

# Hydraulic Calculations for

**Project:** ALFANDEGA DA RECEITA FEDERAL DO BRASIL NO ESTADO DE SAO PAULO  
**Drawing no.:** SRG\_1860\_SPK\_MC\_R02\_VGA4  
**Date:** 14/01/2020

## Design

**Remote area number:** AREA04  
**Remote area location:** VGA04 + RACK20  
**Occupancy classification:** high piled rack storage  
**Density:** Min.=14,3pm/m<sup>2</sup>  
**Area of application:** 186m<sup>2</sup>  
**Coverage per sprinkler:** 8,55m<sup>2</sup>  
**Type of sprinklers calculated:** TETO: SPK K160 - 25UN  
RACK: SPK K115 - 14UN  
**No. of sprinklers calculated:** 39  
**In rack demand:** 1706,07lpm  
**Hose streams:** none outside + none inside  
**Total water required (including hose streams):** 5465,53 lpm at -0,932 bar [ 0,942 bar safety margin (9419,2%) ]  
**Total water required at base of system riser:** 5465,53 lpm at 6,499 bar  
**Type of system:** wet pipe  
**Volume of dry or preaction system:** 656m<sup>3</sup> (SPK) + 64m<sup>3</sup> (HD)

## Water Supply Information

**Date:**  
**Location:**  
**Source:**

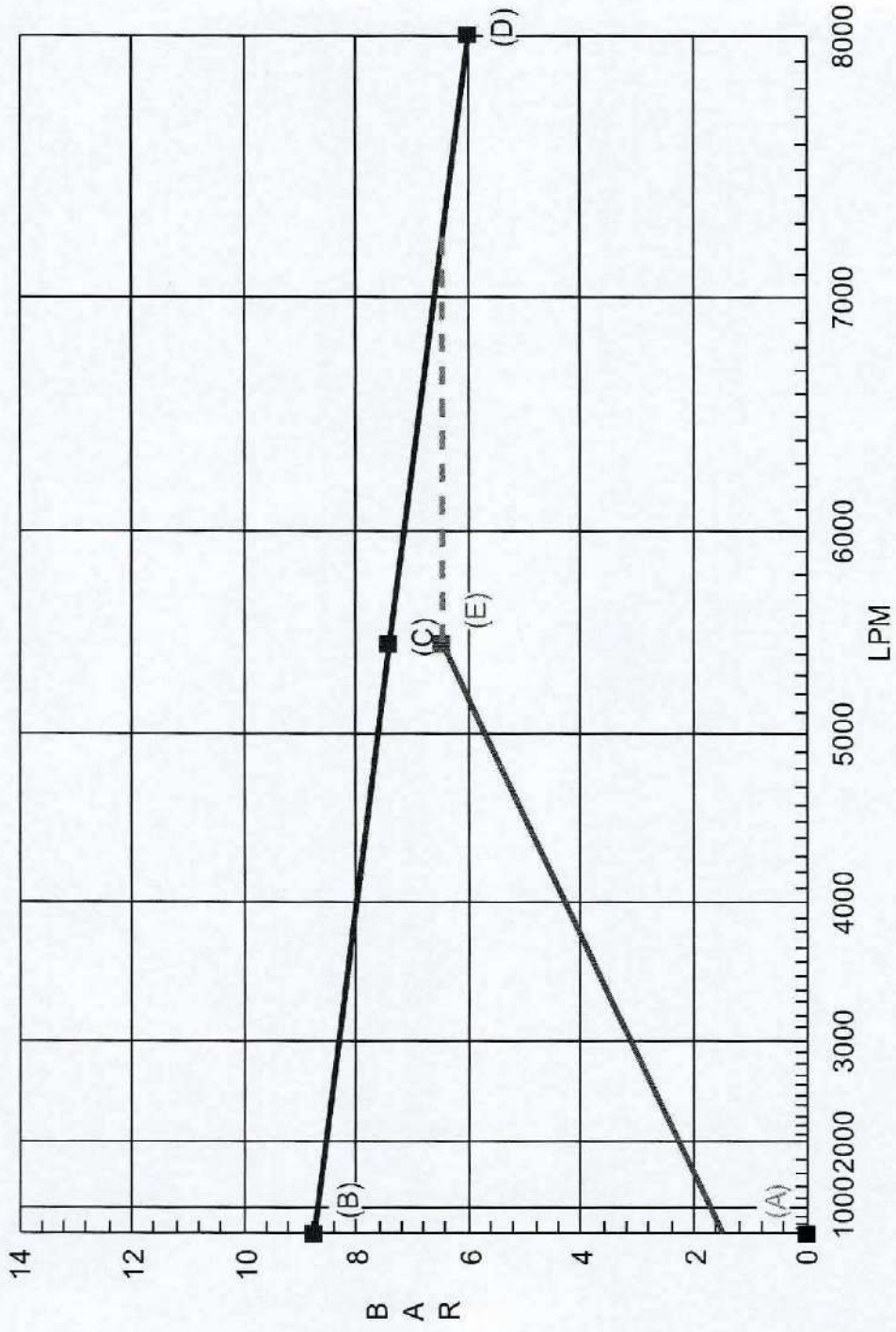
**Contractor:** RECEITA FEDERAL  
**Under contract with:** SORENCE  
**Name of designer:** LUIZ BUENO  
**Authority having jurisdiction:** CORPO DE BOMBEIROS DE SAO PAULO

## Notes

CALCULO HIDRAULICO DO SISTEMA DE CHUVEIROS AUTOMATICOS



## Hydraulic Demand Graph



Water Source:  
A) 0,01 bar Static

Source at BOR:  
B) 8,8 bar Static  
C) 5465,5 lpm at 7,44 bar  
D) 8000 lpm at 6,05 bar

Demand at BOR:  
E) 5465,5 lpm at 6,5 bar

*Handwritten signature*



**Supply Analysis**

Node at	Static Pressure [bar]	Residual Pressure [bar]	Flow [lpm]	Available Pressure [bar]	Total Demand [lpm]	Required Pressure [bar]
RTI	0,01			0,01	5465,53	-0,93

**Node Analysis**

Node Tag	Elev [M]	Type	Pressure [bar]	Discharge [lpm]	Node Tag	Elev [M]	Type	Pressure [bar]	Discharge [lpm]
RTI	-1,850	source	-0,932	-5465,52	L11-18	15,950	ref	1,942	0,000
BB	0,000	ref	-1,158	0,000	L11-19	15,950	ref	1,980	0,000
SB	0,000	ref	7,003	0,000	L12-1	15,950	K=160,00	0,954	156,296
M1-1	13,500	ref	1,935	0,000	L12-2	15,950	K=160,00	0,916	153,158
M1-2	13,500	ref	1,932	0,000	L12-3	15,950	K=160,00	0,905	152,205
M1-3	13,500	ref	1,925	0,000	L12-4	15,950	K=160,00	0,905	152,194
M1-4	13,500	ref	1,910	0,000	L12-5	15,950	K=160,00	0,913	152,862
M1-5	13,500	ref	1,886	0,000	L12-6	15,950	K=160,00	0,944	155,494
M1-6	13,500	ref	1,852	0,000	L12-7	15,950	ref	1,015	0,000
M1-7	13,500	ref	1,807	0,000	L12-8	15,950	ref	1,085	0,000
M1-8	13,500	ref	1,750	0,000	L12-9	15,950	ref	1,155	0,000
M1-9	13,500	ref	1,680	0,000	L12-10	15,950	ref	1,225	0,000
M1-10	13,500	ref	1,596	0,000	L12-11	15,950	ref	1,295	0,000
M1-11	13,500	ref	1,508	0,000	L12-12	15,950	ref	1,365	0,000
M1-12	13,500	ref	1,413	0,000	L12-13	15,950	ref	1,435	0,000
M1-13	13,500	ref	1,341	0,000	L12-14	15,950	ref	1,505	0,000
M1-14	13,500	ref	1,287	0,000	L12-15	15,950	ref	1,575	0,000
M1-15	13,500	ref	1,249	0,000	L12-16	15,950	ref	1,645	0,000
N1	13,500	ref	1,536	0,000	L12-17	15,950	ref	1,715	0,000
N2	13,500	ref	1,348	0,000	L12-18	15,950	ref	1,786	0,000
N3	13,500	ref	1,249	0,000	L12-19	15,950	ref	1,856	0,000
M2-1	13,500	ref	3,490	0,000	L13-1	15,950	K=160,00	0,904	152,157
M2-2	13,500	ref	3,275	0,000	L13-2	15,950	K=160,00	0,871	149,347
M2-3	13,500	ref	3,091	0,000	L13-3	15,950	K=160,00	0,862	148,565
M2-4	13,500	ref	2,932	0,000	L13-4	15,950	K=160,00	0,862	148,565
M2-5	13,500	ref	2,796	0,000	L13-5	15,950	K=160,00	0,871	149,360
M2-6	13,500	ref	2,681	0,000	L13-6	15,950	K=160,00	0,905	152,194
M2-7	13,500	ref	2,582	0,000	L13-7	15,950	ref	0,976	0,000
M2-8	13,500	ref	2,499	0,000	L13-8	15,950	ref	1,048	0,000
M2-9	13,500	ref	2,431	0,000	L13-9	15,950	ref	1,119	0,000
M2-10	13,500	ref	2,375	0,000	L13-10	15,950	ref	1,191	0,000
M2-11	13,500	ref	2,336	0,000	L13-11	15,950	ref	1,262	0,000
M2-12	13,500	ref	2,308	0,000	L13-12	15,950	ref	1,334	0,000
M2-13	13,500	ref	2,291	0,000	L13-13	15,950	ref	1,405	0,000
M2-14	13,500	ref	2,283	0,000	L13-14	15,950	ref	1,477	0,000
M2-15	13,500	ref	2,281	0,000	L13-15	15,950	ref	1,548	0,000
L11-1	15,950	K=160,00	1,290	181,745	L13-16	15,950	ref	1,620	0,000
L11-2	15,950	ref	1,329	0,000	L13-17	15,950	ref	1,691	0,000
L11-3	15,950	ref	1,367	0,000	L13-18	15,950	ref	1,763	0,000
L11-4	15,950	ref	1,405	0,000	L13-19	15,950	ref	1,835	0,000
L11-5	15,950	ref	1,444	0,000	L14-1	15,950	K=160,00	0,868	149,029
L11-6	15,950	ref	1,482	0,000	L14-2	15,950	K=160,00	0,838	146,472
L11-7	15,950	ref	1,520	0,000	L14-3	15,950	K=160,00	0,831	145,818
L11-8	15,950	ref	1,559	0,000	L14-4	15,950	K=160,00	0,831	145,827
L11-9	15,950	ref	1,597	0,000	L14-5	15,950	K=160,00	0,841	146,735
L11-10	15,950	ref	1,635	0,000	L14-6	15,950	K=160,00	0,876	149,741
L11-11	15,950	ref	1,674	0,000	L14-7	15,950	ref	0,949	0,000
L11-12	15,950	ref	1,712	0,000	L14-8	15,950	ref	1,022	0,000
L11-13	15,950	ref	1,750	0,000	L14-9	15,950	ref	1,094	0,000
L11-14	15,950	ref	1,789	0,000	L14-10	15,950	ref	1,167	0,000
L11-15	15,950	ref	1,827	0,000	L14-11	15,950	ref	1,240	0,000
L11-16	15,950	ref	1,865	0,000	L14-12	15,950	ref	1,313	0,000
L11-17	15,950	ref	1,904	0,000	L14-13	15,950	ref	1,386	0,000



Node Analysis, cont.

