General

Title: AFT Fathom Model
Analysis run on: 12/5/2011 4:28:30 PM
Application version: AFT Fathom Version 7.0 (2008.02.22)
Input File: H:\Projects\University of Wisconsin\10723-00 Platteville Master Plan\Mechanical\Flow Modeling\UWP Chilled Water Phase 2.fth

Execution Time= 0.20 seconds
Total Number Of Head/Pressure Iterations= 0
Total Number Of Flow Iterations= 2
Total Number Of Temperature Iterations= 0
Number Of Pipes= 117
Number Of Junctions= 108
Matrix Method= Gaussian Elimination

Pressure/Head Tolerance= 0.0001 relative change
Flow Rate Tolerance= 0.0001 relative change
Flow Relaxation= (Automatic)
Pressure Relaxation= (Automatic)

Constant Fluid Property Model
Fluid Database: AFT Standard
Fluid: Water at 1 atm
Max Fluid Temperature Data= 212 deg. F
Min Fluid Temperature Data= 32 deg. F
Temperature= 40 deg. F
Density= 62.42849 lbm/ft3
Viscosity= 3.74836 lbm/hr-ft
Vapor Pressure= 0.12037 psia
Viscosity Model= Newtonian

Atmospheric Pressure= 1 atm
Gravitational Acceleration= 1 g
Turbulent Flow Above Reynolds Number= 4000
Laminar Flow Below Reynolds Number= 2300

Total Inflow= 9.020E-04 gal/min
Total Outflow= 1.287E-03 gal/min
Maximum Pressure is 67.62 psia at Junction 12 Outlet
Minimum Pressure is 14.33 psia at Junction 12 Inlet

Pump Summary

Jct	Name	Vol. Flow (gal/min)	Mass Flow (lbm/sec)	dP (psid)	dH (feet)	Overall Efficiency (Percent)	Speed (Percent)	Overall Power (hp)	BEP (gal/min)	% of BEP (Percent)	NPSHA (feet)	NPSHR (feet)
12	Russell Hall Chilled Water Plant Pump	2,400	333.8	53.29	122.9	100.0	N/A	74.60	N/A	N/A	33.71	N/A
152	F1 Chiller Plant Pump	1,474	205.0	46.65	107.6	100.0	N/A	40.11	N/A	N/A	36.38	N/A

Valve Summary

Jct	Name	Valve Type	Vol. Flow (gal/min)	Mass Flow (lbm/sec)	dP Stag. (psid)	dH (feet)	P Inlet Static (psia)	Cv	K	Valve State
26	Karrmann Library Load	FCV	230.0	31.99	14.41628	33.2532	50.92	60.60	282.9249	Open
27	Karrmann Library Head Loss	PDCV	230.0	31.99	19.94243	46.0000	36.51	51.53	391.3778	Open
58	Center for the Arts Head Loss	PDCV	584.0	81.23	19.94243	46.0000	39.60	130.83	60.7052	Open
59	Center for the Arts Load	FCV	584.0	81.23	7.71713	17.8006	47.33	210.32	23.4911	Open
62	Russell Hall Head Loss	PDCV	704.0	97.92	19.94243	46.0000	34.93	157.71	119.9717	Open
63	Russell Hall Load	FCV	704.0	97.92	17.33270	39.9803	52.27	169.17	104.2718	Open
72	Boebel Hall Head Loss	PDCV	584.0	81.23	19.94243	46.0000	36.50	130.83	60.7052	Open
73	Boebel Hall Load	FCV	584.0	81.23	13.87751	32.0104	50.60	156.84	121.3199	Open
108	Doudna Hall Load	FCV	404.0	56.19	11.33511	26.1460	49.28	120.05	72.1002	Open
109	Doudna Hall Head Loss	PDCV	404.0	56.19	19.94243	46.0000	37.94	90.51	126.8496	Open
112	Pioneer Student Center/S9/S10 Load	FCV	146.0	20.31	14.95570	34.4974	51.24	37.77	2,091.9300	Open
113	Pioneer Student Center/S9/S10 Head Loss	PDCV	146.0	20.31	19.94243	46.0000	36.29	32.71	2,789.4500	Open
120	A7 Load	FCV	460.0	63.98	0.05360	0.1236	43.59	1,987.72	0.2630	Open
121	A7 Head Loss	PDCV	460.0	63.98	19.94243	46.0000	43.53	103.05	97.8445	Open
136	AR1 Load	FCV	248.0	34.49	14.41952	33.2606	50.92	65.34	243.4003	Open
137	AR1 Head Loss	PDCV	248.0	34.49	19.94243	46.0000	36.50	55.56	336.6267	Open
164	A1 Load	FCV	514.0	71.49	8.41453	19.4093	47.72	177.27	33.0657	Open
165	A1 Head Loss	PDCV	514.0	71.49	19.94243	46.0000	39.30	115.15	78.3656	Open
174	Russell Hall Chilled Water Plant Head Loss	PDCV	2,400.0	333.82	15.17359	35.0000	67.56	616.39	37.5329	Open
175	F1 Chilled Water Plant Head Loss	PDCV	1,474.0	205.02	10.83828	25.0000	62.52	447.92	430.4108	Open

