

AQUATERA UTILITIES INC.

AREAS SOUTHEAST OF CITY OF GRANDE PRAIRIE SERVICING STUDY

EASTERN AREAS LOW PRESSURE SYSTEM DESIGN FLOW CALCULATION SHEET

From	To	No. of Lots	Accm. No. of Lots	Max. Flow (USGPM)	Max. Flow (CMS)	Size of Main (m)	C	C1.85	D4.87	Length (m)	Friction Loss (m/m)	Total Friction Loss (m)	Accum. Head Loss (m)
A1	A2	80	80	90	0.005678	0.15	110	5978.283	9.72E-05	1609	0.001287	2.07013254	2.070133
A	A2	64	64	78	0.004921	0.1	110	5978.283	1.35E-05	804.5	0.007113	5.72214634	5.722146
A2	A3	111	255	196	0.012364	0.15	110	5978.283	9.72E-05	804.5	0.00543	4.36810678	10.09025
A3	A6	57	57	75	0.004731	0.15	110	5978.283	9.72E-05	1609	0.000918	1.47745019	11.5677
A3	A4	108	420	210	0.013248	0.15	110	5978.283	9.72E-05	804.5	0.006169	4.96278213	16.53049
A4	A5	108	528	240	0.01514	0.15	110	5978.283	9.72E-05	804.5	0.007897	6.35346017	22.88395
A5	B	55	583	250	0.015771	0.2	110	5978.283	0.000394	804.5	0.002098	1.68793953	24.57189
B1	B	52	52	70	0.004416	0.1	110	5978.283	1.35E-05	1609	0.005822	9.36796621	9.367966
B	D	0	635	260	0.016402	0.2	110	5978.283	0.000394	1609	0.002256	3.62993256	12.9979
E	E1	128	128	113	0.007128	0.15	110	5978.283	9.72E-05	804.5	0.00196	1.57693806	1.576938
E1	E2	128	256	165	0.010409	0.15	110	5978.283	9.72E-05	804.5	0.003949	3.17661667	4.753555
E2	E3	128	384	200	0.012617	0.15	110	5978.283	9.72E-05	804.5	0.005636	4.53445406	9.288009
E3	E4	128	512	240	0.01514	0.15	110	5978.283	9.72E-05	804.5	0.007897	6.35346017	15.64147
E4	D	128	640	260	0.016402	0.15	110	5978.283	9.72E-05	804.5	0.009158	7.36750108	23.00897
C	C1	44	44	64	0.004037	0.1	110	5978.283	1.35E-05	800	0.004933	3.94621585	3.946216
C1	D	125	169	135	0.008516	0.1	110	5978.283	1.35E-05	804.5	0.019623	15.7870657	19.73328
F	F1	128	128	113	0.007128	0.15	110	5978.283	9.72E-05	804.5	0.00196	1.57693806	1.576938
F1	F2	128	256	165	0.010409	0.15	110	5978.283	9.72E-05	804.5	0.003949	3.17661667	4.753555
F2	F3	128	384	200	0.012617	0.15	110	5978.283	9.72E-05	804.5	0.005636	4.53445406	9.288009
F3	F4	128	512	240	0.01514	0.15	110	5978.283	9.72E-05	804.5	0.007897	6.35346017	15.64147
F4	G	128	640	260	0.016402	0.15	110	5978.283	9.72E-05	804.5	0.009158	7.36750108	23.00897
H	H1	42	42	64	0.004037	0.1	110	5978.283	1.35E-05	804.5	0.004933	3.96841331	3.968413
H1	G	128	170	235	0.014825	0.15	110	5978.283	9.72E-05	804.5	0.007596	6.11075764	10.07917
L	L1	128	128	113	0.007128	0.15	110	5978.283	9.72E-05	804.5	0.00196	1.57693806	1.576938
L1	L2	128	256	256	0.016149	0.15	110	5978.283	9.72E-05	804.5	0.008899	7.15918277	8.736121
L2	L3	128	384	200	0.012617	0.15	110	5978.283	9.72E-05	804.5	0.005636	4.53445406	13.27057
L3	L4	72	456	230	0.014509	0.15	110	5978.283	9.72E-05	804.5	0.007299	5.87240515	19.14298
L4	K	59	515	240	0.01514	0.2	110	5978.283	0.000394	804.5	0.001946	1.56515973	20.70814
G	K	0	1325	370	0.023341	0.2	110	5978.283	0.000394	1609	0.004333	6.97221952	6.97222
M	M1	388	388	205	0.012932	0.15	110	5978.283	9.72E-05	804.5	0.0059	4.74639805	4.746398
M1	M2	538	926	325	0.020502	0.2	110	5978.283	0.000394	804.5	0.003409	2.74253441	7.488932
M2	M3	776	1702	450	0.028388	0.2	110	5978.283	0.000394	804.5	0.006224	5.00738538	12.49632
M3	M4	422	2124	510	0.032173	0.2	110	5978.283	0.000394	804.5	0.007846	6.31208288	18.8084
M4	N	776	2900	690	0.043528	0.25	110	5978.283	0.001169	804.5	0.00463	3.72466246	22.53306
N	O	8	2908	690	0.043528	0.25	110	5978.283	0.001169	804.5	0.00463	3.72466246	26.25773

AQUATERA UTILITIES INC.

