



Hydraulic Calculations by HydraCALC

Hydratec Incorporated
64 Haverhill Road
Route 111
Windham, NH 03087
603-434-0502

Job Name : LINCOLN EQUITIES SOUTHEAST
Drawing : HIGH PILED STORAGE
Location : NY312 & PUGSLEY RD, BREWSTER, NY 10509
Remote Area : SYSTEM 5
Contract : 5031092
Data File : Lincoln Equities - BLDG A SYS 5 K22 8.23.23.WXF



Hydraulic Design Information Sheet

Name - LINCOLN EQUITIES SOUTHEAST Date - 8.23.23
Location - NY312 & PUGSLEY RD, BREWSTER, NY 10509
Building - HIGH PILED STORAGE System No. - SYSTEM 5
Contractor - SA COMUNALE Contract No. - 5031092
Calculated By - JUSTIN BEOUGHER Drawing No. - PG.7
Construction: () Combustible (X) Non-Combustible Ceiling Height - 44'-6
Occupancy - ESFR

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

S Other

T Specific Ruling

Made By

Date

M	Number of ESFR Sprinklers	- 12	System Type	Sprinkler/Nozzle
	End Head Pressure (PSI)	- 40	(X) Wet	Make RELIABLE
D	ESFR K-Factor	- 22.4	() Dry	Model P22
E	Elevation at Highest Outlet	- 43'-10 1/4	() Deluge	Size 1"
S	Hose Allowance - Inside	- 100	() Preaction	K-Factor 22.4
I	Rack Sprinkler Allowance	- NA	() Other	Temp.Rat.165
G	Hose Allowance - Outside	- 150		

N Note

Calculation Flow Required - 1966.16 Press Required - 131.298
Summary C-Factor Used: 120 Overhead 150 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test -		Cap. -
T	Time of Test -	Rated Cap.- 2000	Elev.-
E	Static Press -	@ Press - 149	
R	Residual Press -	Elev. - 2	Well
	Flow -		Proof Flow
S	Elevation -		

U Location - PUMP
P WATER STORAGE TANK
L Source of Information -
Y

C	Commodity GROUP A	CARTONED UNEXP.	Class 1-4	Location
O	Storage Ht. 40 FT		Area	Aisle W.
M	Storage Method:	Solid Piled	%	Palletized % Rack
M		() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S	R	() Double Row	() Slave Pallet	() Solid Shelf () Non
T	A	() Mult. Row		() Open Shelf
O	C			
R	K	Flue Spacing	Clearance:Storage to Ceiling	
A		Longitudinal	Transverse	
G				
E		Horizontal Barriers Provided:		

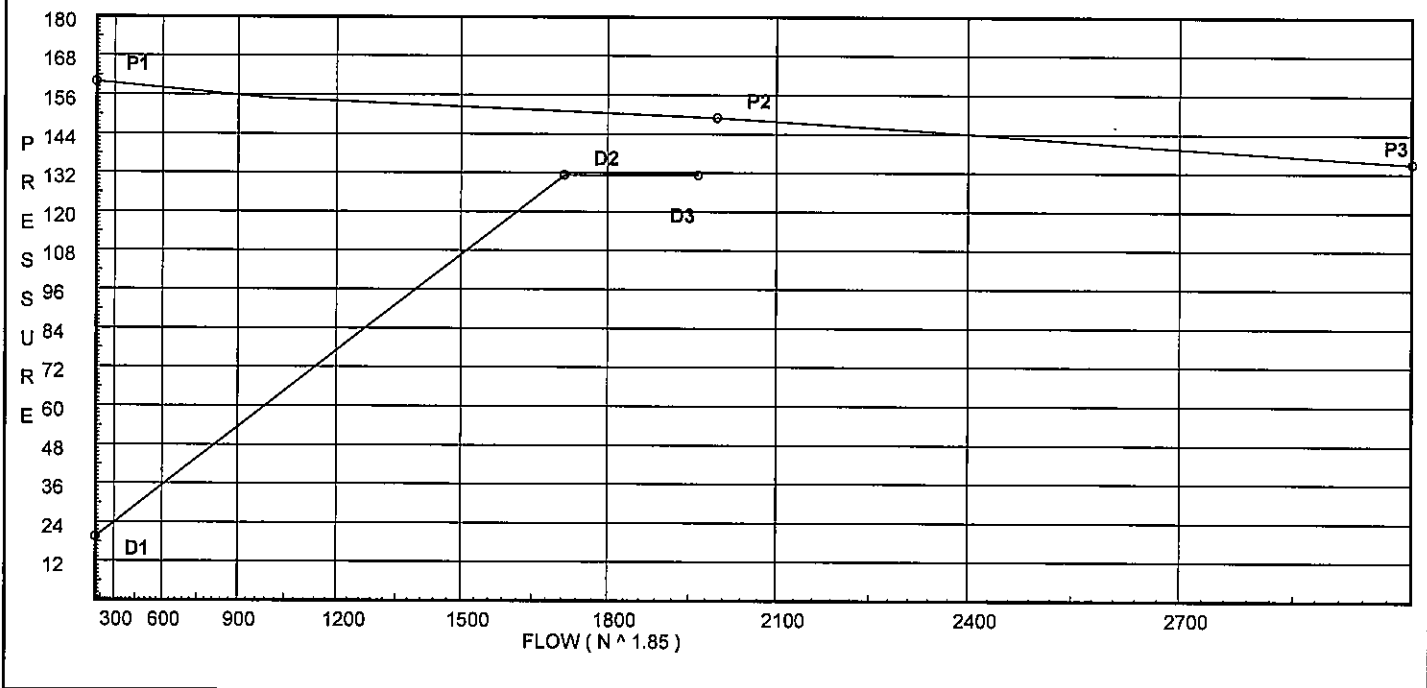
Water Supply Curve C

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Pump Data:
P1 - Pump Churn Pressure : 160
P2 - Pump Rated Pressure : 149
P2 - Pump Rated Flow : 2000
P3 - Pump Pressure @ Max Flow : 135
P3 - Pump Max Flow : 3000

