0	5.450	0.540		Vel = 8.41
14	0.0	3.068		0.0	14.660	28.883		
to		120		0.0	0.0	0.0		
13	53.34	0.0043		0.0	14.660	0.063		Vel = 2.31
13	52.80	3.068		0.0	14.660	28.946		
to		120		0.0	0.0	0.0		
12	106.14	0.0153		0.0	14.660	0.225		Vel = 4.61
12	22.22	3.068		0.0	9.290	29.171		
to		120		0.0	0.0	0.0		
11	128.36	0.0217		0.0	9.290	0.202		Vel = 5.57
11	23.62	3.26		0.0	8.160	29.373		
to		120		0.0	0.0	0.0		
10	151.98	0.0222		0.0	8.160	0.181		Vel = 5.84
10	23.94	3.26		0.0	12.290	29.554		
to		120		0.0	0.0	0.0		
9	175.92	0.0290		0.0	12.290	0.357		Vel = 6.76
9	24.19	3.26	2E	18.815	13.160	29.911		
to		120		0.0	18.815	0.0		
8	200.11	0.0369		0.0	31.975	1.179		Vel = 7.69
8	34.14	3.26		0.0	12.290	31.090		
to		120		0.0	0.0	0.0		
7	234.25	0.0493		0.0	12.290	0.606		Vel = 9.00
7	27.61	3.26		0.0	12.290	31.696		
to		120		0.0	0.0	0.0		
6	261.86	0.0606		0.0	12.290	0.745		Vel = 10.07
6	29.06	3.26		0.0	12.290	32.441		
to		120		0.0	0.0	0.0		
5	290.92	0.0737		0.0	12.290	0.906		Vel = 11.18
5	31.38	3.26	3E	28.223	18.160	33.347		
to		120		0.0	28.223	3.396		
4	322.3	0.0890		0.0	46.383	4.129		Vel = 12.39
4	0.0	3.26	1E	9.408	3.000	40.872		
to		120		0.0	9.408	1.299		
3	322.3	0.0891		0.0	12.408	1.105		Vel = 12.39
3	0.0	4.26	2E	26.334	25.540	43.276		
to		120		0.0	26.334	0.0		
2	322.3	0.0242		0.0	51.874	1.255		Vel = 7.25

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
2	0.0	4.26	1E	13.167	5.660	44.531		
to		120		0.0	13.167	2.451		
1	322.3	0.0242		0.0	18.827	0.456		Vel = 7.25
1	0.0	4.26	2E	26.334	4.830	47.438		
to		120	1Zac	0.0	26.334	3.332		* Fixed loss = 3.332
0	322.3	0.0242		0.0	31.164	0.754		Vel = 7.25
0	0.0	8.27	4E	113.872	458.330	51.524		
to		140		0.0	113.872	3.866		* Fixed loss = 3
TEST	322.3	0.0007		0.0	572.202	0.412		Vel = 1.93
	250.00							Qa = 250.00
	572.30					55.802		K Factor = 76.61