Node Tag	Elev [M]	Type	Pressure [bar]	Discharge [lpm]	Node Tag	Elev [M]	Type	Pressure [bar]	Discharge [lpm]
L14-14	15,950	ref	1,458	0,000	N3-117	4,450	K=115,00	1,261	129,161
L14-15	15,950	ref	1,531	0,000	N3-118	4,450	K=115,00	1,165	124,132
L14-16	15,950	ref	1,604	0,000	N3-119	4,450	K=115,00	1,236	127,864
L14-17	15,950	ref	1,677	0,000	N3-120	4,450	K=115,00	1,142	122,878
L14-18	15,950	ref	1,750	0,000	N3-121	4,450	K=115,00	1,229	127,503
L14-19	15,950	ref	1,823	0,000	N3-122	4,450	K=115,00	1,135	122,529
L15-1	15,950	K=160,00	0,841	146,762	N3-101	4,450	ref	1,816	0,000
L15-2	15,950	K=160,00	0,814	144,393	N3-102	4,450	ref	1,816	0,000
L15-3	15,950	K=160,00	0,808	143,831	N3-103	4,450	ref	1,750	0,000
L15-4	15,950	K=160,00	0,808	143,856	N3-104	4,450	ref	1,750	0,000
L15-5	15,950	K=160,00	0,820	144,856	N3-105	4,450	ref	1,677	0,000
L15-6	15,950	K=160,00	0,856	148,002	N3-106	4,450	ref	1,677	0,000
L15-7	15,950	ref	0,930	0,000	N3-107	4,450	ref	1,605	0,000
L15-8	15,950	ref	1,004	0,000	N3-108	4,450	ref	1,605	0,000
L15-9	15,950	ref	1,077	0,000	N3-109	4,450	ref	1,532	0,000
L15-10	15,950	ref	1,151	0,000	N3-110	4,450	ref	1,532	0,000
L15-11	15,950	ref	1,225	0,000	N3-111	4,450	ref	1,460	0,000
L15-12	15,950	ref	1,299	0,000	N3-112	4,450	ref	1,460	0,000
L15-13	15,950	ref	1,373	0,000	N3-113	4,450	ref	1,388	0,000
L15-14	15,950	ref	1,447	0,000	N3-114	4,450	ref	1,388	0,000
L15-15	15,950	ref	1,521	0,000	N3-116	4,450	ref	1,315	0,000
L15-16	15,950	ref	1,595	0,000	N3-201	8,950	ref	1,310	0,000
L15-17	15,950	ref	1,669	0,000	N3-2	8,950	ref	1,481	0,000
L15-18	15,950	ref	1,743	0,000	N3-1	4,450	ref	1,901	0,000
L15-19	15,950	ref	1,817	0,000					
R1-1	15,950	ref	1,830	0,000					
R1-2	15,950	ref	1,809	0,000					
R1-3	15,950	ref	1,786	0,000					
R1-4	15,950	ref	1,759	0,000					
R1-5	15,950	ref	1,725	0,000					
R1-6	15,950	ref	1,684	0,000					
R1-7	15,950	ref	1,634	0,000					
R1-8	15,950	ref	1,575	0,000					
R1-9	15,950	ref	1,505	0,000					
R1-10	15,950	ref	1,423	0,000					
R1-11	15,950	ref	1,285	0,000					
R1-12	15,950	ref	1,009	0,000					
R1-13	15,950	ref	0,953	0,000					
R1-14	15,950	ref	0,913	0,000					
R1-15	15,950	ref	0,883	0,000					
R2-1	15,950	ref	3,115	0,000					
R2-2	15,950	ref	2,919	0,000					
R2-3	15,950	ref	2,749	0,000					
R2-4	15,950	ref	2,603	0,000					
R2-5	15,950	ref	2,477	0,000					
R2-6	15,950	ref	2,368	0,000					
R2-7	15,950	ref	2,275	0,000					
R2-8	15,950	ref	2,194	0,000					
R2-9	15,950	ref	2,125	0,000					
R2-10	15,950	ref	2,067	0,000					
R2-11	15,950	ref	2,017	0,000					
R2-12	15,950	ref	1,923	0,000					
R2-13	15,950	ref	1,903	0,000					
R2-14	15,950	ref	1,892	0,000					
R2-15	15,950	ref	1,888	0,000					
BOR	0,500	ref	6,499	0,000					
N3-204	8,950	K=115,00	1,122	121,793					
N3-205	8,950	K=115,00	1,075	119,234					
N3-206	8,950	K=115,00	1,042	117,391					
N3-207	8,950	K=115,00	1,020	116,163					
N3-208	8,950	K=115,00	1,008	115,438					
N3-209	8,950	K=115,00	1,002	115,095					
N3-210	8,950	K=115,00	1,000	115,000					
N3-115	4,450	K=115,00	1,315	131,884					



## Pipe Information

negative pipe flow (Q) indicates flow is from node 2 towards node 1

Node 1	Elev [M]	Discharge & Flow [lpm]	Nom i.d. [mm]	Fittings num & length [M]	L [M] F [M] T [M]	C factor bar/M	total (Pt) elev (Pe) frict (Pf)	Notes
Node 2	K-factor							
RTI	-1,850	q=-5465,52 Q=5465,528	200 209,5	1E=6,447 1G=1,433	5,000 7,880		Pt= -0,932 Pe= 0,181	Mat="S10"
EB	0,000				12,880	C=120 0,004	Pf= 0,045	
EB	0,000	Pump inlet pressure = -1,158 bar						
		Net gain across pump = 8,162 bar						
SB	0,000	Pump outlet pressure = 7,003 bar						
SB	0,000	q= 0,000 Q=5465,528	200 209,5	6E=38,682 1B=4,298	61,350 68,369	C=120	Pt= 7,003 Pe= 0,049	Mat="S10"
BOR	0,500			1C=16,088 2TN=9,301	129,719	0,004	Pf= 0,456	
BOR	0,500	q= 0,000 Q=5465,528	150 161,5	1T=11,435 1B=3,833	110,700 28,299	C=120	Pt= 6,499 Pe= 1,274	Mat="S10"
M2-1	13,500			1A=7,665 1E=5,366	138,999	0,012	Pf= 1,734	
M1-1	13,500	q= 0,000 Q= 429,539	100 108,2		2,850 0,000	C=120	Pt= 1,935 Pe= 0,000	Mat="S10"
M1-2	13,500				2,850	0,001	Pf= 0,002	
M1-2	13,500	q= 0,000 Q= 826,271	100 108,2		2,850 0,000	C=120	Pt= 1,932 Pe= 0,000	Mat="S10"
M1-3	13,500				2,850	0,003	Pf= 0,008	
M1-3	13,500	q= 0,000 Q=1193,914	100 108,2		2,850 0,000	C=120	Pt= 1,925 Pe= 0,000	Mat="S10"
M1-4	13,500				2,850	0,005	Pf= 0,015	
M1-4	13,500	q= 0,000 Q=1336,167	100 108,2		2,850 0,000	C=120	Pt= 1,910 Pe= 0,000	Mat="S10"
M1-5	13,500				2,850	0,008	Pf= 0,024	
M1-5	13,500	q= 0,000 Q=1857,727	100 108,2		2,850 0,000	C=120	Pt= 1,886 Pe= 0,000	Mat="S10"
M1-6	13,500				2,850	0,012	Pf= 0,034	
M1-6	13,500	q= 0,000 Q=2163,297	100 108,2		2,850 0,000	C=120	Pt= 1,852 Pe= 0,000	Mat="S10"
M1-7	13,500				2,850	0,016	Pf= 0,045	
M1-7	13,500	q= 0,000 Q=2458,051	100 108,2		2,850 0,000	C=120	Pt= 1,807 Pe= 0,000	Mat="S10"
M1-8	13,500				2,850	0,02	Pf= 0,057	
M1-8	13,500	q= 0,000 Q=2747,463	100 108,2		2,850 0,000	C=120	Pt= 1,750 Pe= 0,000	Mat="S10"
M1-9	13,500				2,850	0,025	Pf= 0,070	
M1-9	13,500	q= 0,000 Q=3037,162	100 108,2		2,850 0,000	C=120	Pt= 1,680 Pe= 0,000	Mat="S10"
M1-10	13,500				2,850	0,03	Pf= 0,084	
M1-10	13,500	q= 0,000 Q=3332,773	100 108,2		1,700 0,000	C=120	Pt= 1,596 Pe= 0,000	Mat="S10"
N1	13,500				1,700	0,035	Pf= 0,080	
M1-11	13,500	q= 0,000 Q=3472,821	100 108,2		2,500 0,000	C=120	Pt= 1,508 Pe= 0,000	Mat="S10"
M1-12	13,500				2,500	0,038	Pf= 0,095	





Pipe Information. cont.