Demand:
D1 - Elevation : 19,490
D2 - System Flow : 1716.16
D2 - System Pressure : 131.298
Hose (Demand) : 250
D3 - System Demand : 1966.16
Safety Margin : 17.960



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	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
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
L	NFPA 13 Long Turn Elbow	0.5	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
T	NFPA 13 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	4.5	5.1	0	0	0	0	0
X	90° Tee-Branch Firelock 002	0	0	0	0	0	8.5	10.8	13	0	16	21	25	33	9.3	11	0	0	0	0	0

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.

Flow Summary - NFPA

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SUPPLY ANALYSIS

<i>Node at Source</i>	<i>Static Pressure</i>	<i>Residual Pressure</i>	<i>Flow</i>	<i>Available Pressure</i>	<i>Total Demand</i>	<i>Required Pressure</i>
PO	See Information on Pump Curve			149.258	1966.16	131.298

NODE ANALYSIS

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
R13	47.0		86.95		
1	47.0		87.28		
2	47.0		87.34		
3	47.0		87.39		
4	47.0		87.44		
R14	47.0		86.95		
5	47.0		87.28		
6	47.0		87.33		
7	47.0		87.39		
8	47.0		87.44		
R15	47.0		86.94		
9	47.0		87.27		
10	47.0		87.33		
11	47.0		87.38		
12	47.0		87.44		
R16	47.0		86.91		
R17	47.0		86.86		
R18	47.0		86.78		
R19	47.0		86.67		
R20	47.0		86.51		
R21	47.0		73.7		
H1	47.0	22.4	41.39	144.11	
H2	47.0	22.4	40.0	141.67	
H3	47.0	22.4	40.0	141.67	
H4	47.0	22.4	41.52	144.34	
R22	47.0		74.37		
H5	47.0	22.4	41.46	144.23	
H6	47.0	22.4	40.02	141.7	
H7	47.0	22.4	40.02	141.7	
H8	47.0	22.4	41.49	144.28	
R23	47.0		74.49		
H9	47.0	22.4	41.54	144.36	
H10	47.0	22.4	40.09	141.84	
H11	47.0	22.4	40.09	141.84	
H12	47.0	22.4	41.57	144.42	
R24	47.0		86.8		
R25	47.0		87.2		
R26	47.0		87.55		
R27	47.0		87.85		

Flow Summary - NFPA

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NODE ANALYSIS (cont.)

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
R28	47.0		88.12		
R29	47.0		88.35		
R30	47.0		88.56		
R31	47.0		88.73		
R32	47.0		88.87		
R33	47.0		88.98		
R34	47.0		89.07		
R35	47.0		87.77		
R36	47.0		87.77		
R37	47.0		87.77		
R38	47.0		87.77		
R39	47.0		87.77		
R40	47.0		87.76		
R41	47.0		87.76		
R42	47.0		87.75		
R43	47.0		75.18		
R44	47.0		74.57		
R45	47.0		74.72		
R46	47.0		88.49		
R47	47.0		88.89		
R48	47.0		89.29		
R49	47.0		89.71		
R50	47.0		90.14		
R51	47.0		90.61		
R52	47.0		91.12		
R53	47.0		91.66		
R54	47.0		92.22		
R55	47.0		92.82		
R56	47.0		93.45		
13	47.0		86.78		
14	47.0		86.78		
15	47.0		86.76		
16	47.0		86.73		
17	47.0		86.66		
18	47.0		86.57		
19	47.0		86.43		
20	47.0		86.25		
21	47.0		86.0		
22	47.0		85.98		
23	47.0		86.08		
24	47.0		86.54		
25	47.0		86.94		
26	47.0		87.28		
27	47.0		87.56		
28	47.0		87.8		
29	47.0		88.0		
30	47.0		88.16		
31	47.0		88.27		
32	47.0		88.34		

Flow Summary - NFPA

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NODE ANALYSIS (cont.)

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
33	47.0		88.38		
35	47.0		87.94		
36	47.0		87.94		
37	47.0		87.94		
38	47.0		87.95		
39	47.0		87.96		
40	47.0		87.97		
41	47.0		87.99		
42	47.0		88.02		
43	47.0		88.05		
44	47.0		88.16		
45	47.0		88.39		
46	47.0		88.76		
47	47.0		89.15		
48	47.0		89.56		
49	47.0		90.0		
50	47.0		90.45		
51	47.0		90.96		
52	47.0		91.52		
53	47.0		92.12		
54	47.0		92.75		
55	47.0		93.41		
56	47.0		94.13		
FMJ	47.0		95.3		
TR2	47.0		99.65		
BR2	2.0		121.85	100.0	
FLG	2.0		122.24		
UG1	-5.0		128.57		
UG2	-5.0		129.2		
UG3	-5.0		129.87		
UG4	-5.0		127.6	150.0	
UG5	-5.0		127.6		
UG6	-5.0		133.0		
PUMP	2.0		130.28		
PO	2.0		131.3		