AREAS SOUTH EAST OF CITY OF GRANDE PRAIRIE SERVICING STUDY

SOUTHERN AREAS SANITARY GRAVITY SEWER DESIGN FLOW CALCULATION SHEET

FR MH	TO MH	DES. R. POP.	ACCU. R. POP.	DES. I. POP.	ACCU. I. POP.	DES. A.	ACCU. A.	AVG. R. FL.	P. FACTOR	PEAK R. FL.	AVG. I. FL.	P. FACTOR	PEAK I. FL.	ACCU. PEAK FL.	I/I	TOT. FLOW	DES. FLOW	DIA.	LENGTH	SLOPE	CAP.
						HA.		m3/s		m3/s	m3/s		m3/s		m3/s	m3/s	m3/s	mm	m	%	m3/s
1	3	144	144			97	97	0.00045833	3.1560008	0.0014465				0.0014465	0.02716	0.0286065	0.033109375	250	804.5	0.4	0.03761
2	3	288	288			64	64	0.001	2.9446528	0.00294465				0.002944653	0.01792	0.02086465	0.024148904	250	804.5	0.4	0.03761
3	5	144	576			48.5	209.5	0.002	2.7474582	0.00549492				0.005494916	0.05866	0.06415492	0.074253376	375	402.3	0.4	0.110888
4	5	306	306			129.4	129.4	0.0010625	2.926855	0.00310978				0.003109783	0.036232	0.03934178	0.045534472	300	1200	0.4	0.061159
6	5	348	1230	1570	1570	277	615.9	0.00427083	2.5467296	0.01087666	0.01135706	5	0.0567853	0.067661959	0.172452	0.24011396	0.277909674	525	2400	0.43	0.282009
																				0.4	0
8	10	135	135			55	55	0.00046875	3.176435	0.00148895				0.001488954	0.0154	0.01688895	0.0195474	200	1600	0.4	0.020743
9	10	504	504			92.9	92.9	0.00175	2.7843915	0.00487269				0.004872685	0.026012	0.03088469	0.035746163	250	1450	0.4	0.03761
7	11	96	96			97	97	0.00033333	3.2865953	0.00109553				0.001095532	0.02716	0.02825553	0.032703162	250	1609	0.4	0.03761
12	11	288	288			64.7	64.7	0.001	2.9446528	0.00294465				0.002944653	0.018116	0.02106065	0.024375756	250	1609	0.4	0.03761
13	11	276	276			95.4	95.4	0.00095833	2.9572119	0.00283399				0.002833995	0.026712	0.02954599	0.034196753	250	1609	0.4	0.03761
11	10	270	1569			32.3	437.3	0.00544792	2.4854845	0.01354071				0.013540712	0.122444	0.13598471	0.157389713	450	804.5	0.4	0.180316
																				0.4	0
14	6	174	174	1235	1235	197	197	0.00060417	3.0968375	0.00187101	0.00893374	5	0.04466869	0.046539698	0.05516	0.1016997	0.117707984	375	1609	0.46	0.118914
6	15		2973	500	3305	33	1283.2	0.01032292	2.331599	0.0240689	0.0239077	5	0.11953848	0.143607386	0.359296	0.50290339	0.582064104	675	1609	0.48	0.582374
FM																					
5	6		1230		1570		1115.8	0.00427083	2.5467296	0.01087666	0.01135706	5	0.0567853	0.067661959	0.312424	0.24011396	0.277909674		2800		
10	6		1569				437.3	0.00544792	2.4854845	0.01354071	0	0	0	0	0.122444	0.13598471	0.157389713		2400		
8	10		135				55	0.00046875	3.176435	0.00148895	0	0	0	0	0.0154	0.01688895	0.0195474		1609		
LS																					
A																0.24011396	0.277909674				
B																0.13598471	0.157389713				
C																0.01688895	0.0195474				