Node 1 Node 2	Elev [M]	K-factor	Discharge & Flow [lpm]	Nom i.d. [mm]	Fittings num & length [M]	L [M] F [M] T [M]	C factor bar/M	total (Pt) elev (Pe) frict (Pf)	Notes
M1-12	13,500		q= 0,000 100 Q=2996,540 108,2			2,250 0,000		Pt= 1,413 Mat="S10" Pe= 0,000	
N2	13,500					2,250	0,029	Pf= 0,065	
M1-13	13,500		q= 0,000 100 Q=2547,155 108,2			2,500 0,000	C=120	Pt= 1,341 Mat="S10" Pe= 0,000	
M1-14	13,500					2,500	0,021	Pf= 0,053	
M1-14	13,500		q= 0,000 100 Q=2118,761 108,2			2,500 0,000	C=120	Pt= 1,287 Mat="S10" Pe= 0,000	
N3	13,500					2,500	0,015	Pf= 0,038	
N3	13,500		q= 0,000 100 Q= 412,694 108,2			0,250 0,000	C=120	Pt= 1,249 Mat="S10" Pe= 0,000	
M1-15	13,500					0,250	0,001	Pf= 0,000	
N2	13,500		q= 0,000 100 Q=2996,540 108,2			0,250 0,000	C=120	Pt= 1,348 Mat="S10" Pe= 0,000	
M1-13	13,500					0,250	0,029	Pf= 0,007	
N1	13,500		q= 0,000 100 Q=3332,773 108,2			0,800 0,000	C=120	Pt= 1,536 Mat="S10" Pe= 0,000	
M1-11	13,500					0,800	0,035	Pf= 0,028	
M2-1	13,500		q= 0,000 100 Q=5035,989 108,2			2,850 0,000	C=120	Pt= 3,490 Mat="S10" Pe= 0,000	
M2-2	13,500					2,850	0,075	Pf= 0,215	
M2-2	13,500		q= 0,000 100 Q=4639,257 108,2			2,850 0,000	C=120	Pt= 3,275 Mat="S10" Pe= 0,000	
M2-3	13,500					2,850	0,065	Pf= 0,185	
M2-3	13,500		q= 0,000 100 Q=4271,714 108,2			2,850 0,000	C=120	Pt= 3,091 Mat="S10" Pe= 0,000	
M2-4	13,500					2,850	0,056	Pf= 0,159	
M2-4	13,500		q= 0,000 100 Q=3929,361 108,2			2,850 0,000	C=120	Pt= 2,932 Mat="S10" Pe= 0,000	
M2-5	13,500					2,850	0,048	Pf= 0,136	
M2-5	13,500		q= 0,000 100 Q=3607,800 108,2			2,850 0,000	C=120	Pt= 2,796 Mat="S10" Pe= 0,000	
M2-6	13,500					2,850	0,041	Pf= 0,116	
M2-6	13,500		q= 0,000 100 Q=3302,231 108,2			2,850 0,000	C=120	Pt= 2,681 Mat="S10" Pe= 0,000	
M2-7	13,500					2,850	0,035	Pf= 0,098	
M2-7	13,500		q= 0,000 100 Q=3007,476 108,2			2,850 0,000	C=120	Pt= 2,582 Mat="S10" Pe= 0,000	
M2-8	13,500					2,850	0,029	Pf= 0,083	
M2-8	13,500		q= 0,000 100 Q=2718,065 108,2			2,850 0,000	C=120	Pt= 2,499 Mat="S10" Pe= 0,000	
M2-9	13,500					2,850	0,024	Pf= 0,069	
M2-9	13,500		q= 0,000 100 Q=2428,365 108,2			2,850 0,000	C=120	Pt= 2,431 Mat="S10" Pe= 0,000	
M2-10	13,500					2,850	0,02	Pf= 0,056	



Pipe Information. cont.

Node 1 Node 2	Elev [M]	K-factor	Discharge & Flow [lpm]	Nom i.d. [mm]	Fittings num & length [M]	L [M] F [M] T [M]	C factor bar/M	total (Pt) elev (Pe) frict (Pf)	Notes
M2-10	13,500		q= 0,000 100 Q=2132,755 108,2			2,500 0,000 2,500		Pt= 2,375 Mat="S10" Pe= 0,000 Pf= 0,038	
M2-11	13,500		q= 0,000 100 Q=1810,962 108,2			2,500 0,000 2,500		Pt= 2,336 Mat="S10" Pe= 0,000 Pf= 0,028	
M2-12	13,500		q= 0,000 100 Q=1365,035 108,2			2,500 0,000 2,500		Pt= 2,308 Mat="S10" Pe= 0,000 Pf= 0,017	
M2-13	13,500		q= 0,000 100 Q= 914,233 108,2			2,500 0,000 2,500		Pt= 2,291 Mat="S10" Pe= 0,000 Pf= 0,008	
M2-14	13,500		q= 0,000 100 Q= 459,006 108,2			2,500 0,000 2,500		Pt= 2,283 Mat="S10" Pe= 0,000 Pf= 0,002	
M2-15	13,500								
R1-1	15,950		q= 0,000 50 Q=-429,539 54,8		2E=3,746	55,200 3,746 58,946		Pt= 1,830 Mat="S10" Pe= 0,000 Pf= -1,285	
R2-1	15,950								
R1-2	15,950		q= 0,000 50 Q=-396,731 54,8		2E=3,746	55,200 3,746 58,946		Pt= 1,809 Mat="S10" Pe= 0,000 Pf= -1,109	
R2-2	15,950								
R1-3	15,950		q= 0,000 50 Q=-367,543 54,8		2E=3,746	55,200 3,746 58,946		Pt= 1,786 Mat="S10" Pe= 0,000 Pf= -0,963	
R2-3	15,950								
R1-4	15,950		q= 0,000 50 Q=-342,353 54,8		2E=3,746	55,200 3,746 58,946		Pt= 1,759 Mat="S10" Pe= 0,000 Pf= -0,845	
R2-4	15,950								
R1-5	15,950		q= 0,000 50 Q=-321,561 54,8		2E=3,746	55,200 3,746 58,946		Pt= 1,725 Mat="S10" Pe= 0,000 Pf= -0,752	
R2-5	15,950								
R1-6	15,950		q= 0,000 50 Q=-305,569 54,8		2E=3,746	55,200 3,746 58,946		Pt= 1,684 Mat="S10" Pe= 0,000 Pf= -0,684	
R2-6	15,950								
R1-7	15,950		q= 0,000 50 Q=-294,755 54,8		2E=3,746	55,200 3,746 58,946		Pt= 1,634 Mat="S10" Pe= 0,000 Pf= -0,640	
R2-7	15,950								
R1-8	15,950		q= 0,000 50 Q=-289,412 54,8		2E=3,746	55,200 3,746 58,946		Pt= 1,575 Mat="S10" Pe= 0,000 Pf= -0,619	
R2-8	15,950								
R1-9	15,950		q= 0,000 50 Q=-289,700 54,8		2E=3,746	55,200 3,746 58,946		Pt= 1,505 Mat="S10" Pe= 0,000 Pf= -0,620	
R2-9	15,950								
R1-10	15,950		q= 0,000 50 Q=-295,610 54,8		2E=3,746	55,200 3,746 58,946		Pt= 1,423 Mat="S10" Pe= 0,000 Pf= -0,644	
R2-10	15,950								



Pipe Information. cont.

Node 1 Node 2	Elev [M]	K-factor	Discharge & Flow [lpm]	Nom i.d. [mm]	Fittings num & length [M]	L [M] F [M] T [M]	C factor bar/M	total (Pt) elev (Pe) frict (Pf)	Notes
R1-11	15,950		q= 0,000 Q=-140,048	50 54,8	1E=1,873	0,200 1,873 2,073	C=120 0,003	Pt= 1,285 Mat="S10" Pe= 0,000 Pf= -0,006	
L11-1	15,950	160	q= 181,745 Q=-321,793	50 54,8		3,000 0,000 3,000	C=120 0,013	Pt= 1,290 Mat="S10" Pe= 0,000 Pf= -0,038	
L11-2	15,950		q= 0,000 Q=-321,793	50 54,8		3,000 0,000 3,000	C=120 0,013	Pt= 1,329 Mat="S10" Pe= 0,000 Pf= -0,038	
L11-3	15,950		q= 0,000 Q=-321,793	50 54,8		3,000 0,000 3,000	C=120 0,013	Pt= 1,367 Mat="S10" Pe= 0,000 Pf= -0,038	
L11-4	15,950		q= 0,000 Q=-321,793	50 54,8		3,000 0,000 3,000	C=120 0,013	Pt= 1,405 Mat="S10" Pe= 0,000 Pf= -0,038	
L11-5	15,950		q= 0,000 Q=-321,793	50 54,8		3,000 0,000 3,000	C=120 0,013	Pt= 1,444 Mat="S10" Pe= 0,000 Pf= -0,038	
L11-6	15,950		q= 0,000 Q=-321,793	50 54,8		3,000 0,000 3,000	C=120 0,013	Pt= 1,482 Mat="S10" Pe= 0,000 Pf= -0,038	
L11-7	15,950		q= 0,000 Q=-321,793	50 54,8		3,000 0,000 3,000	C=120 0,013	Pt= 1,520 Mat="S10" Pe= 0,000 Pf= -0,038	
L11-8	15,950		q= 0,000 Q=-321,793	50 54,8		3,000 0,000 3,000	C=120 0,013	Pt= 1,559 Mat="S10" Pe= 0,000 Pf= -0,038	
L11-9	15,950		q= 0,000 Q=-321,793	50 54,8		3,000 0,000 3,000	C=120 0,013	Pt= 1,597 Mat="S10" Pe= 0,000 Pf= -0,038	
L11-10	15,950		q= 0,000 Q=-321,793	50 54,8		3,000 0,000 3,000	C=120 0,013	Pt= 1,635 Mat="S10" Pe= 0,000 Pf= -0,038	
L11-11	15,950		q= 0,000 Q=-321,793	50 54,8		3,000 0,000 3,000	C=120 0,013	Pt= 1,674 Mat="S10" Pe= 0,000 Pf= -0,038	
L11-12	15,950		q= 0,000 Q=-321,793	50 54,8		3,000 0,000 3,000	C=120 0,013	Pt= 1,712 Mat="S10" Pe= 0,000 Pf= -0,038	
L11-13	15,950		q= 0,000 Q=-321,793	50 54,8		3,000 0,000 3,000	C=120 0,013	Pt= 1,750 Mat="S10" Pe= 0,000 Pf= -0,038	
L11-14	15,950		q= 0,000 Q=-321,793	50 54,8		3,000 0,000 3,000	C=120 0,013	Pt= 1,789 Mat="S10" Pe= 0,000 Pf= -0,038	
L11-15	15,950		q= 0,000 Q=-321,793	50 54,8		3,000 0,000 3,000	C=120 0,013	Pt= 1,789 Mat="S10" Pe= 0,000 Pf= -0,038	



Pipe Information, cont.