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
R13 to 1	47 47		40.12 40.12	2.5 2.635		0.0 0.0	62.042 0.0	120 0.0053	86.953 0.0			
						0.0	62.042	0.0053	0.330	Vel =	2.36	
1 to 2	47 47		0.0 40.12	2.5 2.635		0.0 0.0	10.000 0.0	120 0.0053	87.283 0.0			
						0.0	10.000	0.0053	0.053	Vel =	2.36	
2 to 3	47 47		0.0 40.12	2.5 2.635		0.0 0.0	10.000 0.0	120 0.0054	87.336 0.0			
						0.0	10.000	0.0054	0.054	Vel =	2.36	
3 to 4	47 47		0.0 40.12	2.5 2.635		0.0 0.0	10.000 0.0	120 0.0053	87.390 0.0			
						0.0	10.000	0.0053	0.053	Vel =	2.36	
4 to R35	47 47		0.0 40.12	2.5 2.635		0.0 0.0	61.708 0.0	120 0.0053	87.443 0.0			
						0.0	61.708	0.0053	0.328	Vel =	2.36	
R35			0.0 40.12						87.771	K Factor =	4.28	
R14 to 5	47 47		40.22 40.22	2.5 2.635		0.0 0.0	62.042 0.0	120 0.0053	86.950 0.0			
						0.0	62.042	0.0053	0.331	Vel =	2.37	
5 to 6	47 47		0.0 40.22	2.5 2.635		0.0 0.0	10.000 0.0	120 0.0053	87.281 0.0			
						0.0	10.000	0.0053	0.053	Vel =	2.37	
6 to 7	47 47		0.0 40.22	2.5 2.635		0.0 0.0	10.000 0.0	120 0.0054	87.334 0.0			
						0.0	10.000	0.0054	0.054	Vel =	2.37	
7 to 8	47 47		0.0 40.22	2.5 2.635		0.0 0.0	10.000 0.0	120 0.0053	87.388 0.0			
						0.0	10.000	0.0053	0.053	Vel =	2.37	
8 to R36	47 47		0.0 40.22	2.5 2.635		0.0 0.0	61.708 0.0	120 0.0053	87.441 0.0			
						0.0	61.708	0.0053	0.330	Vel =	2.37	
R36			0.0 40.22						87.771	K Factor =	4.29	
R15 to 9	47 47		40.58 40.58	2.5 2.635		0.0 0.0	62.042 0.0	120 0.0054	86.936 0.0			
						0.0	62.042	0.0054	0.337	Vel =	2.39	
9 to 10	47 47		0.0 40.58	2.5 2.635		0.0 0.0	10.000 0.0	120 0.0054	87.273 0.0			
						0.0	10.000	0.0054	0.054	Vel =	2.39	
10 to 11	47 47		0.0 40.58	2.5 2.635		0.0 0.0	10.000 0.0	120 0.0054	87.327 0.0			
						0.0	10.000	0.0054	0.054	Vel =	2.39	
11 to 12	47 47		0.0 40.58	2.5 2.635		0.0 0.0	10.000 0.0	120 0.0054	87.381 0.0			
						0.0	10.000	0.0054	0.054	Vel =	2.39	
12 to R37	47 47		0.0 40.58	2.5 2.635		0.0 0.0	61.708 0.0	120 0.0054	87.435 0.0			
						0.0	61.708	0.0054	0.335	Vel =	2.39	

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
R37			0.0 40.58					87.770		K Factor = 4.33	
R16 to R38	47 47		41.56	2.5	0.0 0.0	151.458 0.0	120	86.908 0.0			
			41.56	2.635	0.0	151.458	0.0057	0.860		Vel = 2.45	
R38			0.0 41.56					87.768		K Factor = 4.44	
R17 to R39	47 47		42.83	2.5	0.0 0.0	151.458 0.0	120	86.857 0.0			
			42.83	2.635	0.0	151.458	0.0060	0.909		Vel = 2.52	
R39			0.0 42.83					87.766		K Factor = 4.57	
R18 to R40	47 47		44.72	2.5	0.0 0.0	151.458 0.0	120	86.779 0.0			
			44.72	2.635	0.0	151.458	0.0065	0.984		Vel = 2.63	
R40			0.0 44.72					87.763		K Factor = 4.77	
R19 to R41	47 47		47.34	2.5	0.0 0.0	151.458 0.0	120	86.666 0.0			
			47.34	2.635	0.0	151.458	0.0072	1.094		Vel = 2.79	
R41			0.0 47.34					87.760		K Factor = 5.05	
R20 to R42	47 47		50.76	2.5	0.0 0.0	151.458 0.0	120	86.510 0.0			
			50.76	2.635	0.0	151.458	0.0082	1.244		Vel = 2.99	
R42			0.0 50.76					87.754		K Factor = 5.42	
R21 to H1	47 47		-282.33	2	0.0 0.0	62.042 0.0	120	73.703 0.0			
			-282.33	2.157	0.0	62.042	-0.5208	-32.313		Vel = 24.79	
H1 to H2	47 47	22.40	144.11	2	0.0 0.0	10.000 0.0	120	41.390 0.0			
			-138.22	2.157	0.0	10.000	-0.1390	-1.390		Vel = 12.14	
H2 to H3	47 47	22.40	141.67	2	0.0 0.0	10.000 0.0	120	40.000 0.0			
			3.45	2.157	0.0	10.000	0.0002	0.002		Vel = 0.30	
H3 to H4	47 47	22.40	141.67	2	0.0 0.0	10.000 0.0	120	40.002 0.0			
			145.12	2.157	0.0	10.000	0.1520	1.520		Vel = 12.74	
H4 to R43	47 47	22.40	144.34	2	0.0 0.0	61.708 0.0	120	41.522 0.0			
			289.46	2.157	0.0	61.708	0.5455	33.659		Vel = 25.41	
R43			0.0 289.46					75.181		K Factor = 33.38	
R22 to H5	47 47		-285.13	2	0.0 0.0	62.042 0.0	120	74.367 0.0			
			-285.13	2.157	0.0	62.042	-0.5304	-32.909		Vel = 25.03	