Pipe Output Table

Pipe	Name	Pipe Nominal Size	Length (feet)	Vol. Flow Rate (gal/min)	Velocity (feet/sec)	dP Stag. Total (ft. H2O std.)	P Stag. In (ft. H2O std. (g))	P Stag. Out (ft. H2O std. (g))	P Static In (ft. H2O std. (g))	P Static Out (ft. H2O std. (g))	dP Static Total (ft. H2O std.)
10	R	12 inch	69.000	1,696.0	5.474	0.4955657	87.0548	86.55920	86.5891	86.0935	0.4955657
11	S 12"	12 inch	42.000	1,696.0	5.474	0.3016487	86.4975	86.19582	86.0318	85.7301	0.3016487
12	S 12"	12 inch	60.000	1,696.0	5.474	0.4309267	86.1341	85.70316	85.6684	85.2375	0.4309267
13	S 12"	12 inch	21.000	1,696.0	5.474	0.1508243	85.6414	85.49061	85.1758	85.0249	0.1508243
14	S 12"	12 inch	62.000	1,696.0	5.474	0.4452909	85.4289	84.98359	84.9632	84.5179	0.4452909
15	S 12"	12 inch	27.000	722.0	2.330	0.0414621	84.5905	84.54899	84.5061	84.4646	0.0414621
16	S 12"	12 inch	109.000	722.0	2.330	0.1673841	84.5260	84.35863	84.4416	84.2742	0.1673841
17	S 12"	12 inch	22.000	722.0	2.330	0.0337840	84.3428	84.30904	84.2584	84.2246	0.0337840
19	Pipe	12 inch	69.000	1,696.0	5.474	0.4955657	1.5405	1.04493	1.0748	0.5792	0.4955657
21	R 12"	12 inch	22.000	722.0	2.330	0.0337840	3.7982	3.76439	3.7138	3.6800	0.0337840
22	R 12"	12 inch	109.000	722.0	2.330	0.1673841	3.7486	3.58120	3.6642	3.4968	0.1673841
23	R 12"	12 inch	27.000	722.0	2.330	0.0414621	3.5582	3.51676	3.4738	3.4324	0.0414621