Node 1 Node 2	Elev [M]	K-factor	Discharge & Flow [lpm]	Nom i.d. [mm]	Fittings num & length [M]	L [M] F [M] T [M]	C factor bar/M	total (Pt) elev (Pe) frict (Pf)	Notes
L11-15	15,950		q= 0,000 Q=-321,793	50 54,8		3,000 0,000		Pt= 1,827 Pe= 0,000	Mat="S10"
L11-16	15,950					3,000	C=120 0,013	Pf= -0,038	
L11-16	15,950		q= 0,000 Q=-321,793	50 54,8		3,000 0,000		Pt= 1,865 Pe= 0,000	Mat="S10"
L11-17	15,950					3,000	C=120 0,013	Pf= -0,038	
L11-17	15,950		q= 0,000 Q=-321,793	50 54,8		3,000 0,000		Pt= 1,904 Pe= 0,000	Mat="S10"
L11-18	15,950					3,000	C=120 0,013	Pf= -0,038	
L11-18	15,950		q= 0,000 Q=-321,793	50 54,8		3,000 0,000		Pt= 1,942 Pe= 0,000	Mat="S10"
L11-19	15,950					3,000	C=120 0,013	Pf= -0,038	
L11-19	15,950		q= 0,000 Q=-321,793	50 54,8	1E=1,873	1,000 1,873		Pt= 1,980 Pe= 0,000	Mat="S10"
R2-11	15,950					2,873	C=120 0,013	Pf= -0,037	
R1-12	15,950		q= 0,000 Q= 476,280	50 54,8	1E=1,873	0,200 1,873		Pt= 1,009 Pe= 0,000	Mat="S10"
L12-1	15,950					2,073	C=120 0,026	Pf= 0,055	
L12-1	15,950	160	q= 156,296 Q= 319,985	50 54,8		3,000 0,000		Pt= 0,954 Pe= 0,000	Mat="S10"
L12-2	15,950					3,000	C=120 0,013	Pf= 0,038	
L12-2	15,950	160	q= 153,158 Q= 166,827	50 54,8		3,000 0,000		Pt= 0,916 Pe= 0,000	Mat="S10"
L12-3	15,950					3,000	C=120 0,004	Pf= 0,011	
L12-3	15,950	160	q= 152,205 Q= 14,622	50 54,8		3,000 0,000		Pt= 0,905 Pe= 0,000	Mat="S10"
L12-4	15,950					3,000	C=120 0	Pf= 0,000	
L12-4	15,950	160	q= 152,194 Q=-137,572	50 54,8		3,000 0,000		Pt= 0,905 Pe= 0,000	Mat="S10"
L12-5	15,950					3,000	C=120 0,003	Pf= -0,008	
L12-5	15,950	160	q= 152,862 Q=-290,433	50 54,8		3,000 0,000		Pt= 0,913 Pe= 0,000	Mat="S10"
L12-6	15,950					3,000	C=120 0,011	Pf= -0,032	
L12-6	15,950	160	q= 155,494 Q=-445,928	50 54,8		3,000 0,000		Pt= 0,944 Pe= 0,000	Mat="S10"
L12-7	15,950					3,000	C=120 0,023	Pf= -0,070	
L12-7	15,950		q= 0,000 Q=-445,928	50 54,8		3,000 0,000		Pt= 1,015 Pe= 0,000	Mat="S10"
L12-8	15,950					3,000	C=120 0,023	Pf= -0,070	
L12-8	15,950		q= 0,000 Q=-445,928	50 54,8		3,000 0,000		Pt= 1,085 Pe= 0,000	Mat="S10"
L12-9	15,950					3,000	C=120 0,023	Pf= -0,070	
L12-9	15,950		q= 0,000 Q=-445,928	50 54,8		3,000 0,000		Pt= 1,155 Pe= 0,000	Mat="S10"
L12-10	15,950					3,000	C=120 0,023	Pf= -0,070	



Pipe Information. cont.

Node 1 Node 2	Elev [M]	K-factor	Discharge & Flow [lpm]	Nom i.d. [mm]	Fittings num & length [M]	L [M] F [M] T [M]	C factor bar/M	total (Pt) elev (Pe) frict (Pf)	Notes
L12-10	15,950		q= 0,000 Q=-445,928	50 54,8		3,000 0,000 3,000		Pt= 1,225 Mat="S10" Pe= 0,000 Pf= -0,070	
L12-11	15,950		q= 0,000 Q=-445,928	50 54,8		3,000 0,000 3,000		Pt= 1,295 Mat="S10" Pe= 0,000 Pf= -0,070	
L12-12	15,950		q= 0,000 Q=-445,928	50 54,8		3,000 0,000 3,000		Pt= 1,365 Mat="S10" Pe= 0,000 Pf= -0,070	
L12-13	15,950		q= 0,000 Q=-445,928	50 54,8		3,000 0,000 3,000		Pt= 1,435 Mat="S10" Pe= 0,000 Pf= -0,070	
L12-14	15,950		q= 0,000 Q=-445,928	50 54,8		3,000 0,000 3,000		Pt= 1,505 Mat="S10" Pe= 0,000 Pf= -0,070	
L12-15	15,950		q= 0,000 Q=-445,928	50 54,8		3,000 0,000 3,000		Pt= 1,575 Mat="S10" Pe= 0,000 Pf= -0,070	
L12-16	15,950		q= 0,000 Q=-445,928	50 54,8		3,000 0,000 3,000		Pt= 1,645 Mat="S10" Pe= 0,000 Pf= -0,070	
L12-17	15,950		q= 0,000 Q=-445,928	50 54,8		3,000 0,000 3,000		Pt= 1,715 Mat="S10" Pe= 0,000 Pf= -0,070	
L12-18	15,950		q= 0,000 Q=-445,928	50 54,8		3,000 0,000 3,000		Pt= 1,786 Mat="S10" Pe= 0,000 Pf= -0,070	
L12-19	15,950		q= 0,000 Q=-445,928	50 54,8		3,000 0,000 3,000		Pt= 1,856 Mat="S10" Pe= 0,000 Pf= -0,070	
R2-12	15,950		q= 0,000 Q=-445,928	50 54,8	1E-1,873	1,000 1,873 2,873		Pt= 1,856 Mat="S10" Pe= 0,000 Pf= -0,067	
R1-13	15,950		q= 0,000 Q= 449,385	50 54,8	1E-1,873	0,200 1,873 2,073		Pt= 0,953 Mat="S10" Pe= 0,000 Pf= 0,049	
L13-1	15,950								
L13-1	15,950	160	q= 152,157 Q= 297,228	50 54,8		3,000 0,000 3,000		Pt= 0,904 Mat="S10" Pe= 0,000 Pf= 0,033	
L13-2	15,950								
L13-2	15,950	160	q= 149,347 Q= 147,882	50 54,8		3,000 0,000 3,000		Pt= 0,871 Mat="S10" Pe= 0,000 Pf= 0,009	
L13-3	15,950								
L13-3	15,950	160	q= 148,565 Q= -0,683	50 54,8		3,000 0,000 3,000		Pt= 0,862 Mat="S10" Pe= 0,000 Pf= 0,000	
L13-4	15,950								
L13-4	15,950	160	q= 148,565 Q=-149,248	50 54,8		3,000 0,000 3,000		Pt= 0,862 Mat="S10" Pe= 0,000 Pf= -0,009	
L13-5	15,950								



Pipe Information. cont.

Node 1 Node 2	Elev [M]	K-factor	Discharge & Flow [lpm]	Nom i.d. [mm]	Fittings num & length [M]	L [M] F [M] T [M]	C factor bar/M	total (Pt) elev (Pe) frict (Pf)	Notes
L13-5	15,950	160	q= 149,360 Q=-298,608	50 54,8		3,000 0,000		Pt= 0,871 Mat="S10" Pe= 0,000	
L13-6	15,950					3,000	0,011	Pf= -0,033	
L13-6	15,950	160	q= 152,194 Q=-450,802	50 54,8		3,000 0,000		Pt= 0,905 Mat="S10" Pe= 0,000	
L13-7	15,950					3,000	0,024	Pf= -0,072	
L13-7	15,950		q= 0,000 Q=-450,802	50 54,8		3,000 0,000		Pt= 0,976 Mat="S10" Pe= 0,000	
L13-8	15,950					3,000	0,024	Pf= -0,072	
L13-8	15,950		q= 0,000 Q=-450,802	50 54,8		3,000 0,000		Pt= 1,048 Mat="S10" Pe= 0,000	
L13-9	15,950					3,000	0,024	Pf= -0,072	
L13-9	15,950		q= 0,000 Q=-450,802	50 54,8		3,000 0,000		Pt= 1,119 Mat="S10" Pe= 0,000	
L13-10	15,950					3,000	0,024	Pf= -0,072	
L13-10	15,950		q= 0,000 Q=-450,802	50 54,8		3,000 0,000		Pt= 1,191 Mat="S10" Pe= 0,000	
L13-11	15,950					3,000	0,024	Pf= -0,072	
L13-11	15,950		q= 0,000 Q=-450,802	50 54,8		3,000 0,000		Pt= 1,262 Mat="S10" Pe= 0,000	
L13-12	15,950					3,000	0,024	Pf= -0,072	
L13-12	15,950		q= 0,000 Q=-450,802	50 54,8		3,000 0,000		Pt= 1,334 Mat="S10" Pe= 0,000	
L13-13	15,950					3,000	0,024	Pf= -0,072	
L13-13	15,950		q= 0,000 Q=-450,802	50 54,8		3,000 0,000		Pt= 1,405 Mat="S10" Pe= 0,000	
L13-14	15,950					3,000	0,024	Pf= -0,072	
L13-14	15,950		q= 0,000 Q=-450,802	50 54,8		3,000 0,000		Pt= 1,477 Mat="S10" Pe= 0,000	
L13-15	15,950					3,000	0,024	Pf= -0,072	
L13-15	15,950		q= 0,000 Q=-450,802	50 54,8		3,000 0,000		Pt= 1,548 Mat="S10" Pe= 0,000	
L13-16	15,950					3,000	0,024	Pf= -0,072	
L13-16	15,950		q= 0,000 Q=-450,802	50 54,8		3,000 0,000		Pt= 1,620 Mat="S10" Pe= 0,000	
L13-17	15,950					3,000	0,024	Pf= -0,072	
L13-17	15,950		q= 0,000 Q=-450,802	50 54,8		3,000 0,000		Pt= 1,691 Mat="S10" Pe= 0,000	
L13-18	15,950					3,000	0,024	Pf= -0,072	
L13-18	15,950		q= 0,000 Q=-450,802	50 54,8		3,000 0,000		Pt= 1,763 Mat="S10" Pe= 0,000	
L13-19	15,950					3,000	0,024	Pf= -0,072	
L13-19	15,950		q= 0,000 Q=-450,802	50 54,8	1E=1,873	1,000 1,873		Pt= 1,835 Mat="S10" Pe= 0,000	
R2-13	15,950					2,873	0,024	Pf= -0,068	



Pipe Information, cont.