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
H5 to H6	47 47	22.40	144.23 -140.9	2 2.157		0.0 0.0 0.0	10.000 0.0 10.000	120 -0.1440	41.458 0.0 -1.440		Vel = 12.37	
H6 to H7	47 47	22.40	141.70 0.8	2 2.157		0.0 0.0 0.0	10.000 0.0 10.000	120 0	40.018 0.0 0.0		Vel = 0.07	
H7 to H8	47 47	22.40	141.70 142.5	2 2.157		0.0 0.0 0.0	10.000 0.0 10.000	120 0.1470	40.018 0.0 1.470		Vel = 12.51	
H8 to R44	47 47	22.40	144.28 286.78	2 2.157		0.0 0.0 0.0	61.708 0.0 61.708	120 0.5361	41.488 0.0 33.084		Vel = 25.18	
R44			0.0 286.78						74.572		K Factor = 33.21	
R23 to H9	47 47		-285.36 -285.36	2 2.157		0.0 0.0 0.0	62.042 0.0 62.042	120 -0.5312	74.493 0.0 -32.958		Vel = 25.05	
H9 to H10	47 47	22.40	144.37 -140.99	2 2.157		0.0 0.0 0.0	10.000 0.0 10.000	120 -0.1441	41.535 0.0 -1.441		Vel = 12.38	
H10 to H11	47 47	22.40	141.83 0.84	2 2.157		0.0 0.0 0.0	10.000 0.0 10.000	120 0	40.094 0.0 0.0		Vel = 0.07	
H11 to H12	47 47	22.40	141.84 142.68	2 2.157		0.0 0.0 0.0	10.000 0.0 10.000	120 0.1473	40.094 0.0 1.473		Vel = 12.53	
H12 to R45	47 47	22.40	144.42 287.1	2 2.157		0.0 0.0 0.0	61.708 0.0 61.708	120 0.5372	41.567 0.0 33.151		Vel = 25.21	
R45			0.0 287.10						74.718		K Factor = 33.21	
R22 to R44	47 47		11.30 11.3	2 2.157		0.0 0.0 0.0	151.458 0.0 151.458	120 0.0014	74.367 0.0 0.205		Vel = 0.99	
R44			0.0 11.30						74.572		K Factor = 1.31	
R23 to R45	47 47		11.90 11.9	2 2.157		0.0 0.0 0.0	151.458 0.0 151.458	120 0.0015	74.493 0.0 0.225		Vel = 1.04	
R45			0.0 11.90						74.718		K Factor = 1.38	
R24 to R46	47 47		35.39 35.39	2 2.157		0.0 0.0 0.0	151.458 0.0 151.458	120 0.0112	86.802 0.0 1.692		Vel = 3.11	
R46			0.0 35.39						88.494		K Factor = 3.76	

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
R25 to R47	47 47		35.34 35.34	2 2.157	0.0 0.0	151.458 0.0	120 0.0112	87.198 0.0		Vel = 3.10	
R47			0.0 35.34					88.887		K Factor = 3.75	
R26 to R48	47 47		35.95 35.95	2 2.157	0.0 0.0	151.458 0.0	120 0.0115	87.548 0.0		Vel = 3.16	
R48			0.0 35.95					89.291		K Factor = 3.80	
R27 to R49	47 47		37.18 37.18	2 2.157	0.0 0.0	151.458 0.0	120 0.0122	87.853 0.0		Vel = 3.26	
R49			0.0 37.18					89.707		K Factor = 3.93	
R28 to R50	47 47		38.95 38.95	2 2.157	0.0 0.0	151.458 0.0	120 0.0133	88.116 0.0		Vel = 3.42	
R50			0.0 38.95					90.137		K Factor = 4.10	
R29 to R51	47 47		41.33 41.33	2 2.157	0.0 0.0	151.458 0.0	120 0.0149	88.352 0.0		Vel = 3.63	
R51			0.0 41.33					90.607		K Factor = 4.34	
R30 to R52	47 47		44.28 44.28	2 2.157	0.0 0.0	151.458 0.0	120 0.0169	88.560 0.0		Vel = 3.89	
R52			0.0 44.28					91.122		K Factor = 4.64	
R31 to R53	47 47		47.61 47.61	2 2.157	0.0 0.0	151.458 0.0	120 0.0193	88.730 0.0		Vel = 4.18	
R53			0.0 47.61					91.659		K Factor = 4.97	
R32 to R54	47 47		51.24 51.24	2 2.157	0.0 0.0	151.458 0.0	120 0.0222	88.867 0.0		Vel = 4.50	
R54			0.0 51.24					92.223		K Factor = 5.34	
R33 to R55	47 47		55.10 55.1	2 2.157	0.0 0.0	151.458 0.0	120 0.0253	88.977 0.0		Vel = 4.84	
R55			0.0 55.10					92.816		K Factor = 5.72	
R34 to R56	47 47		59.13 59.13	2 2.157	0.0 0.0	151.458 0.0	120 0.0289	89.071 0.0		Vel = 5.19	

