AquaSAFE™ FIRE SAFETY SYSTEM

Uponor
5925 148th Street West

Apple Valley, MN 55124
800-321-4739

Job Name	:	REQUIA RESIDENCE - Two Head Calculation (H.11 & H.6)
Drawing	:	RESIDENTIAL
Location	:	47 PAMELA ROAD - LOT 35 PORTLAND ME 04103
Remote Area	:	1
Contract	:	21929F
Data File	:	21929F Requia.wx2

HYDRAULIC DESIGN INFORMATION SHEET

Name - REQUIA RESIDENCE Date - 3/15/17
Location - PORTLAND ME 04103
Building - RESIDENTIAL System No. - 1
Contractor - MARK NIGRO SERVICES Contract No. - 21929F
Calculated By - BRENT KOTULA SET IV Drawing No. - 1
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height VARIES
OCCUPANCY - RESIDENTIAL

S Type of Calculation: ( )NFPA 13 Residential ( )NFPA 13R (X)NFPA 13D
Y Number of Sprinklers Flowing: ( )1 (X)2 ( )4 ( )
S ( )Other
T ( )Specific Ruling Made by Date
E
M Listed Flow at Start Point - 13 Gpm System Type
Listed Pres. at Start Point - 7.04 Psi (X) Wet ( ) Dry
D MAXIMUM LISTED SPACING 16 x 16 ( ) Deluge ( ) PreAction
E Domestic Flow Added - 0 Gpm Sprinkler or Nozzle
S Additional Flow Added - Gpm Make SENJU Model RC-RES
I Elevation at Highest Outlet - 119 Feet Size 7/16 K-Factor 4.9
G Note: Temperature Rating 162
N

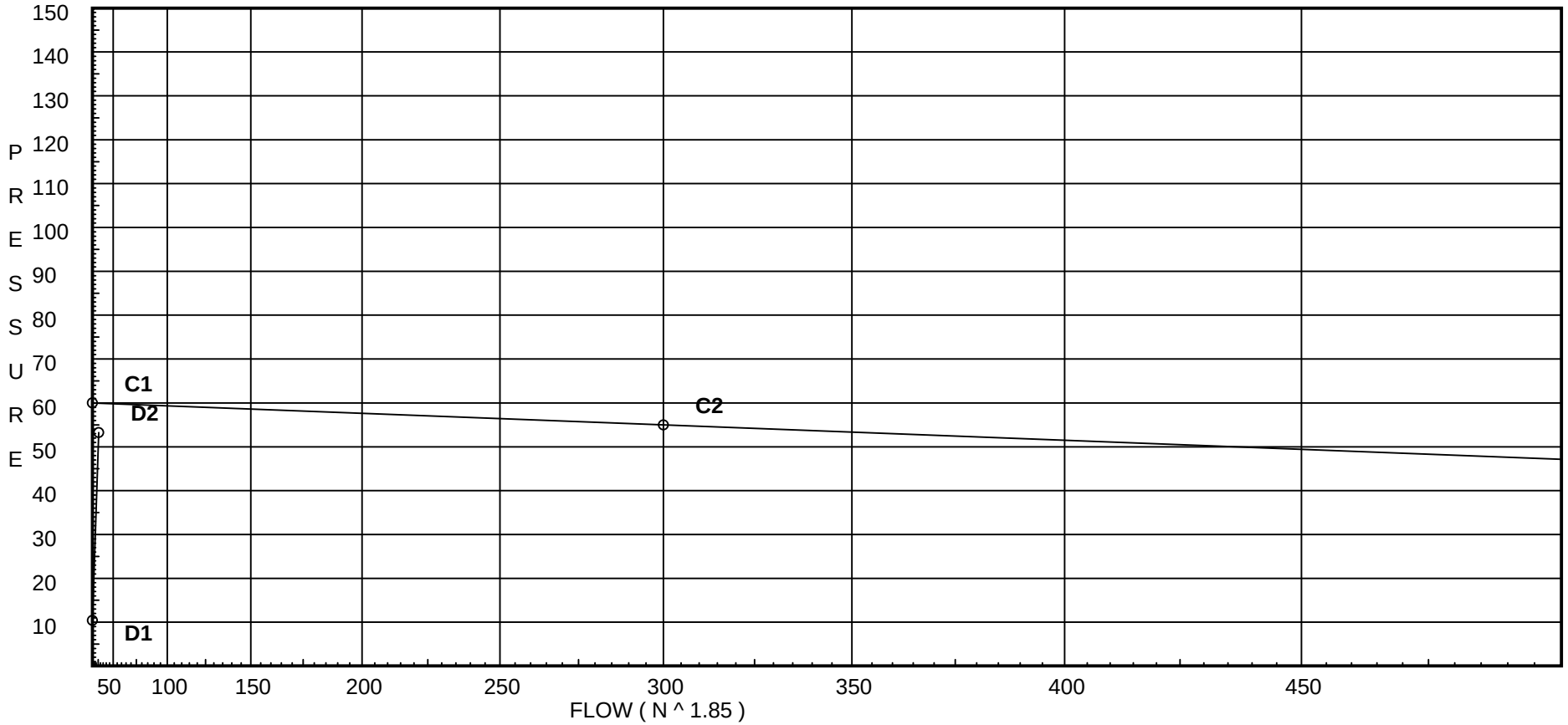
Calculation Gpm Required 26.1039 Psi Required 53.25 At Ref Pt STR
Summary C-Factor Used: Overhead 150 Underground 150

