Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 01/23/14

. . . Fire Protection by Computer Design

Dean and Allyn Inc
116 Lewiston Road
Your Street Address 2
Gray ME, 04039
(207)657-5646

Job Name	:	Portland Jetport Repipe '13 ZONE 1
Building	:	Parking Garage
Location	:	Portland Maine
System	:	
Contract	:	C131180
Data File	:	PJPREPIPE.WXF

Water Supply Curve (C)

Dean and Allyn Inc
Portland Jetport Repipe '13 ZONE 1

Page 1
Date

City Water Supply:
C1 - Static Pressure : 86
C2 - Residual Pressure: 73
C2 - Residual Flow : 2781

Demand:

D1 - Elevation	:	-0.181
D2 - System Flow	:	356.884
D2 - System Pressure	:	55.774
Hose (Adj City)	:	
Hose (Demand)	:	
D3 - System Demand	:	356.884
Safety Margin	:	29.935

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CITY OF PORTLAND, MAINE RESURGAM

Computer Programs by Hydratec Inc. Route 111 Windham N.H. USA 03087

Fittings Used Summary

Dean and Allyn Inc
Portland Jetport Repipe '13 ZONE 1

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	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
Dvc	Dry Vic 756	0	0	0	0	3	9	8	17	0	21	0	22	50	0	0	0	0	0	0	0
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
Ziu	Wilkins 975	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

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CITY OF PORTLAND, MAINE RESURGAM

Pressure / Flow Summary - STANDARD

Dean and Allyn Inc
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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density		
99	13.0	5.6	10.33	na	18.0	0.15		
99A	11.667		12.75	na				
100	11.667	5.6	12.76	na	20.0	0.15		
101	11.542	5.6	13.34	na	20.46	0.15		
102	11.417	5.6	14.57	na	21.38	0.15	120	10.32
103	11.417	5.6	16.66	na	22.86	0.15	120	10.32
104	13.0	5.6	9.68	na	17.42	0.15	92.5	7.0
104A	11.667		11.99	na				
105	11.667	5.6	12.0	na	19.4	0.15	92.5	7.0
106	11.542	5.6	12.55	na	19.84	0.15	92.5	7.0
107	11.417	5.6	13.71	na	20.74	0.15	92.5	7.0
108	11.417	5.6	15.69	na	22.18	0.15	92.5	7.0
109	13.0	5.6	9.84	na	17.57	0.15	113.75	7.0
109A	11.667		11.98	na				
110	11.667	5.6	11.99	na	19.39	0.15	113.75	9.29
111	11.542	5.6	12.54	na	19.83	0.15	113.75	9.29
112	11.417	5.6	13.71	na	20.74	0.15	113.75	9.29
113	11.417	5.6	15.69	na	22.18	0.15	113.75	9.29
114	11.417	5.6	23.89	na	27.37	0.15	120	10.32
115	11.417	5.6	24.18	na	27.54	0.15	120	10.32
89	10.167		27.7	na				
88	10.167		27.73	na				
87	10.167		27.78	na				
86	10.167		28.02	na				
86A	9.75		29.12	na				
85	10.167		36.43	na				
84	9.708		38.4	na				
83	9.458		43.49	na				
TR	21.458		39.41	na				
BR	17.458		42.53	na				
BASE	16.417		54.08	na				
HOSE	13.417		55.51	na				
TEST	13.417		55.77	na				

The maximum velocity is 16.18 and it occurs in the pipe between nodes 103 and 89

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	**
99	18.00	1.049	4E	8.0	9.208	10.332		K
to		120.0		0.0	8.000	0.577		
99A	18.0	0.1071		0.0	17.208	1.843		Vel = 6.68
99A	0.0	1.61		0.0	0.500	12.752		
to		120.0		0.0	0.0	0.0		
100	18.0	0.0120		0.0	0.500	0.006		Vel = 2.84
100	20.00	1.61		0.0	10.000	12.758		K Factor = 5.60
to		120.0		0.0	0.0	0.054		
101	38.0	0.0530		0.0	10.000	0.530		Vel = 5.99
101	20.46	1.61		0.0	10.000	13.342		K Factor = 5.60
to		120.0		0.0	0.0	0.054		
102	58.46	0.1175		0.0	10.000	1.175		Vel = 9.21
102	21.37	1.61		0.0	10.000	14.571		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
103	79.83	0.2092		0.0	10.000	2.092		Vel = 12.58
103	22.86	1.61	2E	8.0	23.500	16.663		K Factor = 5.60
to		120.0		0.0	8.000	0.541		
89	102.69	0.3333		0.0	31.500	10.498		Vel = 16.18
	0.0							
	102.69					27.702		K Factor = 19.51
104	17.42	1.049	4E	8.0	9.208	9.677		K Factor = 5.60
to		120.0		0.0	8.000	0.577		
104A	17.42	0.1008		0.0	17.208	1.735		Vel = 6.47
104A	0.0	1.61		0.0	0.500	11.989		
to		120.0		0.0	0.0	0.0		
105	17.42	0.0120		0.0	0.500	0.006		Vel = 2.75
105	19.40	1.61		0.0	10.000	11.995		K Factor = 5.60
to		120.0		0.0	0.0	0.054		
106	36.82	0.0500		0.0	10.000	0.500		Vel = 5.80
106	19.83	1.61		0.0	10.000	12.549		K Factor = 5.60
to		120.0		0.0	0.0	0.054		
107	56.65	0.1109		0.0	10.000	1.109		Vel = 8.93
107	20.74	1.61		0.0	10.000	13.712		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
108	77.39	0.1974		0.0	10.000	1.974		Vel = 12.20
108	22.18	1.61	3E	12.0	24.542	15.686		K Factor = 5.60
to		120.0		0.0	12.000	0.541		
88	99.57	0.3148		0.0	36.542	11.502		Vel = 15.69
	0.0							
	99.57					27.729		K Factor = 18.91
109	17.57	1.049	3E	6.0	9.208	9.844		K Factor = 5.60
to		120.0		0.0	6.000	0.577		
109A	17.57	0.1024		0.0	15.208	1.558		Vel = 6.52
109A	0.0	1.61		0.0	0.500	11.979		
to		120.0		0.0	0.0	0.0		
110	17.57	0.0140		0.0	0.500	0.007		Vel = 2.77
110	19.39	1.61		0.0	10.000	11.986		K Factor = 5.60
to		120.0		0.0	0.0	0.054		
111	36.96	0.0503		0.0	10.000	0.503		Vel = 5.82