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
R56			0.0 59.13						93.445		K Factor = 6.12	
R13 to 13	47 47		-40.12 -40.12	2.5 2.635	X T	14.827 16.474 0.0	0.833 31.301 32.134	120 -0.0053	86.953 0.0 -0.171		Vel = 2.36	
13			0.0 -40.12						86.782		K Factor = -4.31	
R14 to 14	47 47		-40.22 -40.22	2.5 2.635	X T	14.827 16.474 0.0	0.833 31.301 32.134	120 -0.0054	86.950 0.0 -0.172		Vel = 2.37	
14			0.0 -40.22						86.778		K Factor = -4.32	
R15 to 15	47 47		-40.58 -40.58	2.5 2.635	X T	14.827 16.474 0.0	0.833 31.301 32.134	120 -0.0054	86.936 0.0 -0.175		Vel = 2.39	
15			0.0 -40.58						86.761		K Factor = -4.36	
R16 to 16	47 47		-41.56 -41.56	2.5 2.635	X T	14.827 16.474 0.0	0.833 31.301 32.134	120 -0.0057	86.908 0.0 -0.182		Vel = 2.45	
16			0.0 -41.56						86.726		K Factor = -4.46	
R17 to 17	47 47		-42.83 -42.83	2.5 2.635	X T	14.827 16.474 0.0	0.833 31.301 32.134	120 -0.0060	86.857 0.0 -0.193		Vel = 2.52	
17			0.0 -42.83						86.664		K Factor = -4.60	
R18 to 18	47 47		-44.72 -44.72	2.5 2.635	X T	14.827 16.474 0.0	0.833 31.301 32.134	120 -0.0065	86.779 0.0 -0.209		Vel = 2.63	
18			0.0 -44.72						86.570		K Factor = -4.81	
R19 to 19	47 47		-47.34 -47.34	2.5 2.635	X T	14.827 16.474 0.0	0.833 31.301 32.134	120 -0.0072	86.666 0.0 -0.232		Vel = 2.79	
19			0.0 -47.34						86.434		K Factor = -5.09	
R20 to 20	47 47		-50.76 -50.76	2.5 2.635	X T	14.827 16.474 0.0	0.833 31.301 32.134	120 -0.0082	86.510 0.0 -0.264		Vel = 2.99	
20			0.0 -50.76						86.246		K Factor = -5.47	
R21 to 21	47 47		282.33 282.33	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 0.5208	73.703 0.0 12.292		Vel = 24.79	
			0.0									

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
21			282.33						85.995		K Factor = 30.45	
R22 to 22	47 47		273.83 273.83	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 0.4922	74.367 0.0 11.617			Vel = 24.04
22			0.0 273.83						85.984		K Factor = 29.53	
R23 to 23	47 47		273.46 273.46	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 0.4910	74.493 0.0 11.587			Vel = 24.01
23			0.0 273.46						86.080		K Factor = 29.47	
R24 to 24	47 47		-35.39 -35.39	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 -0.0112	86.802 0.0 -0.264			Vel = 3.11
24			0.0 -35.39						86.538		K Factor = -3.80	
R25 to 25	47 47		-35.34 -35.34	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 -0.0111	87.198 0.0 -0.263			Vel = 3.10
25			0.0 -35.34						86.935		K Factor = -3.79	
R26 to 26	47 47		-35.95 -35.95	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 -0.0115	87.548 0.0 -0.272			Vel = 3.16
26			0.0 -35.95						87.276		K Factor = -3.85	
R27 to 27	47 47		-37.18 -37.18	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 -0.0122	87.853 0.0 -0.289			Vel = 3.26
27			0.0 -37.18						87.564		K Factor = -3.97	
R28 to 28	47 47		-38.95 -38.95	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 -0.0133	88.116 0.0 -0.315			Vel = 3.42
28			0.0 -38.95						87.801		K Factor = -4.16	
R29 to 29	47 47		-41.33 -41.33	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 -0.0149	88.352 0.0 -0.351			Vel = 3.63
29			0.0 -41.33						88.001		K Factor = -4.41	
R30 to 30	47 47		-44.28 -44.28	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 -0.0169	88.560 0.0 -0.399			Vel = 3.89
30			0.0 -44.28						88.161		K Factor = -4.72	