Node 1 Node 2	Elev [M]	K-factor	Discharge & Flow [lpm]	Nom i.d. [mm]	Fittings num & length [M]	L [M] F [M] T [M]	C factor bar/M	total (Pt) elev (Pe) frict (Pf)	Notes
R1-14	15,950		q= 0,000 Q= 428,394	50 54,8	1E=1,873	0,200 1,873 2,073	C=120 0,022	Pt= 0,913 Pe= 0,000 Pf= 0,045	Mat="S10"
L14-1	15,950								
L14-1	15,950	160	q= 149,029 Q= 279,366	50 54,8		3,000 0,000 3,000	C=120 0,01	Pt= 0,868 Pe= 0,000 Pf= 0,030	Mat="S10"
L14-2	15,950								
L14-2	15,950	160	q= 146,472 Q= 132,894	50 54,8		3,000 0,000 3,000	C=120 0,002	Pt= 0,838 Pe= 0,000 Pf= 0,007	Mat="S10"
L14-3	15,950								
L14-3	15,950	160	q= 145,818 Q= -12,925	50 54,8		3,000 0,000 3,000	C=120 0	Pt= 0,831 Pe= 0,000 Pf= 0,000	Mat="S10"
L14-4	15,950								
L14-4	15,950	160	q= 145,827 Q= -158,752	50 54,8		3,000 0,000 3,000	C=120 0,003	Pt= 0,831 Pe= 0,000 Pf= -0,010	Mat="S10"
L14-5	15,950								
L14-5	15,950	160	q= 146,735 Q= -305,486	50 54,8		3,000 0,000 3,000	C=120 0,012	Pt= 0,841 Pe= 0,000 Pf= -0,035	Mat="S10"
L14-6	15,950								
L14-6	15,950	160	q= 149,741 Q= -455,227	50 54,8		3,000 0,000 3,000	C=120 0,024	Pt= 0,876 Pe= 0,000 Pf= -0,073	Mat="S10"
L14-7	15,950								
L14-7	15,950		q= 0,000 Q= -455,227	50 54,8		3,000 0,000 3,000	C=120 0,024	Pt= 0,949 Pe= 0,000 Pf= -0,073	Mat="S10"
L14-8	15,950								
L14-8	15,950		q= 0,000 Q= -455,227	50 54,8		3,000 0,000 3,000	C=120 0,024	Pt= 1,022 Pe= 0,000 Pf= -0,073	Mat="S10"
L14-9	15,950								
L14-9	15,950		q= 0,000 Q= -455,227	50 54,8		3,000 0,000 3,000	C=120 0,024	Pt= 1,094 Pe= 0,000 Pf= -0,073	Mat="S10"
L14-10	15,950								
L14-10	15,950		q= 0,000 Q= -455,227	50 54,8		3,000 0,000 3,000	C=120 0,024	Pt= 1,167 Pe= 0,000 Pf= -0,073	Mat="S10"
L14-11	15,950								
L14-11	15,950		q= 0,000 Q= -455,227	50 54,8		3,000 0,000 3,000	C=120 0,024	Pt= 1,240 Pe= 0,000 Pf= -0,073	Mat="S10"
L14-12	15,950								
L14-12	15,950		q= 0,000 Q= -455,227	50 54,8		3,000 0,000 3,000	C=120 0,024	Pt= 1,313 Pe= 0,000 Pf= -0,073	Mat="S10"
L14-13	15,950								
L14-13	15,950		q= 0,000 Q= -455,227	50 54,8		3,000 0,000 3,000	C=120 0,024	Pt= 1,386 Pe= 0,000 Pf= -0,073	Mat="S10"
L14-14	15,950								
L14-14	15,950		q= 0,000 Q= -455,227	50 54,8		3,000 0,000 3,000	C=120 0,024	Pt= 1,458 Pe= 0,000 Pf= -0,073	Mat="S10"
L14-15	15,950								
L14-15	15,950		q= 0,000 Q= -455,227	50 54,8		3,000 0,000 3,000	C=120 0,024	Pt= 1,458 Pe= 0,000 Pf= -0,073	Mat="S10"



Pipe Information. cont.

Node 1	Elev	Discharge	Nom	Fittings	L [M]	total (Pt)		
Node 2	[M]	K-factor	& Flow	num & length	F [M]	elev (Pe)	C factor	Notes
			[lpm]	[M]	T [M]	frict (Pf)	bar/M	
L14-15	15,950		q= 0,000 50		3,000	Pt= 1,531 Mat="S10"		
			Q=-455,227 54,8		0,000	Pe= 0,000	C=120	
L14-16	15,950				3,000	Pf= -0,073	0,024	
L14-16	15,950		q= 0,000 50		3,000	Pt= 1,604 Mat="S10"		
			Q=-455,227 54,8		0,000	Pe= 0,000	C=120	
L14-17	15,950				3,000	Pf= -0,073	0,024	
L14-17	15,950		q= 0,000 50		3,000	Pt= 1,677 Mat="S10"		
			Q=-455,227 54,8		0,000	Pe= 0,000	C=120	
L14-18	15,950				3,000	Pf= -0,073	0,024	
L14-18	15,950		q= 0,000 50		3,000	Pt= 1,750 Mat="S10"		
			Q=-455,227 54,8		0,000	Pe= 0,000	C=120	
L14-19	15,950				3,000	Pf= -0,073	0,024	
L14-19	15,950		q= 0,000 50	1E=1,873	1,000	Pt= 1,823 Mat="S10"		
			Q=-455,227 54,8		1,873	Pe= 0,000	C=120	
R2-14	15,950				2,873	Pf= -0,070	0,024	
R1-13	15,950		q= 0,000 50	1E=1,873	0,200	Pt= 0,883 Mat="S10"		
			Q= 412,694 54,8		1,873	Pe= 0,000	C=120	
L13-1	15,950				2,073	Pf= 0,042	0,02	
L15-1	15,950	160	q= 146,762 50		3,000	Pt= 0,841 Mat="S10"		
			Q= 265,932 54,8		0,000	Pe= 0,000	C=120	
L15-2	15,950				3,000	Pf= 0,027	0,009	
L15-2	15,950	160	q= 144,393 50		3,000	Pt= 0,814 Mat="S10"		
			Q= 121,539 54,8		0,000	Pe= 0,000	C=120	
L15-3	15,950				3,000	Pf= 0,006	0,002	
L15-3	15,950	160	q= 143,831 50		3,000	Pt= 0,808 Mat="S10"		
			Q= -22,292 54,8		0,000	Pe= 0,000	C=120	
L15-4	15,950				3,000	Pf= 0,000	0	
L15-4	15,950	160	q= 143,856 50		3,000	Pt= 0,808 Mat="S10"		
			Q=-166,148 54,8		0,000	Pe= 0,000	C=120	
L15-5	15,950				3,000	Pf= -0,011	0,004	
L15-5	15,950	160	q= 144,856 50		3,000	Pt= 0,820 Mat="S10"		
			Q=-311,004 54,8		0,000	Pe= 0,000	C=120	
L15-6	15,950				3,000	Pf= -0,036	0,012	
L15-6	15,950	160	q= 148,002 50		3,000	Pt= 0,856 Mat="S10"		
			Q=-459,006 54,8		0,000	Pe= 0,000	C=120	
L15-7	15,950				3,000	Pf= -0,074	0,025	
L15-7	15,950		q= 0,000 50		3,000	Pt= 0,930 Mat="S10"		
			Q=-459,006 54,8		0,000	Pe= 0,000	C=120	
L15-8	15,950				3,000	Pf= -0,074	0,025	
L15-8	15,950		q= 0,000 50		3,000	Pt= 1,004 Mat="S10"		
			Q=-459,006 54,8		0,000	Pe= 0,000	C=120	
L15-9	15,950				3,000	Pf= -0,074	0,025	
L15-9	15,950		q= 0,000 50		3,000	Pt= 1,077 Mat="S10"		
			Q=-459,006 54,8		0,000	Pe= 0,000	C=120	
L15-10	15,950				3,000	Pf= -0,074	0,025	



Pipe Information. cont.