W Water Flow Test: Pump Data:
A Date of Test - x Rated Cap.
T Time of Test - x @ Psi
E Static (Psi) - 60 Elev.
R Residual (Psi) - 55 Other
Flow (Gpm) - 300
S Elevation - 95

P Location: STREET
P
L Source of Information: CONTRACTOR
Y

City Water Supply:
- C1 - Static Pressure : 60
- C2 - Residual Pressure: 55
- C2 - Residual Flow : 300

Demand:
- D1 - Elevation : 10.394
- D2 - System Flow : 26.104
- D2 - System Pressure : 53.250
- Hose (Demand) : _____
- D3 - System Demand : 26.104
- Safety Margin : 6.696



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
G	Generic Gate Valve	1	1	1	1	1	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
Utb *	Aquapex Tee - Branch	2	17	14	9	12	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Utr *	Aquapex Tee - Run	1	2	2	4	2	1	0	0	0	0	0	0	0	0	0	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

SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
STR	60.0	55	300.0	59.945	26.1	53.25

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
H.11	119.0	4.9	7.04	13.0	
H.8	119.0		11.45		
H.9	119.0		12.82		
H.5	119.0		14.2		
H.7	119.0		17.51		
T.34	119.0		25.49		
T.46	109.0		30.84		
T.52	99.0		37.48		
T.51	99.0		37.73		
S.1	94.0		41.61		
MTR	95.0		45.94		
STR	95.0		53.25		
H.6	119.0	4.9	7.15	13.1	
H.1	119.0		15.14		
H.2	119.0		21.45		
T.32	119.0		25.24		
T.40	109.0		30.83		
T.30	119.0		25.52		
H.3	119.0		25.59		
T.31	119.0		25.73		
H.10	119.0		25.93		
T.33	119.0		26.27		
T.41	109.0		30.65		
T.42	109.0		31.17		
T.54	99.0		35.76		
T.55	99.0		36.71		
H.25	99.0		36.84		
T.53	99.0		37.41		
H.13	119.0		25.83		
H.14	119.0		25.9		
T.35	119.0		26.27		
T.48	109.0		30.65		
H.21	109.0		30.86		
T.49	109.0		31.21		
T.60	99.0		35.66		
H.29	99.0		36.09		
T.56	99.0		36.45		
T.57	99.0		36.49		
H.26	99.0		36.62		
H.23	99.0		36.92		
H.4	119.0		26.27		
H.12	119.0		26.27		

NODE ANALYSIS (cont.)