Pipe	Name	Pipe Nominal Size	Length (feet)	Vol. Flow Rate (gal/min)	Velocity (feet/sec)	dP Stag. Total (ft. H2O std.)	P Stag. In (ft. H2O std. (g))	P Stag. Out (ft. H2O std. (g))	P Static In (ft. H2O std. (g))	P Static Out (ft. H2O std. (g))	dP Static Total (ft. H2O std.)
24	R 12"	12 inch	62.000	1,696.0	5.474	0.4452909	3.1161	2.67082	2.6504	2.2051	0.4452909
25	R 12"	12 inch	21.000	1,696.0	5.474	0.1508243	2.6091	2.45826	2.1434	1.9926	0.1508243
26	R 12"	12 inch	42.000	1,696.0	5.474	0.3016487	1.9039	1.60223	1.4382	1.1365	0.3016487
27	R 12"	12 inch	60.000	1,696.0	5.474	0.4309267	2.3965	1.96560	1.9308	1.4999	0.4309267
28	S 6"	6 inch	22.000	230.0	2.750	0.1003244	84.1513	84.05100	84.0338	83.9335	0.1003244
29	R 6"	6 inch	22.000	230.0	2.750	0.1003228	4.0562	3.95589	3.9387	3.8384	0.1003228
30	S 6"	6 inch	35.000	230.0	2.750	0.1596070	84.0333	83.87374	83.9158	83.7562	0.1596070
31	R 6"	6 inch	35.000	230.0	2.750	0.1596070	4.2335	4.07386	4.1159	3.9563	0.1596070
32	S 6"	6 inch	38.000	230.0	2.750	0.1732876	83.8561	83.68279	83.7386	83.5653	0.1732876
33	R 6"	6 inch	38.000	230.0	2.750	0.1732876	4.4244	4.25112	4.3069	4.1336	0.1732876
35	Pipe	6 inch	1.000	230.0	2.750	0.0045602	50.4294	50.42480	50.3118	50.3073	0.0045602
37	S 10"	10 inch	209.000	988.0	4.485	1.2823277	84.1513	82.86900	83.8387	82.5564	1.2823277
38	R 10"	10 inch	209.000	988.0	4.485	1.2823277	5.2382	3.95589	4.9256	3.6433	1.2823277
39	S 10"	10 inch	87.000	988.0	4.485	0.5337918	82.8077	82.27393	82.4951	81.9613	0.5337918
40	R 10"	10 inch	87.000	988.0	4.485	0.5337918	5.8333	5.29949	5.5207	4.9869	0.5337918
41	S 10"	10 inch	172.000	988.0	4.485	1.0553128	82.2127	81.15735	81.9000	80.8447	1.0553128
42	R 10"	10 inch	172.000	988.0	4.485	1.0553128	6.9499	5.89456	6.6372	5.5819	1.0553128
50	S 10"	10 inch	64.000	584.0	2.651	0.1521949	81.1573	81.00514	81.0481	80.8959	0.1521949
52	R 10"	10 inch	64.000	584.0	2.651	0.1521956	7.1021	6.94987	6.9928	6.8406	0.1521956
53	S 10"	10 inch	30.000	584.0	2.651	0.0713413	80.9900	80.91865	80.8808	80.8094	0.0713413
54	R 10"	10 inch	30.000	584.0	2.651	0.0713413	7.1886	7.11722	7.0793	7.0080	0.0713413
56	S 10"	10 inch	48.000	584.0	2.651	0.1141461	80.9035	80.78934	80.7943	80.6801	0.1141461
57	S 10"	10 inch	20.000	584.0	2.651	0.0475609	7.3806	7.33302	7.2714	7.2238	0.0475609
59	S 10"	10 inch	85.000	584.0	2.651	0.2021338	7.5979	7.39574	7.4886	7.2865	0.2021338
60	R 10"	10 inch	85.000	584.0	2.651	0.2021338	80.7115	80.50934	80.6022	80.4001	0.2021338
61	S 6"	6 inch	116.000	584.0	6.983	2.8279035	10.7578	7.92987	10.0000	7.1721	2.8279035
62	R 6"	6 inch	116.000	584.0	6.983	2.8279035	80.3167	77.48881	79.5589	76.7310	2.8279035
63	Pipe	6 inch	1.000	584.0	6.983	0.0243785	58.2353	58.21090	57.4775	57.4531	0.0243785
64	S 6"	6 inch	50.000	584.0	6.983	1.2189239	12.2105	10.99159	11.4528	10.2338	1.2189239
65	R 6"	6 inch	50.000	584.0	6.983	1.2189239	77.2550	76.03606	76.4972	75.2783	1.2189239
66	Pipe	12 inch	70.000	2,400.0	7.746	0.9449288	1.0449	0.10000	0.1124	-0.8325	0.9449288
67	Pipe	12 inch	1.000	2,400.0	7.746	0.0134990	123.0135	122.99999	122.0810	122.0675	0.0134990
69	Pipe	8 inch	1.000	704.0	4.967	0.0096071	1.0545	1.04493	0.6711	0.6615	0.0096071
70	Pipe	8 inch	1.000	704.0	4.967	0.0096060	87.0548	87.04516	86.6713	86.6617	0.0096060
71	Pipe	8 inch	1.000	704.0	4.967	0.0096060	47.0645	47.05493	46.6811	46.6715	0.0096060
72	S 12"	12 inch	150.000	642.0	2.072	0.1865236	84.5472	84.36071	84.4805	84.2940	0.1865236
73	R 12"	12 inch	150.000	642.0	2.072	0.1865236	3.7723	3.58581	3.7056	3.5191	0.1865236
74	R 12"	12 inch	10.000	642.0	2.072	0.0124349	3.5770	3.56453	3.5102	3.4978	0.0124349
75	S 12"	12 inch	10.000	642.0	2.072	0.0124349	84.5685	84.55608	84.5018	84.4894	0.0124349