Node 1 Node 2	Elev [M]	K-factor	Discharge & Flow [lpm]	Nom i.d. [mm]	Fittings num & length [M]	L [M] F [M] T [M]	C factor bar/M	total (Pt) elev (Pe) frict (Pf)	Notes
L15-10	15,950		q= 0,000 Q=-459,006	50 54,8		3,000 0,000		Pt= 1,151 Mat="S10" Pe= 0,000	
L15-11	15,950					3,000	C=120 0,025	Pf= -0,074	
L15-11	15,950		q= 0,000 Q=-459,006	50 54,8		3,000 0,000		Pt= 1,225 Mat="S10" Pe= 0,000	
L15-12	15,950					3,000	C=120 0,025	Pf= -0,074	
L15-12	15,950		q= 0,000 Q=-459,006	50 54,8		3,000 0,000		Pt= 1,299 Mat="S10" Pe= 0,000	
L15-13	15,950					3,000	C=120 0,025	Pf= -0,074	
L15-13	15,950		q= 0,000 Q=-459,006	50 54,8		3,000 0,000		Pt= 1,373 Mat="S10" Pe= 0,000	
L15-14	15,950					3,000	C=120 0,025	Pf= -0,074	
L15-14	15,950		q= 0,000 Q=-459,006	50 54,8		3,000 0,000		Pt= 1,447 Mat="S10" Pe= 0,000	
L15-15	15,950					3,000	C=120 0,025	Pf= -0,074	
L15-15	15,950		q= 0,000 Q=-459,006	50 54,8		3,000 0,000		Pt= 1,521 Mat="S10" Pe= 0,000	
L15-16	15,950					3,000	C=120 0,025	Pf= -0,074	
L15-16	15,950		q= 0,000 Q=-459,006	50 54,8		3,000 0,000		Pt= 1,595 Mat="S10" Pe= 0,000	
L15-17	15,950					3,000	C=120 0,025	Pf= -0,074	
L15-17	15,950		q= 0,000 Q=-459,006	50 54,8		3,000 0,000		Pt= 1,669 Mat="S10" Pe= 0,000	
L15-18	15,950					3,000	C=120 0,025	Pf= -0,074	
L15-18	15,950		q= 0,000 Q=-459,006	50 54,8		3,000 0,000		Pt= 1,743 Mat="S10" Pe= 0,000	
L15-19	15,950					3,000	C=120 0,025	Pf= -0,074	
L15-19	15,950		q= 0,000 Q=-459,006	50 54,8	1E=1,873	1,000 1,873		Pt= 1,817 Mat="S10" Pe= 0,000	
R2-15	15,950					2,873	C=120 0,025	Pf= -0,071	
M1-1	13,500		q= 0,000 Q=-429,539	50 54,8	1T=3,758	2,450 3,758		Pt= 1,935 Mat="S10" Pe= 0,240	
R1-1	15,950					6,208	C=120 0,022	Pf= -0,135	
M1-2	13,500		q= 0,000 Q=-396,731	50 54,8	1T=3,758	2,450 3,758		Pt= 1,932 Mat="S10" Pe= 0,240	
R1-2	15,950					6,208	C=120 0,019	Pf= -0,117	
M1-3	13,500		q= 0,000 Q=-367,543	50 54,8	1T=3,758	2,450 3,758		Pt= 1,925 Mat="S10" Pe= 0,240	
R1-3	15,950					6,208	C=120 0,016	Pf= -0,101	
M1-4	13,500		q= 0,000 Q=-342,353	50 54,8	1T=3,758	2,450 3,758		Pt= 1,910 Mat="S10" Pe= 0,240	
R1-4	15,950					6,208	C=120 0,014	Pf= -0,089	
M1-5	13,500		q= 0,000 Q=-321,561	50 54,8	1T=3,758	2,450 3,758		Pt= 1,886 Mat="S10" Pe= 0,240	
R1-5	15,950					6,208	C=120 0,013	Pf= -0,079	



Pipe Information, cont.

Node 1 Node 2	Elev [M]	K-factor	Discharge & Flow [lpm]	Nom I.d. [mm]	Fittings num & length [M]	L [M] F [M] T [M]	C factor bar/M	total (Pt) elev (Pe) frict (Pf)	Notes
M1-6 R1-6	13,500 15,950		q= 0,000 Q=-305,569	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,012	Pt= 1,852 Mat="S10" Pe= 0,240 Pf= -0,072	
M1-7 R1-7	13,500 15,950		q= 0,000 Q=-294,755	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,011	Pt= 1,807 Mat="S10" Pe= 0,240 Pf= -0,067	
M1-8 R1-8	13,500 15,950		q= 0,000 Q=-289,412	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,011	Pt= 1,750 Mat="S10" Pe= 0,240 Pf= -0,065	
M1-9 R1-9	13,500 15,950		q= 0,000 Q=-289,700	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,011	Pt= 1,680 Mat="S10" Pe= 0,240 Pf= -0,065	
M1-10 R1-10	13,500 15,950		q= 0,000 Q=-295,610	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,011	Pt= 1,596 Mat="S10" Pe= 0,240 Pf= -0,068	
M1-11 R1-11	13,500 15,950		q= 0,000 Q=-140,048	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,003	Pt= 1,508 Mat="S10" Pe= 0,240 Pf= -0,017	
M1-12 R1-12	13,500 15,950		q= 0,000 Q= 476,280	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,026	Pt= 1,413 Mat="S10" Pe= 0,240 Pf= 0,164	
M1-13 R1-13	13,500 15,950		q= 0,000 Q= 449,385	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,024	Pt= 1,341 Mat="S10" Pe= 0,240 Pf= 0,147	
M1-14 R1-14	13,500 15,950		q= 0,000 Q= 428,394	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,022	Pt= 1,287 Mat="S10" Pe= 0,240 Pf= 0,135	
M1-15 R1-15	13,500 15,950		q= 0,000 Q= 412,694	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,02	Pt= 1,249 Mat="S10" Pe= 0,240 Pf= 0,126	
M2-1 R2-1	13,500 15,950		q= 0,000 Q= 429,539	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,022	Pt= 3,490 Mat="S10" Pe= 0,240 Pf= 0,135	
M2-2 R2-2	13,500 15,950		q= 0,000 Q= 396,731	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,019	Pt= 3,275 Mat="S10" Pe= 0,240 Pf= 0,117	
M2-3 R2-3	13,500 15,950		q= 0,000 Q= 367,543	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,016	Pt= 3,091 Mat="S10" Pe= 0,240 Pf= 0,101	
M2-4 R2-4	13,500 15,950		q= 0,000 Q= 342,353	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,014	Pt= 2,932 Mat="S10" Pe= 0,240 Pf= 0,089	
M2-5 R2-5	13,500 15,950		q= 0,000 Q= 321,561	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,013	Pt= 2,796 Mat="S10" Pe= 0,240 Pf= 0,079	





Pipe Information. cont.

Node 1 Node 2	Elev [M]	K-factor	Discharge & Flow [lpm]	Nom i.d. [mm]	Fittings num & length [M]	L [M] F [M] T [M]	C factor bar/M	total (Pt) elev (Pe) frict (Pf)	Notes
M2-6 R2-6	13,500 15,950		q= 0,000 Q= 305,569	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,012	Pt= 2,681 Pe= 0,240 Pf= 0,072	Mat="S10"
M2-7 R2-7	13,500 15,950		q= 0,000 Q= 294,755	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,011	Pt= 2,582 Pe= 0,240 Pf= 0,067	Mat="S10"
M2-8 R2-8	13,500 15,950		q= 0,000 Q= 289,412	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,011	Pt= 2,499 Pe= 0,240 Pf= 0,065	Mat="S10"
M2-9 R2-9	13,500 15,950		q= 0,000 Q= 289,700	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,011	Pt= 2,431 Pe= 0,240 Pf= 0,065	Mat="S10"
M2-10 R2-10	13,500 15,950		q= 0,000 Q= 295,610	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,011	Pt= 2,375 Pe= 0,240 Pf= 0,068	Mat="S10"
M2-11 R2-11	13,500 15,950		q= 0,000 Q= 321,793	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,013	Pt= 2,336 Pe= 0,240 Pf= 0,079	Mat="S10"
M2-12 R2-12	13,500 15,950		q= 0,000 Q= 445,928	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,023	Pt= 2,308 Pe= 0,240 Pf= 0,145	Mat="S10"
M2-13 R2-13	13,500 15,950		q= 0,000 Q= 450,802	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,024	Pt= 2,291 Pe= 0,240 Pf= 0,148	Mat="S10"
M2-14 R2-14	13,500 15,950		q= 0,000 Q= 455,227	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,024	Pt= 2,283 Pe= 0,240 Pf= 0,151	Mat="S10"
M2-15 R2-15	13,500 15,950		q= 0,000 Q= 459,006	50 54,8	1T=3,758	2,450 3,758 6,208	C=120 0,025	Pt= 2,281 Pe= 0,240 Pf= 0,153	Mat="S10"
N3 N3-2	13,500 8,950		q= 0,000 Q=1706,067	100 108,2	1T=8,015 2E=8,015	5,000 16,031 21,031	C=120 0,01	Pt= 1,249 Pe= -0,446 Pf= 0,214	Mat="S10"
N3-2 N3-1	8,950 4,450		q= 0,000 Q= 885,953	100 108,2	1TN=2,405	4,500 2,405 6,905	C=120 0,003	Pt= 1,481 Pe= -0,441 Pf= 0,021	Mat="S10"
N3-2 N3-201	8,950 8,950		q= 0,000 Q= 820,115	65 66,9	1T=5,019	1,250 5,019 6,269	C=120 0,027	Pt= 1,481 Pe= 0,000 Pf= 0,171	Mat="S10"
N3-201 N3-204	8,950 8,950		q= 0,000 Q= 820,115	65 66,9		6,900 0,000 6,900	C=120 0,027	Pt= 1,310 Pe= 0,000 Pf= 0,188	Mat="S10"
N3-204 N3-205	8,950 8,950	115	q= 121,793 Q= 698,322	65 66,9		2,300 0,000 2,300	C=120 0,02	Pt= 1,122 Pe= 0,000 Pf= 0,047	Mat="S10"



Pipe Information, cont.

Node 1 Node 2	Elev [M]	K-factor	Discharge & Flow [lpm]	Nom i.d. [mm]	Fittings num & length [M]	L [M] F [M] T [M]	C factor bar/M	total (Pt) elev (Pe) frict (Pf)	Notes
N3-205	8,950	115	q= 119,234 Q= 579,088	65 66,9		2,300 0,000		Pt= 1,075 Pe= 0,000	Mat="S10"
N3-206	8,950					2,300	C=120 0,014	Pf= 0,033	
N3-206	8,950	115	q= 117,391 Q= 461,697	65 66,9		2,300 0,000		Pt= 1,042 Pe= 0,000	Mat="S10"
N3-207	8,950					2,300	C=120 0,009	Pf= 0,022	
N3-207	8,950	115	q= 116,163 Q= 345,534	65 66,9		2,300 0,000		Pt= 1,020 Pe= 0,000	Mat="S10"
N3-208	8,950					2,300	C=120 0,006	Pf= 0,013	
N3-208	8,950	115	q= 115,438 Q= 230,095	65 66,9		2,300 0,000		Pt= 1,008 Pe= 0,000	Mat="S10"
N3-209	8,950					2,300	C=120 0,003	Pf= 0,006	
N3-209	8,950	115	q= 115,095 Q= 115,000	65 66,9		2,300 0,000		Pt= 1,002 Pe= 0,000	Mat="S10"
N3-210	8,950					2,300	C=120 0,001	Pf= 0,002	
N3-1	4,450		q= 0,000 Q= 885,953	65 66,9	1E=2,509	0,200 2,509		Pt= 1,901 Pe= 0,000	Mat="S10"
N3-101	4,450					2,709	C=120 0,031	Pf= 0,085	
N3-101	4,450		q= 0,000 Q= 885,953	65 66,9		2,100 0,000		Pt= 1,816 Pe= 0,000	Mat="S10"
N3-103	4,450					2,100	C=120 0,031	Pf= 0,066	
N3-103	4,450		q= 0,000 Q= 885,953	65 66,9		2,300 0,000		Pt= 1,750 Pe= 0,000	Mat="S10"
N3-105	4,450					2,300	C=120 0,031	Pf= 0,072	
N3-105	4,450		q= 0,000 Q= 885,953	65 66,9		2,300 0,000		Pt= 1,677 Pe= 0,000	Mat="S10"
N3-107	4,450					2,300	C=120 0,031	Pf= 0,072	
N3-107	4,450		q= 0,000 Q= 885,953	65 66,9		2,300 0,000		Pt= 1,605 Pe= 0,000	Mat="S10"
N3-109	4,450					2,300	C=120 0,031	Pf= 0,072	
N3-109	4,450		q= 0,000 Q= 885,953	65 66,9		2,300 0,000		Pt= 1,532 Pe= 0,000	Mat="S10"
N3-111	4,450					2,300	C=120 0,031	Pf= 0,072	
N3-111	4,450		q= 0,000 Q= 885,953	65 66,9		2,300 0,000		Pt= 1,460 Pe= 0,000	Mat="S10"
N3-113	4,450					2,300	C=120 0,031	Pf= 0,072	
N3-113	4,450		q= 0,000 Q= 885,953	65 66,9		2,300 0,000		Pt= 1,388 Pe= 0,000	Mat="S10"
N3-115	4,450					2,300	C=120 0,031	Pf= 0,072	
N3-115	4,450	115	q= 131,884 Q= 754,068	65 66,9		2,300 0,000		Pt= 1,315 Pe= 0,000	Mat="S10"
N3-117	4,450					2,300	C=120 0,023	Pf= 0,054	
N3-117	4,450	115	q= 129,161 Q= 500,775	65 66,9		2,300 0,000		Pt= 1,261 Pe= 0,000	Mat="S10"
N3-119	4,450					2,300	C=120 0,011	Pf= 0,025	