Node Tag	*Elevation*	*Node Type*	*Pressure at Node*	*Discharge at Node*	*Notes*
H.16	109.0		30.65		
H.17	109.0		30.65		
T.39	109.0		30.87		
H.15	109.0		30.96		
T.37	109.0		30.98		
H.18	109.0		31.04		
T.43	109.0		31.08		
T.47	109.0		30.87		
H.22	109.0		31.05		
H.19	109.0		30.87		
T.45	109.0		30.87		
T.44	109.0		30.87		
H.20	109.0		30.87		
T.59	99.0		35.69		
H.28	99.0		35.7		
H.24	99.0		35.72		
H.27	99.0		36.47		

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
H.11	11.56	0.671		0.0	16.000	7.040		K Factor = 4.90
to		150.0		0.0	0.0	0.0		
H.8	11.56	0.2754		0.0	16.000	4.407		Vel = 10.49
H.8	0.0	0.671	Utr	2.0	3.000	11.447		
to		150.0		0.0	2.000	0.0		
H.9	11.56	0.2754		0.0	5.000	1.377		Vel = 10.49
H.9	0.0	0.671	Utr	2.0	3.000	12.824		
to		150.0		0.0	2.000	0.0		
H.5	11.56	0.2754		0.0	5.000	1.377		Vel = 10.49
H.5	0.0	0.671	Utr	2.0	10.000	14.201		
to		150.0		0.0	2.000	0.0		
H.7	11.56	0.2754		0.0	12.000	3.305		Vel = 10.49
H.7	0.0	0.671	Utb	17.0	12.000	17.506		
to		150.0		0.0	17.000	0.0		
T.34	11.56	0.2754		0.0	29.000	7.988		Vel = 10.49
T.34	-2.00	0.862	Utr	2.0	15.800	25.494		
to		150.0		0.0	2.000	4.331		
T.46	9.56	0.0572		0.0	17.800	1.019		Vel = 5.26
T.46	-1.39	0.862	Utb	17.0	39.800	30.844		
to		150.0		0.0	14.000	4.331		
T.52	8.17	0.0428		0.0	53.800	2.300		Vel = 4.49
T.52	7.16	1.054	Utr	4.0	1.000	37.475		
to		150.0		0.0	4.000	0.0		
T.51	15.33	0.0514		0.0	5.000	0.257		Vel = 5.64
T.51	10.77	1.054	Utr	4.0	6.000	37.732		
to		150.0	T	2.44	6.440	2.166		
S.1	26.1	0.1378		0.0	12.440	1.714		Vel = 9.60
S.1	0.0	0.995	2E	4.673	5.000	41.612		
to		150.0		0.0	4.673	2.567		* * Fixed Loss = 3
MTR	26.1	0.1823		0.0	9.673	1.763		Vel = 10.77
MTR	0.0	0.911	E	1.521	20.000	45.942		
to		150.0	T	3.801	6.082	0.0		
STR	26.1	0.2802	G	0.76	26.082	7.308		Vel = 12.85
	0.0							
	26.10					53.250		K Factor = 3.58
H.11	1.44	0.671	Utr	2.0	17.000	7.040		
to		150.0		0.0	2.000	0.0		
H.6	1.44	0.0058		0.0	19.000	0.110		Vel = 1.31
H.6	13.10	0.671	Utr	2.0	17.000	7.150		K Factor = 4.90
to		150.0		0.0	2.000	0.0		
H.1	14.54	0.4207		0.0	19.000	7.993		Vel = 13.19
H.1	0.0	0.671	Utr	2.0	13.000	15.143		
to		150.0		0.0	2.000	0.0		
H.2	14.54	0.4207		0.0	15.000	6.310		Vel = 13.19
H.2	0.0	0.671	Utr	2.0	7.000	21.453		
to		150.0		0.0	2.000	0.0		
T.32	14.54	0.4207		0.0	9.000	3.786		Vel = 13.19
T.32	-2.32	0.862	Utr	2.0	12.000	25.239		
to		150.0		0.0	2.000	4.331		
T.40	12.22	0.0901		0.0	14.000	1.261		Vel = 6.72