Pipe	Name	Pipe Nominal Size	Length (feet)	Vol. Flow Rate (gal/min)	Velocity (feet/sec)	dP Stag. Total (ft. H2O std.)	P Stag. In (ft. H2O std. (g))	P Stag. Out (ft. H2O std. (g))	P Static In (ft. H2O std. (g))	P Static Out (ft. H2O std. (g))	dP Static Total (ft. H2O std.)
76	R 8"	8 inch	67.000	584.0	4.120	0.4593844	4.0239	3.56453	3.7601	3.3007	0.4593844
77	S 8"	8 inch	67.000	584.0	4.120	0.4593836	84.5685	84.10914	84.3047	83.8453	0.4593836
78	R 8"	8 inch	75.000	584.0	4.120	0.5142354	4.5753	4.06104	4.3114	3.7972	0.5142354
79	S 8"	8 inch	75.000	584.0	4.120	0.5142354	84.0720	83.55778	83.8082	83.2939	0.5142354
81	S 8"	8 inch	14.000	584.0	4.120	0.0959906	83.1802	83.08426	82.9164	82.8204	0.0959906
83	S 8"	8 inch	42.000	584.0	4.120	0.2879718	83.5207	83.23268	83.2568	82.9688	0.2879718
84	R 8"	8 inch	42.000	584.0	4.120	0.2879718	4.9004	4.61239	4.6365	4.3485	0.2879718
85	R 8"	8 inch	14.000	584.0	4.120	0.0959906	5.0488	4.95280	4.7849	4.6890	0.0959906
86	Pipe	10 inch	20.000	584.0	2.651	0.0475609	80.7742	80.72663	80.6650	80.6174	0.0475609
87	Pipe	10 inch	48.000	584.0	2.651	0.1141461	7.3179	7.20372	7.2086	7.0945	0.1141461
88	Pipe	12 inch	1.000	2,400.0	7.746	0.0134990	0.1000	0.08650	-0.8325	-0.8460	0.0134990
91	Pipe	6 inch	1.000	584.0	6.983	0.0243785	51.0736	51.04919	50.3158	50.2914	0.0243785
103	Pipe	10 inch	72.000	584.0	2.651	0.1712192	80.5093	80.33812	80.4001	80.2289	0.1712192
104	Pipe	10 inch	72.000	584.0	2.651	0.1712192	7.7691	7.59787	7.6599	7.4886	0.1712192
115	Pipe	6 inch	5.000	404.0	4.831	0.0626864	7.0126	6.94987	6.6499	6.5872	0.0626864
116	Pipe	6 inch	5.000	404.0	4.831	0.0626865	81.1573	81.09465	80.7947	80.7320	0.0626865
117	Pipe	6 inch	46.000	404.0	4.831	0.5767161	7.6437	7.06702	7.2811	6.7044	0.5767161
118	Pipe	6 inch	46.000	404.0	4.831	0.5767161	81.0402	80.46346	80.6776	80.1008	0.5767161
119	Pipe	6 inch	1.000	404.0	4.831	0.0125373	53.9870	53.97442	53.6243	53.6118	0.0125373
120	Pipe	6 inch	22.000	404.0	4.831	0.2758208	80.4090	80.13318	80.0464	79.7705	0.2758208
121	Pipe	6 inch	22.000	404.0	4.831	0.2758208	7.9740	7.69821	7.6114	7.3356	0.2758208
122	Pipe	12 inch	66.000	496.0	1.601	0.0516734	84.3607	84.30904	84.3209	84.2692	0.0516734
123	Pipe	12 inch	33.000	496.0	1.601	0.0258367	3.7982	3.77234	3.7583	3.7325	0.0258367
124	Pipe	8 inch	78.000	146.0	1.030	0.0448586	84.3607	84.31586	84.3442	84.2994	0.0448586
125	Pipe	8 inch	78.000	146.0	1.030	0.0448574	3.8172	3.77234	3.8007	3.7558	0.0448574
126	Pipe	8 inch	1.000	146.0	1.030	0.0005751	49.8182	49.81758	49.8017	49.8011	0.0005751
127	S 12"	12 inch	40.000	1,218.0	3.931	0.1577147	84.3090	84.15133	84.0689	83.9112	0.1577147
128	R 12"	12 inch	40.000	1,218.0	3.931	0.1577147	3.9559	3.79817	3.7157	3.5580	0.1577147
129	Pipe	6 inch	335.000	460.0	5.500	5.3072133	84.9836	79.67638	84.5135	79.2062	5.3072133
130	Pipe	6 inch	335.000	460.0	5.500	5.3072119	8.4233	3.11611	7.9532	2.6460	5.3072119
131	Pipe	6 inch	750.000	460.0	5.500	11.8818207	79.5766	67.69481	79.1065	67.2247	11.8818207
132	Pipe	6 inch	750.000	460.0	5.500	11.8818207	20.4049	8.52307	19.9348	8.0529	11.8818207
133	Pipe	6 inch	1.000	460.0	5.500	0.0158424	66.9961	66.98030	66.5260	66.5102	0.0158424
134	Pipe	6 inch	30.000	460.0	5.500	0.4752728	67.5951	67.11979	67.1249	66.6497	0.4752728
135	Pipe	6 inch	30.000	460.0	5.500	0.4752728	20.9799	20.50464	20.5098	20.0345	0.4752728
136	Pipe	16 inch	92.000	1,226.0	2.513	0.1231744	84.6917	84.56851	84.5936	84.4704	0.1231744
137	Pipe	16 inch	92.000	1,226.0	2.513	0.1231744	3.5645	3.44136	3.4664	3.3432	0.1231744
138	Pipe	16 inch	260.000	1,226.0	2.513	0.3481016	3.4287	3.08061	3.3306	2.9825	0.3481016
139	Pipe	16 inch	260.000	1,226.0	2.513	0.3481016	85.0524	84.70433	84.9543	84.6062	0.3481016