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EASTERN AREAS SANITARY GRAVITY SEWER DESIGN FLOW CALCULATION SHEET

FR MH	TO MH	DES. R. POP	ACCU. R. POP.	DES. I. POP.	ACCU. I. POP.	DES. A.	ACCU. A.	AVG. R. FL.	P. FACTOR	PEAK R. FL.	AVG. I. FL.	P. FACTOR	PEAK I. FL.	ACCU. PEAK FL.	I/I	TOT. FLOW	DES. FLOW	DIA.	LENGTH	SLOPE	CAP.
						HA.		m3/s		m3/s	m3/s		m3/s		m3/s	m3/s	m3/s	mm	m	%	m3/s
A	B	1920	1920			647	647	0.006666667	2.435808968	0.016238726				0.016238726	0.18116	0.197398726	0.228470748	525	4827	0.4	0.27199
C2	B	240	240			48.3	48.3	0.000833333	2.998832603	0.002499027				0.002499027	0.01352	0.016023027	0.01854517	200	804.5	0.4	0.02074
B1	B	309	309			242.8	242.8	0.001072917	2.924000887	0.003137209				0.003137209	0.06798	0.071121209	0.082316214	375	1609	0.4	0.11089
B	C1	276	2745			64.7	1002.8	0.00953125	2.350277338	0.022401081				0.022401081	0.28078	0.303185081	0.350908658	600	804.5	0.4	0.38833
B2	C1	85	85			64.7	64.7	0.000295139	3.326836483	0.000981879				0.000981879	0.01812	0.019097879	0.022104026	200	1500	0.45	0.022
C1	C	324	3154			128.4	1195.9	0.010951389	2.317859884	0.025383785				0.048766745	0.33485	0.360235785	0.416939566	600	804.5	0.46	0.41644
C	F	491	3645			258.8	1454.7	0.01265625	2.284565398	0.028914031				0.055279695	0.40732	0.436230031	0.504895869	675	1609	0.4	0.53163
D	E	156	156			71	71	0.000541667	3.130840103	0.001695872				0.001695872	0.01988	0.021575872	0.024972074	250	804.5	0.4	0.03761
M	K	192	192			64.7	64.7	0.000666667	3.066501808	0.002044335				0.002044335	0.01812	0.020160335	0.023333721	200	804.5	0.5	0.02319
L	K	960	960			323.5	323.5	0.003333333	2.610635412	0.008702118				0.008702118	0.09058	0.099282118	0.114909859	375	2413.5	0.45	0.11761
J	K	411	411			194.1	194.1	0.001427083	2.841771574	0.004055445				0.004055445	0.05435	0.058403445	0.06759658	300	1609	0.5	0.06838
K	G	384	1947			258.8	841.1	0.006760417	2.432409847	0.016444104				0.016444104	0.23551	0.251952104	0.291611232	525	1609	0.5	0.3041
H	G	960	960			323.5	323.5	0.003333333	2.610635412	0.008702118				0.008702118	0.09058	0.099282118	0.114909859	375	2413.5	0.43	0.11497
I	G	323	323			109.5	109.5	0.001121528	2.911072997	0.003264849				0.003264849	0.03066	0.033924849	0.039264872	250	1400	0.45	0.03989
G	F	283	2513			258.8	1532.9	0.008725694	2.371123087	0.020689696				0.020689696	0.42921	0.449901696	0.520719555	675	1609	0.4	0.53163
M	O	139	139			129.4	129.4	0.000482639	3.167173595	0.001528601				0.001528601	0.03623	0.037760601	0.043704399	250	804.5	0.52	0.04288
N	O	1004	1004			323.5	323.5	0.003486111	2.598962282	0.009060271				0.009060271	0.09058	0.099640271	0.115324388	375	2413.5	0.45	0.11761
O	P	148	1291			49.7	502.6	0.004482639	2.534432469	0.011360946				0.011360946	0.14073	0.152088946	0.176028872	450	804.5	0.4	0.18032
A	Q	9189	9189			759.9	759.9	0.03190625	2.082794983	0.066454177				0.066454177	0.21277	0.279226177	0.323178446	600	5631.5	0.4	0.38833
R	S	144	144			71	71	0.0005	3.156000757	0.001578				0.001578	0.01988	0.021458	0.024835649	200	450	0.5	0.02319
S	Q	119	263			54.7	125.7	0.000913194	2.971513948	0.00271357				0.00271357	0.0352	0.03790957	0.043876817	250	804.5	0.55	0.0441
Q	P	821	11564			187.4	1073	0.040152778	2.035459847	0.081729367				0.081729367	0.30044	0.382169367	0.442325656	675	1609	0.4	0.53163
FM																					
E	F		156				71	0.000541667	3.130840103	0.001695872				0.001695872	0.01988	0.021575872	0.024972074		804.5		
F	P	3513				7306										0.907707598	1.050587498		5631.5		
I	G		323				109.5	0.001121528	2.911072997	0.003264849				0.003264849	0.03066	0.033924849	0.039264872		1400		
J	K		411				194.1	0.001427083	2.841771574	0.004055445				0.004055445	0.05435	0.058403445	0.06759658		1600		
R	S		144				71	0.0005	3.156000757	0.001578				0.001578	0.01988	0.021458	0.024835649		500		
P	T	18878				4634.2										1.441965911	1.668942026		3230		
LS																					
1																0.021575872	0.024972074				
2																0.907707598	1.050587498				
3																1.441965911	1.668942026				
4																0.058403445	0.06759658				
5																0.033924849	0.039264872				
6																0.021458	0.024835649				