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
T.40	-1.44	0.862	Utb	17.0	22.000	30.831		
to		150.0		0.0	14.000	4.331		
T.51	10.78	0.0714		0.0	36.000	2.570		Vel = 5.93
	0.0							
	10.78					37.732		K Factor = 1.75
T.32	2.32	0.671	Utb	17.0	3.000	25.239		
to		150.0		0.0	17.000	0.0		
T.30	2.32	0.0141		0.0	20.000	0.281		Vel = 2.10
T.30	0.0	0.671	Utr	2.0	3.000	25.520		
to		150.0		0.0	2.000	0.0		
H.3	2.32	0.0142		0.0	5.000	0.071		Vel = 2.10
H.3	0.0	0.671	Utr	2.0	8.000	25.591		
to		150.0		0.0	2.000	0.0		
T.31	2.32	0.0141		0.0	10.000	0.141		Vel = 2.10
T.31	0.0	0.671	Utr	2.0	12.000	25.732		
to		150.0		0.0	2.000	0.0		
H.10	2.32	0.0141		0.0	14.000	0.197		Vel = 2.10
H.10	0.0	0.671	Utb	17.0	7.000	25.929		
to		150.0		0.0	17.000	0.0		
T.33	2.32	0.0140		0.0	24.000	0.337		Vel = 2.10
T.33	0.01	0.862		0.0	12.000	26.266		
to		150.0		0.0	0.0	4.331		
T.41	2.33	0.0042		0.0	12.000	0.051		Vel = 1.28
T.41	0.02	0.671	2Utb	34.0	2.000	30.648		
to		150.0		0.0	34.000	0.0		
T.42	2.35	0.0145		0.0	36.000	0.521		Vel = 2.13
T.42	1.29	0.862		0.0	27.000	31.169		
to		150.0		0.0	0.0	4.331		
T.54	3.64	0.0096		0.0	27.000	0.258		Vel = 2.00
T.54	0.62	0.671	Utr	2.0	3.000	35.758		
to		150.0	Utb	17.0	19.000	0.0		
T.55	4.26	0.0435		0.0	22.000	0.956		Vel = 3.87
T.55	0.0	0.671		0.0	3.000	36.714		
to		150.0		0.0	0.0	0.0		
H.25	4.26	0.0433		0.0	3.000	0.130		Vel = 3.87
H.25	0.0	0.671	Utr	2.0	11.000	36.844		
to		150.0		0.0	2.000	0.0		
T.53	4.26	0.0434		0.0	13.000	0.564		Vel = 3.87
T.53	2.90	1.054		0.0	5.329	37.408		
to		150.0		0.0	0.0	0.0		
T.52	7.16	0.0126		0.0	5.329	0.067		Vel = 2.63
	0.0							
	7.16					37.475		K Factor = 1.17
T.34	2.00	0.671	Utb	17.0	12.000	25.494		
to		150.0	Utr	2.0	19.000	0.0		
H.13	2.0	0.0107		0.0	31.000	0.333		Vel = 1.81
H.13	0.0	0.671		0.0	7.000	25.827		
to		150.0		0.0	0.0	0.0		
H.14	2.0	0.0107		0.0	7.000	0.075		Vel = 1.81