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
R31 to 31	47 47		-47.61 -47.61	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 -0.0194	88.730 0.0 -0.457		Vel = 4.18	
31			0.0 -47.61						88.273		K Factor = -5.07	
R32 to 32	47 47		-51.24 -51.24	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 -0.0222	88.867 0.0 -0.523		Vel = 4.50	
32			0.0 -51.24						88.344		K Factor = -5.45	
R33 to 33	47 47		-55.10 -55.1	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 -0.0253	88.977 0.0 -0.598		Vel = 4.84	
33			0.0 -55.10						88.379		K Factor = -5.86	
R34 to 34	47 47		-59.13 -59.13	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 -0.0289	89.071 0.0 -0.681		Vel = 5.19	
34			0.0 -59.13						88.390		K Factor = -6.29	
R35 to 35	47 47		40.12 40.12	2.5 2.635	X T	14.827 16.474 0.0	0.833 31.301 32.134	120 0.0053	87.771 0.0 0.171		Vel = 2.36	
35			0.0 40.12						87.942		K Factor = 4.28	
R36 to 36	47 47		40.22 40.22	2.5 2.635	X T	14.827 16.474 0.0	0.833 31.301 32.134	120 0.0054	87.771 0.0 0.172		Vel = 2.37	
36			0.0 40.22						87.943		K Factor = 4.29	
R37 to 37	47 47		40.58 40.58	2.5 2.635	X T	14.827 16.474 0.0	0.833 31.301 32.134	120 0.0054	87.770 0.0 0.175		Vel = 2.39	
37			0.0 40.58						87.945		K Factor = 4.33	
R38 to 38	47 47		41.56 41.56	2.5 2.635	X T	14.827 16.474 0.0	0.833 31.301 32.134	120 0.0057	87.768 0.0 0.182		Vel = 2.45	
38			0.0 41.56						87.950		K Factor = 4.43	
R39 to 39	47 47		42.83 42.83	2.5 2.635	X T	14.827 16.474 0.0	0.833 31.301 32.134	120 0.0060	87.766 0.0 0.193		Vel = 2.52	
39			0.0 42.83						87.959		K Factor = 4.57	
R40 to 40	47 47		44.72 44.72	2.5 2.635	X T	14.827 16.474 0.0	0.833 31.301 32.134	120 0.0065	87.763 0.0 0.209		Vel = 2.63	

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eq/v	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
40			0.0 44.72						87.972		K Factor = 4.77	
R41 to 41	47 47		47.34 47.34	2.5 2.635	X T	14.827 16.474	0.833 31.301	120 0.0072	87.760 0.0			Vel = 2.79
41			0.0 47.34						87.992		K Factor = 5.05	
R42 to 42	47 47		50.76 50.76	2.5 2.635	X T	14.827 16.474	0.833 31.301	120 0.0082	87.754 0.0			Vel = 2.99
42			0.0 50.76						88.018		K Factor = 5.41	
R43 to 43	47 47		289.46 289.46	2 2.157	X T	10.461 12.307	0.833 22.768	120 0.5454	75.181 0.0			Vel = 25.41
43			0.0 289.46						88.054		K Factor = 30.85	
R44 to 44	47 47		298.09 298.09	2 2.157	X T	10.461 12.307	0.833 22.768	120 0.5759	74.572 0.0			Vel = 26.17
44			0.0 298.09						88.164		K Factor = 31.75	
R45 to 45	47 47		298.99 298.99	2 2.157	X T	10.461 12.307	0.833 22.768	120 0.5791	74.718 0.0			Vel = 26.25
45			0.0 298.99						88.386		K Factor = 31.80	
R46 to 46	47 47		35.39 35.39	2 2.157	X T	10.461 12.307	0.833 22.768	120 0.0112	88.494 0.0			Vel = 3.11
46			0.0 35.39						88.758		K Factor = 3.76	
R47 to 47	47 47		35.34 35.34	2 2.157	X T	10.461 12.307	0.833 22.768	120 0.0111	88.887 0.0			Vel = 3.10
47			0.0 35.34						89.150		K Factor = 3.74	
R48 to 48	47 47		35.95 35.95	2 2.157	X T	10.461 12.307	0.833 22.768	120 0.0115	89.291 0.0			Vel = 3.16
48			0.0 35.95						89.562		K Factor = 3.80	
R49 to 49	47 47		37.18 37.18	2 2.157	X T	10.461 12.307	0.833 22.768	120 0.0122	89.707 0.0			Vel = 3.26
			0.0									

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftns Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
49			37.18						89.996		K Factor = 3.92	
R50 to 50	47 47		38.95 38.95	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 0.0133	90.137 0.0 0.315			Vel = 3.42
50			0.0 38.95						90.452		K Factor = 4.10	
R51 to 51	47 47		41.33 41.33	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 0.0149	90.607 0.0 0.352			Vel = 3.63
51			0.0 41.33						90.959		K Factor = 4.33	
R52 to 52	47 47		44.28 44.28	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 0.0169	91.122 0.0 0.399			Vel = 3.89
52			0.0 44.28						91.521		K Factor = 4.63	
R53 to 53	47 47		47.61 47.61	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 0.0194	91.659 0.0 0.457			Vel = 4.18
53			0.0 47.61						92.116		K Factor = 4.96	
R54 to 54	47 47		51.24 51.24	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 0.0222	92.223 0.0 0.523			Vel = 4.50
54			0.0 51.24						92.746		K Factor = 5.32	
R55 to 55	47 47		55.10 55.1	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 0.0254	92.816 0.0 0.599			Vel = 4.84
55			0.0 55.10						93.415		K Factor = 5.70	
R56 to 56	47 47		59.13 59.13	2 2.157	X T	10.461 12.307 0.0	0.833 22.768 23.601	120 0.0289	93.445 0.0 0.682			Vel = 5.19
56			0.0 59.13						94.127		K Factor = 6.09	
13 to 14	47 47		-40.12 -40.12	4 4.26		0.0 0.0 0.0	9.000 0.0 9.000	120 -0.0004	86.782 0.0 -0.004			Vel = 0.90
14 to 15	47 47		-40.22 -80.34	4 4.26		0.0 0.0 0.0	9.000 0.0 9.000	120 -0.0019	86.778 0.0 -0.017			Vel = 1.81
15 to 16	47 47		-40.58 -120.92	4 4.26		0.0 0.0 0.0	9.000 0.0 9.000	120 -0.0039	86.761 0.0 -0.035			Vel = 2.72
16 to 17	47 47		-41.56 -162.48	4 4.26		0.0 0.0 0.0	9.000 0.0 9.000	120 -0.0069	86.726 0.0 -0.062			Vel = 3.66