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	*
111	19.83	1.61		0.0	10.000	12.543		K
to		120.0		0.0	0.0	0.054		
112	56.79	0.1114		0.0	10.000	1.114		Vel = 8.95
112	20.74	1.61		0.0	10.000	13.711		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
113	77.53	0.1981		0.0	10.000	1.981		Vel = 12.22
113	22.18	1.61	3E	12.0	24.583	15.692		K Factor = 5.60
to		120.0		0.0	12.000	0.541		
87	99.71	0.3156		0.0	36.583	11.544		Vel = 15.71
	0.0							
	99.71					27.777		K Factor = 18.92
114	27.37	1.61		0.0	10.000	23.894		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
115	27.37	0.0289		0.0	10.000	0.289		Vel = 4.31
115	27.54	1.61	2E	8.0	23.500	24.183		K Factor = 5.60
to		120.0		0.0	8.000	0.541		
86	54.91	0.1047		0.0	31.500	3.297		Vel = 8.65
	0.0							
	54.91					28.021		K Factor = 10.37
89	102.69	4.26		0.0	9.250	27.702		
to		120.0		0.0	0.0	0.0		
88	102.69	0.0029		0.0	9.250	0.027		Vel = 2.31
88	99.57	4.26		0.0	4.750	27.729		
to		120.0		0.0	0.0	0.0		
87	202.26	0.0101		0.0	4.750	0.048		Vel = 4.55
87	99.71	4.26		0.0	11.375	27.777		
to		120.0		0.0	0.0	0.0		
86	301.97	0.0215		0.0	11.375	0.244		Vel = 6.80
86	54.91	4.26		0.0	31.333	28.021		
to		120.0		0.0	0.0	0.181		
86A	356.88	0.0292		0.0	31.333	0.915		Vel = 8.03
86A	0.0	4.26	2F	10.534	246.125	29.117		
to		120.0		0.0	10.534	-0.181		
85	356.88	0.0292		0.0	256.659	7.499		Vel = 8.03
85	0.0	4.26	2E	26.334	34.125	36.435		
to		120.0		0.0	26.334	0.199		
84	356.88	0.0292		0.0	60.459	1.766		Vel = 8.03
84	0.0	4.26	3E	39.501	130.917	38.400		
to		120.0		0.0	39.501	0.108		
83	356.88	0.0292		0.0	170.418	4.979		Vel = 8.03
83	0.0	4.26	2E	26.334	12.000	43.487		
to		120.0		0.0	26.334	-5.197		
TR	356.88	0.0292		0.0	38.334	1.120		Vel = 8.03
TR	0.0	4.26	1Dvc	27.651	4.000	39.410		
to		120.0	1B	15.8	43.451	1.732		
BR	356.88	0.0292		0.0	47.451	1.386		Vel = 8.03
BR	0.0	8.249	1Ziu	0.0	7.000	42.528		
to		120.0		0.0	0.0	11.548		* Fixed loss = 11.097
BASE	356.88	0.0011		0.0	7.000	0.008		Vel = 2.14

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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	*
BASE	0.0	8.27	3E	85.404	50.000	54.084		
to		140.0	1G	6.326	91.730	1.299		
HOSE	356.88	0.0009		0.0	141.730	0.123		Vel = 2.13
HOSE	0.0	12.34	6F	121.897	2000.000	55.506		
to		140.0	1E	42.195	164.092	0.0		
TEST	356.88	0.0001		0.0	2164.092	0.268		Vel = 0.96
	0.0							
	356.88					55.774		K Factor = 47.79