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
H.14	0.0	0.671	Utb	17.0	15.000	25.902		
to		150.0	Utr	2.0	19.000	0.0		
T.35	2.0	0.0107		0.0	34.000	0.364		Vel = 1.81
T.35	-0.01	0.862		0.0	16.000	26.266		
to		150.0		0.0	0.0	4.331		
T.48	1.99	0.0031		0.0	16.000	0.050		Vel = 1.09
T.48	-0.03	0.671	Utb	17.0	1.000	30.647		
to		150.0	Utr	2.0	19.000	0.0		
H.21	1.96	0.0104		0.0	20.000	0.208		Vel = 1.78
H.21	0.0	0.671	Utb	17.0	17.000	30.855		
to		150.0		0.0	17.000	0.0		
T.49	1.96	0.0104		0.0	34.000	0.352		Vel = 1.78
T.49	1.56	0.862		0.0	14.000	31.207		
to		150.0		0.0	0.0	4.331		
T.60	3.52	0.0090		0.0	14.000	0.126		Vel = 1.94
T.60	-0.62	0.671	Utb	17.0	3.000	35.664		
to		150.0		0.0	17.000	0.0		
H.29	2.9	0.0212		0.0	20.000	0.425		Vel = 2.63
H.29	0.0	0.671	Utr	2.0	15.000	36.089		
to		150.0		0.0	2.000	0.0		
T.56	2.9	0.0212		0.0	17.000	0.361		Vel = 2.63
T.56	-0.53	0.671	Utr	2.0	1.000	36.450		
to		150.0		0.0	2.000	0.0		
T.57	2.37	0.0150		0.0	3.000	0.045		Vel = 2.15
T.57	0.53	0.671	Utr	2.0	4.000	36.495		
to		150.0		0.0	2.000	0.0		
H.26	2.9	0.0212		0.0	6.000	0.127		Vel = 2.63
H.26	0.0	0.671	Utr	2.0	12.000	36.622		
to		150.0		0.0	2.000	0.0		
H.23	2.9	0.0213		0.0	14.000	0.298		Vel = 2.63
H.23	0.0	0.671	Utb	17.0	4.000	36.920		
to		150.0	Utr	2.0	19.000	0.0		
T.53	2.9	0.0212		0.0	23.000	0.488		Vel = 2.63
	0.0							
	2.90					37.408		K Factor = 0.47
T.33	-0.01	0.671	Utb	17.0	5.000	26.266		
to		150.0	Utr	2.0	19.000	0.0		
H.4	-0.01	0.0		0.0	24.000	0.0		Vel = 0.01
H.4	0.0	0.671	Utr	2.0	14.000	26.266		
to		150.0		0.0	2.000	0.0		
H.12	-0.01	0.0		0.0	16.000	0.0		Vel = 0.01
H.12	0.0	0.671	Utb	17.0	3.000	26.266		
to		150.0		0.0	17.000	0.0		
T.35	-0.01	0.0		0.0	20.000	0.0		Vel = 0.01
	0.0							
	-0.01					26.266		K Factor = 0
T.48	0.02	0.671	Utb	17.0	20.000	30.647		
to		150.0		0.0	17.000	0.0		
H.16	0.02	0.0		0.0	37.000	0.0		Vel = 0.02