Pipe	Name	Pipe Nominal Size	Length (feet)	Vol. Flow Rate (gal/min)	Velocity (feet/sec)	dP Stag. Total (ft. H2O std.)	P Stag. In (ft. H2O std. (g))	P Stag. Out (ft. H2O std. (g))	P Static In (ft. H2O std. (g))	P Static Out (ft. H2O std. (g))	dP Static Total (ft. H2O std.)
140	Pipe	20 inch	301.000	1,226.0	1.608	0.1379686	85.1952	85.05728	85.1551	85.0171	0.1379686
141	Pipe	20 inch	301.000	1,226.0	1.608	0.1379686	3.0680	2.93001	3.0278	2.8898	0.1379686
142	Pipe	20 inch	7.000	1,226.0	1.608	0.0032086	85.2053	85.20210	85.1651	85.1619	0.0032086
143	Pipe	20 inch	7.000	1,226.0	1.608	0.0032086	2.9232	2.91995	2.8830	2.8798	0.0032086
147	Pipe	20 inch	157.000	1,226.0	1.608	0.0719637	85.2773	85.20531	85.2371	85.1651	0.0719637
148	Pipe	20 inch	157.000	1,226.0	1.608	0.0719637	2.9199	2.84798	2.8798	2.8078	0.0719637
149	Pipe	6 inch	303.000	248.0	2.965	1.5813847	85.2773	83.69589	85.1406	83.5592	1.5813847
150	Pipe	6 inch	303.000	248.0	2.965	1.5813864	4.4294	2.84798	4.2927	2.7113	1.5813864
151	Pipe	6 inch	1.000	248.0	2.965	0.0052191	50.4350	50.42976	50.2983	50.2931	0.0052191
152	Pipe	20 inch	73.000	1,474.0	1.933	0.0466239	85.3239	85.27728	85.2658	85.2192	0.0466239
153	Pipe	20 inch	73.000	1,474.0	1.933	0.0466242	2.8480	2.80136	2.7899	2.7433	0.0466242
154	Pipe	20 inch	46.000	1,474.0	1.933	0.0293796	85.3632	85.33380	85.3051	85.2757	0.0293796
155	Pipe	20 inch	56.000	1,474.0	1.933	0.0357665	2.7915	2.75569	2.7334	2.6976	0.0357665
169	Pipe	12 inch	60.000	2,400.0	7.746	0.8099394	87.8647	87.05476	86.9322	86.1222	0.8099394
170	R 12"	12 inch	62.000	1,236.0	3.989	0.2510300	3.3671	3.11611	3.1198	2.8688	0.2510300
171	S 12"	12 inch	62.000	1,236.0	3.989	0.2510300	84.9836	84.73256	84.7363	84.4852	0.2510300
172	Pipe	6 inch	98.000	514.0	6.146	1.8969613	84.5905	82.69349	84.0035	82.1065	1.8969613
173	Pipe	6 inch	98.000	514.0	6.146	1.8969620	5.4137	3.51676	4.8267	2.9298	1.8969620
174	R 12"	12 inch	27.000	1,236.0	3.989	0.1093195	3.5168	3.40744	3.2694	3.1601	0.1093195
175	S 12"	12 inch	27.000	1,236.0	3.989	0.1093195	84.6998	84.59045	84.4524	84.3431	0.1093195
176	Pipe	6 inch	245.000	514.0	6.146	4.7424035	82.6053	77.86292	82.0183	77.2759	4.7424035
177	Pipe	6 inch	245.000	514.0	6.146	4.7424035	10.2443	5.50189	9.6573	4.9149	4.7424035
178	Pipe	6 inch	1.000	514.0	6.146	0.0193567	57.3588	57.33939	56.7718	56.7524	0.0193567
179	Pipe	6 inch	52.000	514.0	6.146	1.0065509	77.7748	76.76820	77.1878	76.1812	1.0065509
180	Pipe	6 inch	52.000	514.0	6.146	1.0065509	11.3390	10.33246	10.7520	9.7455	1.0065509
181	Pipe	12 inch	10.000	2,400.0	7.746	0.1349898	123.0000	122.86500	122.0675	121.9325	0.1349898
182	Pipe	20 inch	10.000	1,474.0	1.933	0.0063869	110.3698	110.36340	110.3117	110.3053	0.0063869