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
17 to 18	47 47		-42.83 -205.31	4 4.26	0.0 0.0 0.0	9.000 0.0 9.000	120 -0.0104	86.664 0.0 -0.094		Vel = 4.62	
18 to 19	47 47		-44.72 -250.03	4 4.26	0.0 0.0 0.0	9.000 0.0 9.000	120 -0.0151	86.570 0.0 -0.136		Vel = 5.63	
19 to 20	47 47		-47.34 -297.37	4 4.26	0.0 0.0 0.0	9.000 0.0 9.000	120 -0.0209	86.434 0.0 -0.188		Vel = 6.69	
20 to 21	47 47		-50.75 -348.12	4 4.26	0.0 0.0 0.0	9.000 0.0 9.000	120 -0.0279	86.246 0.0 -0.251		Vel = 7.84	
21 to 22	47 47		282.32 -65.8	4 4.26	0.0 0.0 0.0	9.000 0.0 9.000	120 -0.0012	85.995 0.0 -0.011		Vel = 1.48	
22 to 23	47 47		273.83 208.03	4 4.26	0.0 0.0 0.0	9.000 0.0 9.000	120 0.0107	85.984 0.0 0.096		Vel = 4.68	
23 to 24	47 47		273.46 481.49	4 4.26	0.0 0.0 0.0	9.000 0.0 9.000	120 0.0509	86.080 0.0 0.458		Vel = 10.84	
24 to 25	47 47		-35.39 446.1	4 4.26	0.0 0.0 0.0	9.000 0.0 9.000	120 0.0441	86.538 0.0 0.397		Vel = 10.04	
25 to 26	47 47		-35.34 410.76	4 4.26	0.0 0.0 0.0	9.000 0.0 9.000	120 0.0379	86.935 0.0 0.341		Vel = 9.25	
26 to 27	47 47		-35.96 374.8	4 4.26	0.0 0.0 0.0	9.000 0.0 9.000	120 0.0320	87.276 0.0 0.288		Vel = 8.44	
27 to 28	47 47		-37.17 337.63	4 4.26	0.0 0.0 0.0	9.000 0.0 9.000	120 0.0263	87.564 0.0 0.237		Vel = 7.60	
28 to 29	47 47		-38.95 298.68	4 4.26	0.0 0.0 0.0	9.500 0.0 9.500	120 0.0211	87.801 0.0 0.200		Vel = 6.72	
29 to 30	47 47		-41.33 257.35	4 4.26	0.0 0.0 0.0	10.000 0.0 10.000	120 0.0160	88.001 0.0 0.160		Vel = 5.79	
30 to 31	47 47		-44.28 213.07	4 4.26	0.0 0.0 0.0	10.000 0.0 10.000	120 0.0112	88.161 0.0 0.112		Vel = 4.80	
31 to 32	47 47		-47.61 165.46	4 4.26	0.0 0.0 0.0	10.000 0.0 10.000	120 0.0071	88.273 0.0 0.071		Vel = 3.72	
32 to 33	47 47		-51.23 114.23	4 4.26	0.0 0.0 0.0	10.000 0.0 10.000	120 0.0035	88.344 0.0 0.035		Vel = 2.57	

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
33 to 34	47 47		-55.10 59.13	4 4.26		0.0 0.0 0.0	10.000 0.0 10.000	120 0.0011	88.379 0.0 0.011		Vel = 1.33	
34			0.0 59.13						88.390		K Factor = 6.29	
35 to 36	47 47		40.12 40.12	6 6.357		0.0 0.0 0.0	9.000 0.0 9.000	120 0.0001	87.942 0.0 0.001		Vel = 0.41	
36 to 37	47 47		40.22 80.34	6 6.357		0.0 0.0 0.0	9.000 0.0 9.000	120 0.0002	87.943 0.0 0.002		Vel = 0.81	
37 to 38	47 47		40.58 120.92	6 6.357		0.0 0.0 0.0	9.000 0.0 9.000	120 0.0006	87.945 0.0 0.005		Vel = 1.22	
38 to 39	47 47		41.56 162.48	6 6.357		0.0 0.0 0.0	9.000 0.0 9.000	120 0.0010	87.950 0.0 0.009		Vel = 1.64	
39 to 40	47 47		42.83 205.31	6 6.357		0.0 0.0 0.0	9.000 0.0 9.000	120 0.0014	87.959 0.0 0.013		Vel = 2.08	
40 to 41	47 47		44.72 250.03	6 6.357		0.0 0.0 0.0	9.000 0.0 9.000	120 0.0022	87.972 0.0 0.020		Vel = 2.53	
41 to 42	47 47		47.34 297.37	6 6.357		0.0 0.0 0.0	9.000 0.0 9.000	120 0.0029	87.992 0.0 0.026		Vel = 3.01	
42 to 43	47 47		50.75 348.12	6 6.357		0.0 0.0 0.0	9.000 0.0 9.000	120 0.0040	88.018 0.0 0.036		Vel = 3.52	
43 to 44	47 47		289.47 637.59	6 6.357		0.0 0.0 0.0	9.000 0.0 9.000	120 0.0122	88.054 0.0 0.110		Vel = 6.45	
44 to 45	47 47		298.08 935.67	6 6.357		0.0 0.0 0.0	9.000 0.0 9.000	120 0.0247	88.164 0.0 0.222		Vel = 9.46	
45 to 46	47 47		299.00 1234.67	6 6.357		0.0 0.0 0.0	9.000 0.0 9.000	120 0.0413	88.386 0.0 0.372		Vel = 12.48	
46 to 47	47 47		35.39 1270.06	6 6.357		0.0 0.0 0.0	9.000 0.0 9.000	120 0.0436	88.758 0.0 0.392		Vel = 12.84	
47 to 48	47 47		35.34 1305.4	6 6.357		0.0 0.0 0.0	9.000 0.0 9.000	120 0.0458	89.150 0.0 0.412		Vel = 13.20	
48 to 49	47 47		35.96 1341.36	6 6.357		0.0 0.0 0.0	9.000 0.0 9.000	120 0.0482	89.562 0.0 0.434		Vel = 13.56	