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
H.16	0.0	0.671	Utr	2.0	11.000	30.647		
to		150.0		0.0	2.000	0.0		
H.17	0.02	0.0001		0.0	13.000	0.001		Vel = 0.02
H.17	0.0	0.671	Utb	17.0	2.000	30.648		
to		150.0	Utr	2.0	19.000	0.0		
T.41	0.02	0.0		0.0	21.000	0.0		Vel = 0.02
	0.0							
	0.02					30.648		K Factor = 0
T.40	1.44	0.862	Utb	17.0	5.839	30.831		
to		150.0		0.0	14.000	0.0		
T.39	1.44	0.0018		0.0	19.839	0.035		Vel = 0.79
T.39	-0.15	0.671	Utb	17.0	3.000	30.866		
to		150.0		0.0	17.000	0.0		
H.15	1.29	0.0047		0.0	20.000	0.094		Vel = 1.17
H.15	0.0	0.671	Utr	2.0	1.000	30.960		
to		150.0		0.0	2.000	0.0		
T.37	1.29	0.0050		0.0	3.000	0.015		Vel = 1.17
T.37	0.0	0.671	Utr	2.0	11.000	30.975		
to		150.0		0.0	2.000	0.0		
H.18	1.29	0.0047		0.0	13.000	0.061		Vel = 1.17
H.18	0.0	0.671	Utr	2.0	7.000	31.036		
to		150.0		0.0	2.000	0.0		
T.43	1.29	0.0048		0.0	9.000	0.043		Vel = 1.17
T.43	0.0	0.671	Utb	17.0	2.000	31.079		
to		150.0		0.0	17.000	0.0		
T.42	1.29	0.0047		0.0	19.000	0.090		Vel = 1.17
	0.0							
	1.29					31.169		K Factor = 0.23
T.46	1.39	0.862	Utb	17.0	3.000	30.844		
to		150.0		0.0	14.000	0.0		
T.47	1.39	0.0016		0.0	17.000	0.028		Vel = 0.76
T.47	0.16	0.671	Utb	17.0	7.000	30.872		
to		150.0	Utr	2.0	19.000	0.0		
H.22	1.55	0.0067		0.0	26.000	0.174		Vel = 1.41
H.22	0.0	0.671	Utb	17.0	7.000	31.046		
to		150.0		0.0	17.000	0.0		
T.49	1.55	0.0067		0.0	24.000	0.161		Vel = 1.41
	0.0							
	1.55					31.207		K Factor = 0.28
T.39	0.16	0.671	Utb	17.0	6.000	30.866		
to		150.0	Utr	2.0	19.000	0.0		
H.19	0.16	0.0001		0.0	25.000	0.002		Vel = 0.15
H.19	0.0	0.671	Utr	2.0	4.000	30.868		
to		150.0		0.0	2.000	0.0		
T.45	0.16	0.0002		0.0	6.000	0.001		Vel = 0.15
T.45	-0.03	0.671	Utr	2.0	1.000	30.869		
to		150.0		0.0	2.000	0.0		
T.44	0.13	0.0		0.0	3.000	0.0		Vel = 0.12

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
T.44	0.03	0.671	Utb	17.0	7.000	30.869		
to		150.0		0.0	17.000	0.0		
T.47	0.16	0.0001		0.0	24.000	0.003		Vel = 0.15
	0.0							
	0.16					30.872		K Factor = 0.03
T.45	0.03	0.671	Utb	17.0	5.000	30.869		
to		150.0	Utr	2.0	19.000	0.0		
H.20	0.03	0.0		0.0	24.000	0.0		Vel = 0.03
H.20	0.0	0.671	Utb	17.0	4.000	30.869		
to		150.0		0.0	17.000	0.0		
T.44	0.03	0.0		0.0	21.000	0.0		Vel = 0.03
	0.0							
	0.03					30.869		K Factor = 0.01
T.60	0.62	0.671	Utb	17.0	1.000	35.664		
to		150.0		0.0	17.000	0.0		
T.59	0.62	0.0012		0.0	18.000	0.022		Vel = 0.56
T.59	0.0	0.671	Utr	2.0	10.000	35.686		
to		150.0		0.0	2.000	0.0		
H.28	0.62	0.0012		0.0	12.000	0.015		Vel = 0.56
H.28	0.0	0.671	Utr	2.0	17.000	35.701		
to		150.0		0.0	2.000	0.0		
H.24	0.62	0.0013		0.0	19.000	0.024		Vel = 0.56
H.24	0.0	0.671	Utb	17.0	8.000	35.725		
to		150.0	Utr	2.0	19.000	0.0		
T.54	0.62	0.0012		0.0	27.000	0.033		Vel = 0.56
	0.0							
	0.62					35.758		K Factor = 0.10
T.56	0.52	0.671	Utb	17.0	6.000	36.450		
to		150.0		0.0	17.000	0.0		
H.27	0.52	0.0009		0.0	23.000	0.021		Vel = 0.47
H.27	0.0	0.671	Utb	17.0	7.000	36.471		
to		150.0	Utr	2.0	19.000	0.0		
T.57	0.52	0.0009		0.0	26.000	0.024		Vel = 0.47
	0.0							
	0.52					36.495		K Factor = 0.09