All Junction Table

Jct	Name	P Static In (ft. H2O std. (g))	P Static Out (ft. H2O std. (g))	P Stag. In (ft. H2O std. (g))	P Stag. Out (ft. H2O std. (g))	Vol. Flow Rate Thru Jct (gal/min)	dP Stag. Total (ft. H2O std.)	dP Static Total (ft. H2O std.)
3	Bend	1.4999	1.4382	1.96560	1.9039	1,696.0	0.061730	6.173E-02
4	Bend	1.1365	1.0748	1.60223	1.5405	1,696.0	0.061730	6.173E-02
5	Bend	1.9926	1.9308	2.45826	2.3965	1,696.0	0.061730	6.173E-02
6	Bend	2.2051	2.1434	2.67082	2.6091	1,696.0	0.061730	6.173E-02
7	Bend	3.1601	3.1198	3.40744	3.3671	1,236.0	0.040300	4.030E-02
8	Bend	3.4968	3.4738	3.58120	3.5582	722.0	0.022983	2.298E-02

Jct	Name	P Static In (ft. H2O std. (g))	P Static Out (ft. H2O std. (g))	P Stag. In (ft. H2O std. (g))	P Stag. Out (ft. H2O std. (g))	Vol. Flow Rate Thru Jct (gal/min)	dP Stag. Total (ft. H2O std.)	dP Static Total (ft. H2O std.)
9	Bend	3.6800	3.6642	3.76439	3.7486	722.0	0.015803	1.580E-02
10	Tee or Wye	3.6914	3.6914	3.79817	3.7982	N/A	0.000000	0.000E+00
11	Tee or Wye	3.7406	3.7406	3.95589	3.9559	N/A	0.000000	0.000E+00
12	Russell Hall Chilled Water Plant Pump	-0.8460	122.0810	0.08650	123.0135	2,400.0	-122.926987	-1.229E+02
13	Bend	86.0935	86.0318	86.55920	86.4975	1,696.0	0.061730	6.173E-02
14	Bend	85.7301	85.6684	86.19582	86.1341	1,696.0	0.061730	6.173E-02
15	Bend	85.2375	85.1758	85.70316	85.6414	1,696.0	0.061730	6.173E-02
16	Bend	85.0249	84.9632	85.49061	85.4289	1,696.0	0.061730	6.173E-02
17	Bend	84.4646	84.4416	84.54899	84.5260	722.0	0.022983	2.298E-02
18	Bend	84.2742	84.2584	84.35863	84.3428	722.0	0.015803	1.580E-02
19	Tee or Wye	84.2023	84.2023	84.30904	84.3090	N/A	0.000000	0.000E+00
20	Tee or Wye	83.9360	83.9360	84.15133	84.1513	N/A	0.000000	0.000E+00
21	Bend	84.4852	84.4524	84.73256	84.6998	1,236.0	0.032786	3.279E-02
22	Bend	83.9335	83.9158	84.05100	84.0333	230.0	0.017654	1.765E-02
23	Bend	3.9563	3.9387	4.07386	4.0562	230.0	0.017654	1.765E-02
24	Bend	83.7562	83.7386	83.87374	83.8561	230.0	0.017654	1.765E-02
25	Bend	4.1336	4.1159	4.25112	4.2335	230.0	0.017654	1.765E-02
26	Karrmann Library Load	83.5653	50.3118	83.68279	50.4294	230.0	33.253433	3.325E+01
27	Karrmann Library Head Loss	50.3073	4.3069	50.42480	4.4244	230.0	46.000389	4.600E+01
28	Bend	4.9869	4.9256	5.29949	5.2382	988.0	0.061275	6.128E-02
29	Bend	82.5564	82.4951	82.86900	82.8077	988.0	0.061275	6.128E-02
30	Bend	81.9613	81.9000	82.27393	82.2127	988.0	0.061275	6.128E-02
31	Bend	5.5819	5.5207	5.89456	5.8333	988.0	0.061275	6.128E-02
40	Bend	7.0080	6.9928	7.11722	7.1021	584.0	0.015156	1.516E-02
41	Bend	80.8959	80.8808	81.00514	80.9900	584.0	0.015156	1.516E-02
42	Bend	80.8094	80.7943	80.91865	80.9035	584.0	0.015156	1.516E-02
43	Bend	7.0945	7.0793	7.20372	7.1886	584.0	0.015156	1.516E-02
45	Bend	80.6801	80.6650	80.78934	80.7742	584.0	0.015156	1.516E-02
52	Bend	80.6174	80.6022	80.72663	80.7115	584.0	0.015156	1.516E-02
53	Bend	7.2865	7.2714	7.39574	7.3806	584.0	0.015156	1.516E-02
56	Bend	10.2338	10.0000	10.99159	10.7578	584.0	0.233822	2.338E-01
57	Bend	76.7310	76.4972	77.48881	77.2550	584.0	0.233822	2.338E-01
58	Center for the Arts Head Loss	57.4531	11.4528	58.21090	12.2105	584.0	46.000389	4.600E+01
59	Center for the Arts Load	75.2783	57.4775	76.03606	58.2353	584.0	17.800779	1.780E+01
60	Branch	0.4737	0.4737	1.04493	1.0449	N/A	0.000000	0.000E+00
61	Branch	86.4836	86.4836	87.05476	87.0548	N/A	0.000000	0.000E+00
62	Russell Hall Head Loss	46.6715	0.6711	47.05493	1.0545	704.0	46.000389	4.600E+01
63	Russell Hall Load	86.6617	46.6811	87.04516	47.0645	704.0	39.980625	3.998E+01
64	Bend	3.5191	3.5102	3.58581	3.5770	642.0	0.008845	8.845E-03