Pipe Information, cont.

Node 1 Node 2	Elev [M]	K-factor	Discharge & Flow [lpm]	Nom i.d. [mm]	Fittings num & length [M]	L [M] F [M] T [M]	C factor bar/M	total (Pt) elev (Pa) frict (Pf)	Notes
N3-119	4,450	115	Q= 127,864	65		2,300		Pt= 1,236	Mat="S10"
N3-121	4,450		Q= 250,032	66,9		0,000	C=120	Pe= 0,000	
						2,300	0,003	Pf= 0,007	
N3-101	4,450		Q= 0,000	25		1,300		Pt= 1,816	Mat="S40"
N3-102	4,450		Q= 0,000	26,6		0,000	C=120	Pe= 0,000	
						1,300	0	Pf= 0,000	
N3-103	4,450		Q= 0,000	25		1,300		Pt= 1,750	Mat="S40"
N3-104	4,450		Q= 0,000	26,6		0,000	C=120	Pe= 0,000	
						1,300	0	Pf= 0,000	
N3-105	4,450		Q= 0,000	25		1,300		Pt= 1,677	Mat="S40"
N3-106	4,450		Q= 0,000	26,6		0,000	C=120	Pe= 0,000	
						1,300	0	Pf= 0,000	
N3-107	4,450		Q= 0,000	25		1,300		Pt= 1,605	Mat="S40"
N3-108	4,450		Q= 0,000	26,6		0,000	C=120	Pe= 0,000	
						1,300	0	Pf= 0,000	
N3-109	4,450		Q= 0,000	25		1,300		Pt= 1,532	Mat="S40"
N3-110	4,450		Q= 0,000	26,6		0,000	C=120	Pe= 0,000	
						1,300	0	Pf= 0,000	
N3-111	4,450		Q= 0,000	25		1,300		Pt= 1,460	Mat="S40"
N3-112	4,450		Q= 0,000	26,6		0,000	C=120	Pe= 0,000	
						1,300	0	Pf= 0,000	
N3-113	4,450		Q= 0,000	25		1,300		Pt= 1,388	Mat="S40"
N3-114	4,450		Q= 0,000	26,6		0,000	C=120	Pe= 0,000	
						1,300	0	Pf= 0,000	
N3-115	4,450	115	Q= 131,884	25		1,300		Pt= 1,315	Mat="S40"
N3-116	4,450		Q= 0,000	26,6		0,000	C=120	Pe= 0,000	
						1,300	0	Pf= 0,000	
N3-117	4,450	115	Q= 129,161	25		1,300		Pt= 1,261	Mat="S40"
N3-118	4,450		Q= 124,132	26,6		0,000	C=120	Pe= 0,000	
						1,300	0,074	Pf= 0,096	
N3-119	4,450	115	Q= 127,864	25		1,300		Pt= 1,236	Mat="S40"
N3-120	4,450		Q= 122,878	26,6		0,000	C=120	Pe= 0,000	
						1,300	0,073	Pf= 0,095	
N3-121	4,450	115	Q= 127,503	25		1,300		Pt= 1,229	Mat="S40"
N3-122	4,450		Q= 122,529	26,6		0,000	C=120	Pe= 0,000	
						1,300	0,072	Pf= 0,094	