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
49 to 50	47 47		37.17 1378.53	6 6.357		0.0 0.0	9.000 0.0	120 0.0507	89.996 0.0			
50 to 51	47 47		38.95 1417.48	6 6.357		0.0 0.0	9.500 0.0	120 0.0534	90.452 0.0		Vel = 13.93	
51 to 52	47 47		41.33 1458.81	6 6.357		0.0 0.0	10.000 0.0	120 0.0562	90.959 0.0		Vel = 14.33	
52 to 53	47 47		44.28 1503.09	6 6.357		0.0 0.0	10.000 0.0	120 0.0595	91.521 0.0		Vel = 14.75	
53 to 54	47 47		47.61 1550.7	6 6.357		0.0 0.0	10.000 0.0	120 0.0630	92.116 0.0		Vel = 15.19	
54 to 55	47 47		51.23 1601.93	6 6.357		0.0 0.0	10.000 0.0	120 0.0669	92.746 0.0		Vel = 15.68	
55 to 56	47 47		55.10 1657.03	6 6.357		0.0 0.0	10.000 0.0	120 0.0712	93.415 0.0		Vel = 16.19	
56 to FMJ	47 47		59.13 1716.16	6 6.357	V	12.573 0.0	2.833 12.573	120 0.0760	94.127 0.0		Vel = 16.75	
FMJ			0.0 1716.16									
FMJ to TR2	47 47		1716.16 1716.16	8 8.249	V	15.269 0.0	188.333 15.269	120 0.0214	95.298 0.0		K Factor = 175.80	
TR2 to BR2	47 2		1716.16 1716.16	8 8.249	T	41.108 0.0	38.875 41.108	120 0.0214	99.648 20.490		Vel = 10.30	
BR2 to FLG	2 2	H100	100.00 1816.16	8 7.98	L	19.632 0.0	2.000 19.632	150 0.0184	121.846 0.0		** Fixed Loss = 1	
FLG to UG4	2 -5		0.0 1816.16	8 7.98	L T	19.632 52.855	53.167 72.487	150 0.0184	122.245 3.032		Vel = 10.30	
UG4			0.0 1816.16									
UG1 to UG2	-5 -5		365.42 365.42	8 7.98	3F G	40.774 6.041	614.875 46.814	150 0.0010	128.573 0.0		K Factor = 160.78	
UG2 to UG3	-5 -5		0.0 365.42	8 7.98	3F L T 2G	40.774 19.632 52.855 12.081	580.958 125.343 706.301	150 0.0010	129.202 0.0 0.671		Vel = 2.34	

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
UG3 to UG4	-5 -5		-1966.16 -1600.74	12 11.65	F G	17.441 8.05	958.917 25.490	150	129.873 0.0			
						0.0	984.407	-0.0023	-2.278	Vel =	4.82	
UG4 to UG5	-5 -5	H150	1966.16 365.42	12 11.65	G	8.05 0.0	16.167 8.049	150	127.595 0.0			
						0.0	24.216	0.0002	0.004	Vel =	1.10	
UG5 to UG1	-5 -5		0.0 365.42	8 7.98	5F 2G	67.957 12.081	945.542 80.039	150	127.599 0.0			
						0.0	1025.581	0.0009	0.974	Vel =	2.34	
UG1			0.0 365.42						128.573	K Factor =	32.23	
UG3 to UG6	-5 -5		1966.16 1966.16	12 11.65	6F 2G	104.647 16.1	801.750 120.747	150	129.873 0.0			
						0.0	922.497	0.0034	3.123	Vel =	5.92	
UG6 to PUMP	-5 2		0.0 1966.16	12 11.65	2L	48.299 0.0	45.500 48.298	150	132.996 -3.032			
						0.0	93.798	0.0034	0.318	Vel =	5.92	
PUMP to PO	2 2		0.0 1966.16	10 10.42	2V S B	10.89 66.551 22.99	15.000 100.431 115.431	120	130.282 0.0 1.016			
								0.0088		Vel =	7.40	
PO			0.0 1966.16						131.298	K Factor =	171.59	