Jct	Name	P Static In (ft. H2O std. (g))	P Static Out (ft. H2O std. (g))	P Stag. In (ft. H2O std. (g))	P Stag. Out (ft. H2O std. (g))	Vol. Flow Rate Thru Jct (gal/min)	dP Stag. Total (ft. H2O std.)	dP Static Total (ft. H2O std.)
65	Bend	84.4894	84.4805	84.55608	84.5472	642.0	0.008845	8.845E-03
68	Bend	3.7972	3.7601	4.06104	4.0239	584.0	0.037122	3.712E-02
69	Bend	83.8453	83.8082	84.10914	84.0720	584.0	0.037122	3.712E-02
70	Bend	4.3485	4.3114	4.61239	4.5753	584.0	0.037122	3.712E-02
71	Bend	83.2939	83.2568	83.55778	83.5207	584.0	0.037122	3.712E-02
72	Boebel Hall Head Loss	50.2914	4.7849	51.04919	5.0488	584.0	46.000389	4.551E+01
73	Boebel Hall Load	82.8204	50.3158	83.08426	51.0736	584.0	32.010693	3.250E+01
74	Bend	4.6890	4.6365	4.95280	4.9004	584.0	0.052437	5.244E-02
75	Bend	82.9688	82.9164	83.23268	83.1802	584.0	0.052437	5.244E-02
76	Bend	7.2238	7.2086	7.33302	7.3179	584.0	0.015156	1.516E-02
79	Assigned Pressure	-0.8325	-0.8325	0.10000	0.1000	N/A	0.000000	6.874E-08
102	Tee or Wye	80.9101	80.9101	81.15735	81.1573	N/A	0.000000	0.000E+00
103	Tee or Wye	6.7026	6.7026	6.94987	6.9499	N/A	0.000000	0.000E+00
104	Bend	80.7320	80.6776	81.09465	81.0402	404.0	0.054468	5.447E-02
105	Bend	6.7044	6.6499	7.06702	7.0126	404.0	0.054468	5.447E-02
106	Bend	80.1008	80.0464	80.46346	80.4090	404.0	0.054468	5.447E-02
107	Bend	7.3356	7.2811	7.69821	7.6437	404.0	0.054468	5.447E-02
108	Doudna Hall Load	79.7705	53.6243	80.13318	53.9870	404.0	26.146223	2.615E+01
109	Doudna Hall Head Loss	53.6118	7.6114	53.97442	7.9740	404.0	46.000389	4.600E+01
110	Tee or Wye	3.7341	3.7341	3.77234	3.7723	N/A	0.000000	0.000E+00
111	Tee or Wye	84.3225	84.3225	84.36071	84.3607	N/A	0.000000	0.000E+00
112	Pioneer Student Center/S9/S10 Load	84.2994	49.8017	84.31586	49.8182	146.0	34.497692	3.450E+01
113	Pioneer Student Center/S9/S10 Head Loss	49.8011	3.8007	49.81758	3.8172	146.0	46.000389	4.600E+01
116	Bend	79.2062	79.1065	79.67638	79.5766	460.0	0.099749	9.975E-02
117	Bend	8.0529	7.9532	8.52307	8.4233	460.0	0.099749	9.975E-02
118	Bend	67.2247	67.1249	67.69481	67.5951	460.0	0.099749	9.975E-02
119	Bend	20.0345	19.9348	20.50464	20.4049	460.0	0.099749	9.975E-02
120	A7 Load	66.6497	66.5260	67.11979	66.9961	460.0	0.123641	1.236E-01
121	A7 Head Loss	66.5102	20.5098	66.98030	20.9799	460.0	46.000389	4.600E+01
122	Tee or Wye	3.4337	3.4337	3.56453	3.5645	N/A	0.000000	0.000E+00
123	Tee or Wye	84.4377	84.4377	84.56851	84.5685	N/A	0.000000	0.000E+00
124	Bend	3.3432	3.3306	3.44136	3.4287	1,226.0	0.012641	1.264E-02
125	Bend	84.6062	84.5936	84.70433	84.6917	1,226.0	0.012641	1.264E-02
128	Bend	2.8898	2.8830	2.93001	2.9232	1,226.0	0.006850	6.850E-03
129	Bend	85.1619	85.1551	85.20210	85.1952	1,226.0	0.006850	6.850E-03
134	Tee or Wye	2.7749	2.7749	2.84798	2.8480	N/A	0.000000	0.000E+00
135	Tee or Wye	85.2042	85.2042	85.27728	85.2773	N/A	0.000000	0.000E+00
136	AR1 Load	83.5592	50.2983	83.69589	50.4350	248.0	33.260910	3.326E+01
137	AR1 Head Loss	50.2931	4.2927	50.42976	4.4294	248.0	46.000389	4.600E+01