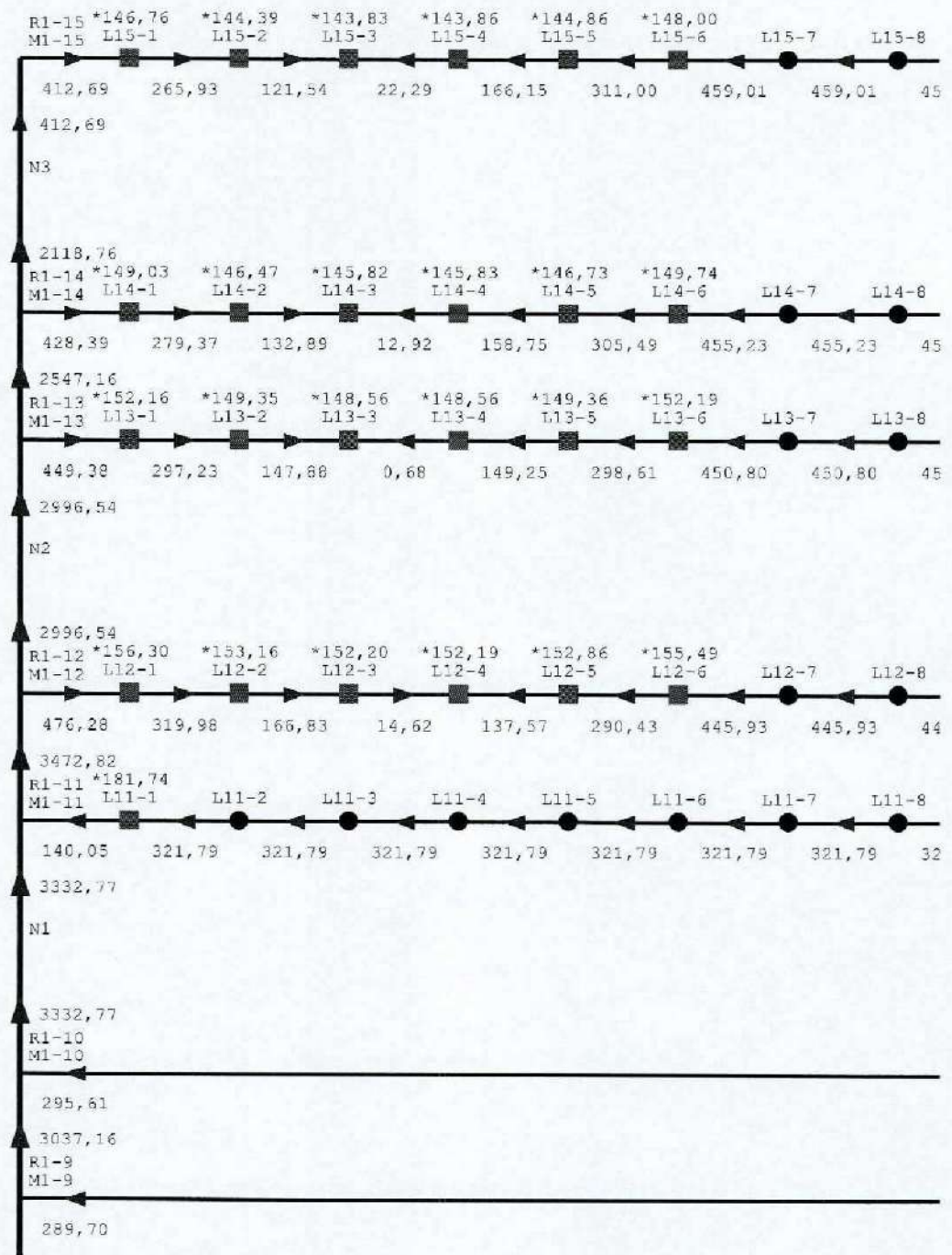
**Material Codes****Pipe Material**

S10 - Schedule 10 Steel  
 S40 - Schedule 40 Steel

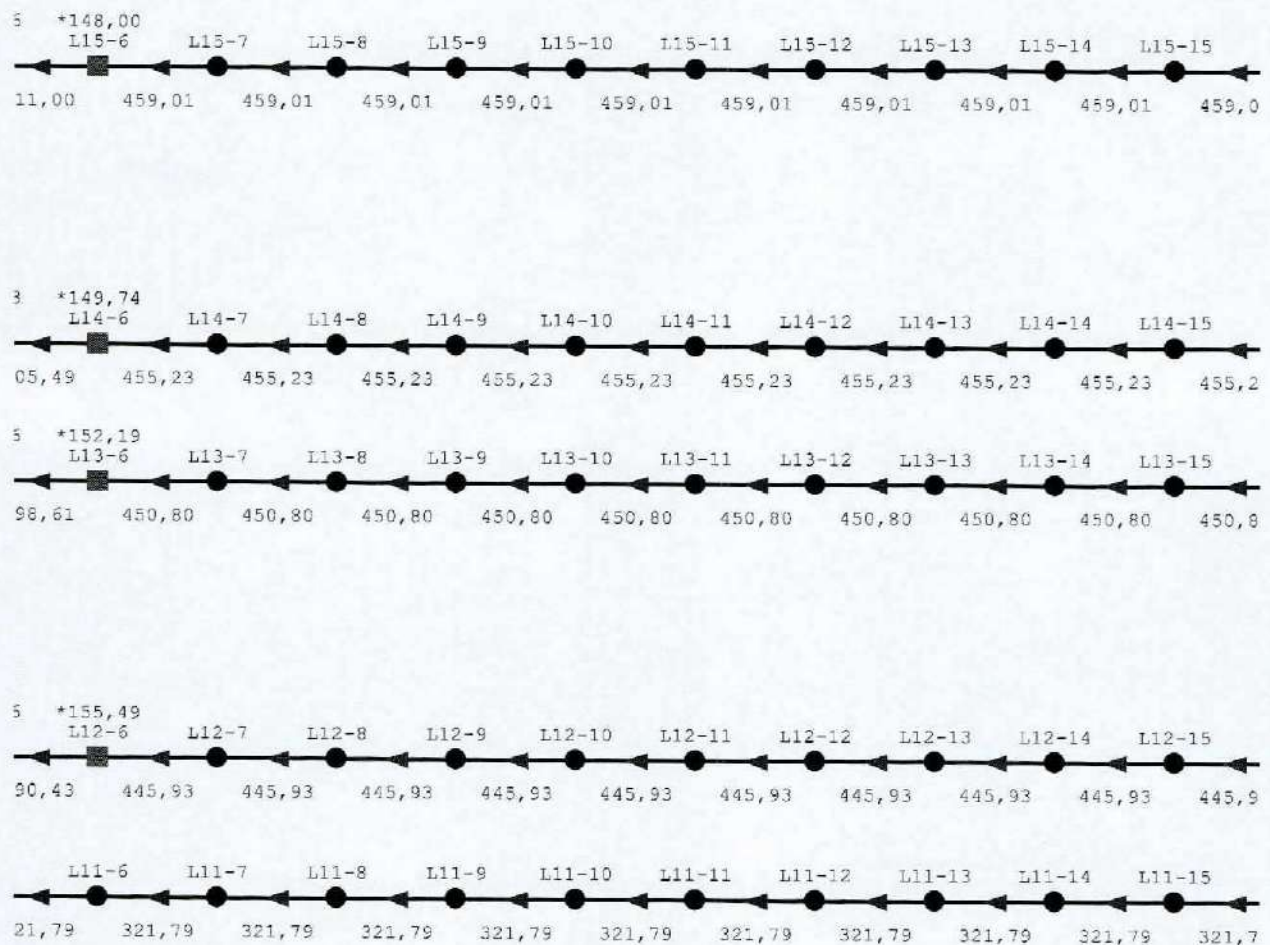
**Fittings**

A - Alarm Valve  
 B - Butterfly Valve  
 C - Check Valve  
 E - Standard 90 degree elbow  
 G - Gate Valve  
 T - Tee - Flow turn 90 degrees  
 TN - Tee - Straight thru path

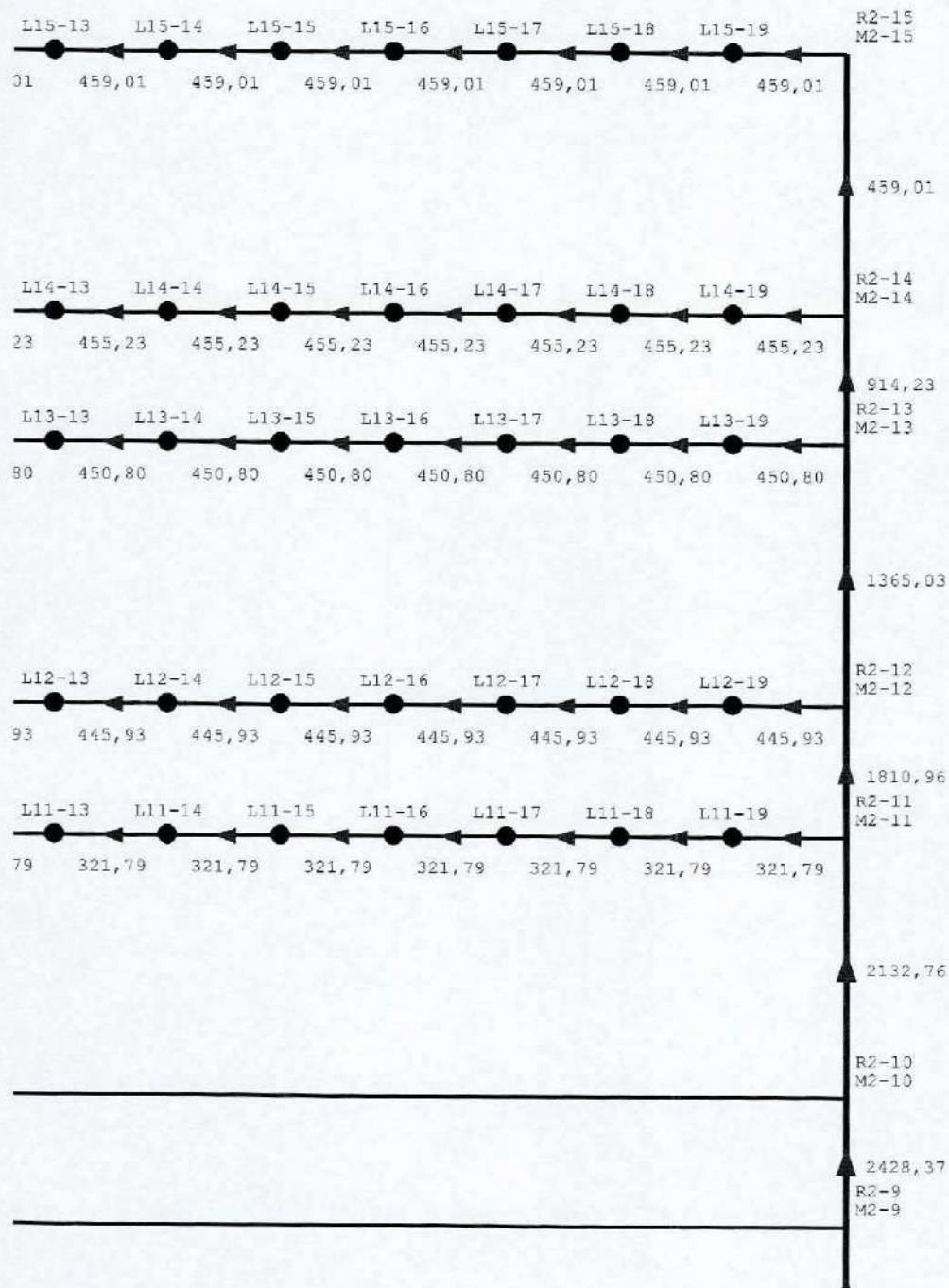


**Flow Diagram ( 1 of 6 )**

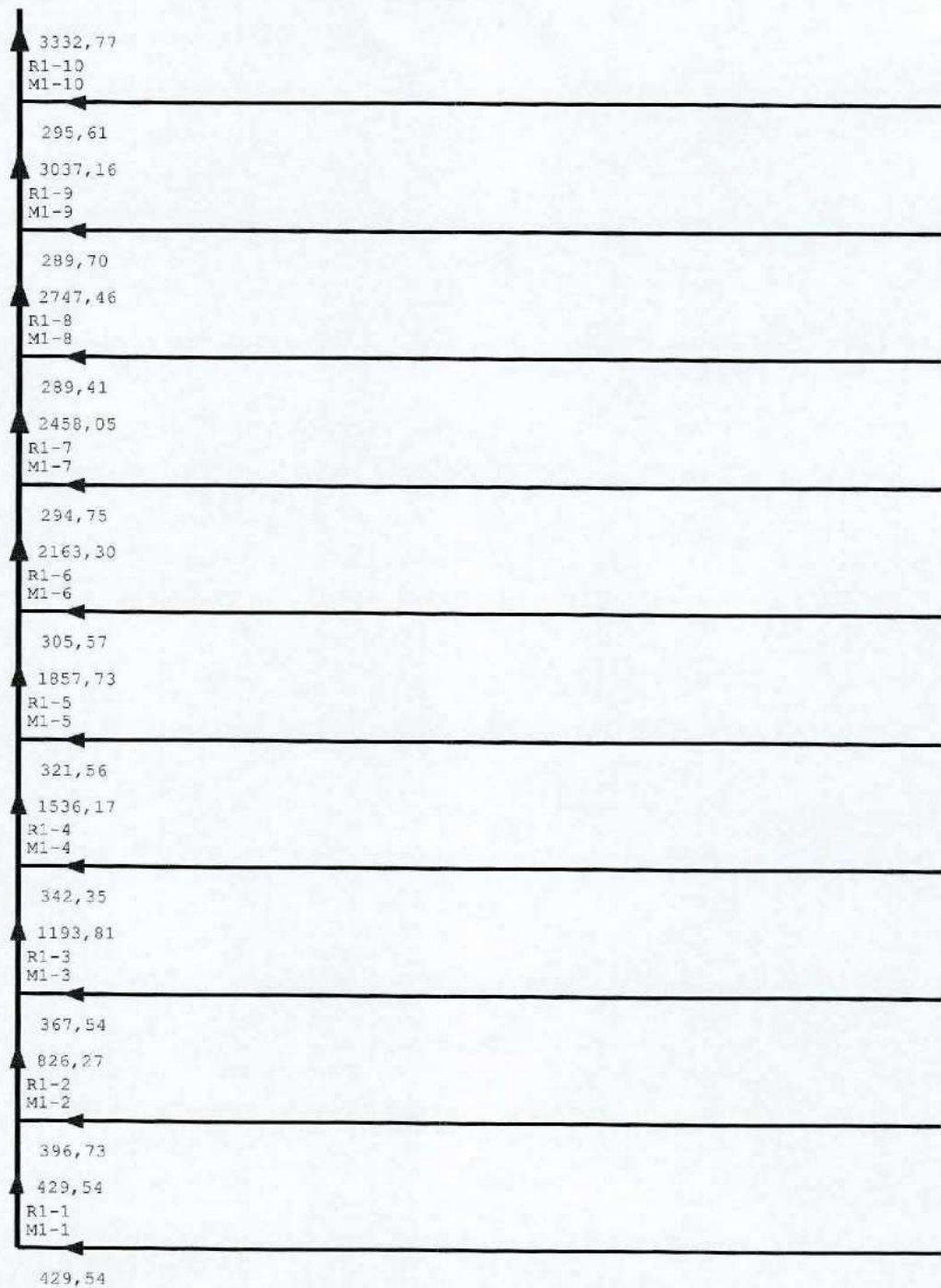


**Flow Diagram ( 2 of 6 )**



**Flow Diagram ( 3 of 6 )**



**Flow Diagram ( 4 of 6 )**

**Flow Diagram ( 5 of 6 )**

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**Flow Diagram ( 6 of 6 )**