Jct	Name	P Static In (ft. H2O std. (g))	P Static Out (ft. H2O std. (g))	P Stag. In (ft. H2O std. (g))	P Stag. Out (ft. H2O std. (g))	Vol. Flow Rate Thru Jct (gal/min)	dP Stag. Total (ft. H2O std.)	dP Static Total (ft. H2O std.)
138	Bend	2.7433	2.7334	2.80136	2.7915	1,474.0	0.009901	9.901E-03
139	Bend	85.2757	85.2658	85.33380	85.3239	1,474.0	0.009901	9.901E-03
152	F1 Chiller Plant Pump	2.6976	110.3117	2.75569	110.3698	1,474.0	-107.614082	-1.076E+02
155	Assigned Pressure	122.0675	122.0675	122.99999	123.0000	N/A	0.000000	-6.874E-08
156	Tee or Wye	84.5970	84.5970	84.98359	84.9836	N/A	0.000000	0.000E+00
157	Tee or Wye	2.7295	2.7295	3.11611	3.1161	N/A	0.000000	0.000E+00
158	Tee or Wye	3.2484	3.2484	3.51676	3.5168	N/A	0.000000	0.000E+00
159	Tee or Wye	84.3221	84.3221	84.59045	84.5905	N/A	0.000000	0.000E+00
160	Bend	4.9149	4.8267	5.50189	5.4137	514.0	0.088167	8.817E-02
161	Bend	82.1065	82.0183	82.69349	82.6053	514.0	0.088167	8.817E-02
162	Bend	77.2759	77.1878	77.86292	77.7748	514.0	0.088167	8.817E-02
163	Bend	9.7455	9.6573	10.33246	10.2443	514.0	0.088167	8.817E-02
164	A1 Load	76.1812	56.7718	76.76820	57.3588	514.0	19.409451	1.941E+01
165	A1 Head Loss	56.7524	10.7520	57.33939	11.3390	514.0	46.000389	4.600E+01
166	Bend	85.0171	84.9543	85.05728	85.0524	1,226.0	0.004849	6.278E-02
167	Bend	2.9825	3.0278	3.08061	3.0680	1,226.0	0.012641	-4.529E-02
168	Branch	85.1651	85.1651	85.20531	85.2053	1,226.0	0.000000	0.000E+00
169	Branch	2.8798	2.8798	2.91995	2.9199	1,226.0	0.000000	0.000E+00
170	Bend	7.1721	7.6599	7.92987	7.7691	584.0	0.160775	-4.878E-01
171	Bend	80.2289	79.5589	80.33812	80.3167	584.0	0.021409	6.699E-01
172	Branch	80.4001	80.4001	80.50934	80.5093	584.0	0.000000	0.000E+00
173	Branch	7.4886	7.4886	7.59787	7.5979	584.0	0.000000	0.000E+00
174	Russell Hall Chilled Water Plant Head Loss	121.9325	86.9322	122.86500	87.8647	2,400.0	35.000298	3.500E+01
175	F1 Chilled Water Plant Head Loss	110.3053	85.3051	110.36340	85.3632	1,474.0	25.000210	2.500E+01