

CUMULATIVE STORM SEWER CALCULATIONS

Storm Sewer Design Analysis  
 Sedona Lakes Retail Development  
 CR 101 @ CR 94  
 Brazoria County, Texas

Design Frequency: 3 years  
 100-Year Multiplier: 1.00  
 Downstream WS ELEV: 59.67 feet

Manhole No. From	Manhole No. To	Drainage Area (acres)	Total Area (acres)	Runoff Coefficient C	DA C * A	Total C * A	Time of Conc. (min)	Intensity I (in/hr)	Drainage Area Flow (cfs)	Total Flow (cfs)	Reach Length (ft)	Diameter (in)	Slope %	Manning's Roughness Coefficient "n"	Design Capacity (cfs)	Design Velocity (ft/sec)	Full Pipe Flow			Drop from Downstream Manhole (ft)	Flowline Elevation Upstream (ft)	Flowline Elevation Downstream (ft)	Minimum Depth Ratio (y/d or y/h)	Minimum W.S. Elev. Downstream (ft)	Actual Depth Ratio (y/d or y/h)	Actual Flow per Barrel			Change in Head (ft)	Elevation of Hyd. Grad. Upstream (ft)	Elevation of Hyd. Grad. Downstream (ft)	Top of Pipe Elevation Upstream (ft)	Top of Pipe Elevation Downstream (ft)	Pvmt / Grate Elevation Upstream (ft)	
																	Area (sq ft)	Wetted Perimeter (ft)	Fall (ft)							Area (sq ft)	Wetted Perimeter (ft)	Hydraulic Gradient %							
A6	A5	0.08	0.08	0.75	0.06	0.06	10.63	5.88	0.35	0.35	114	12	0.440	0.013	2.4	3.0	0.8	3.1	0.50	0.25	61.415	60.913	0.26	61.17	0.47	0.97	0.36	1.51	0.049	0.06	61.44	61.39	62.42	61.91	64.20
A5	A4	0.15	0.57	0.75	0.11	0.43	11.21	5.79	0.65	2.48	104	18	0.260	0.013	5.4	3.0	1.8	4.7	0.27	0.00	60.663	60.393	0.47	61.10	0.53	2.60	0.95	2.45	0.183	0.19	61.39	61.20	62.16	61.89	64.15
A4	A3	0.13	0.70	0.75	0.10	0.53	11.96	5.68	0.55	2.98	134	18	0.260	0.013	5.4	3.0	1.8	4.7	0.35	0.00	60.393	60.045	0.53	60.84	0.62	2.59	1.15	2.72	0.162	0.22	61.20	60.98	61.89	61.55	64.10
A3	A2	0.18	0.88	0.75	0.14	0.66	12.63	5.59	0.75	3.69	122	18	0.260	0.013	5.4	3.0	1.8	4.7	0.32	0.00	60.045	59.728	0.60	60.63	0.67	2.98	1.24	2.84	0.206	0.25	60.98	60.73	61.55	61.23	64.00
A2	A1	0.14	1.02	0.75	0.11	0.77	13.36	5.49	0.58	4.20	131	18	0.260	0.013	5.4	3.0	1.8	4.7	0.34	0.25	59.728	59.387	0.66	60.38	0.66	3.39	1.24	2.84	0.267	0.35	60.73	60.38	61.23	60.89	64.20
A1	EX1	0.30	1.49	0.75	0.23	1.12	13.48	5.47	1.23	6.11	22	24	0.170	0.013	9.3	3.0	3.1	6.3	0.04	-1.00	59.137	59.100	0.59	60.28	0.59	3.23	1.89	3.46	0.180	0.04	60.32	60.28	61.14	61.10	63.60
B2	B1	0.09	0.09	0.75	0.07	0.07	14.03	5.40	0.36	0.36	99	8	0.750	0.013	1.0	3.0	0.3	2.1	0.74	0.17	60.535	59.792	0.40	60.06	0.85	1.15	0.32	1.56	0.086	0.08	60.44	60.36	61.20	60.46	63.35
B1	A1	0.08	0.17	0.75	0.06	0.13	14.63	5.32	0.32	0.68	108	12	0.440	0.013	2.4	3.0	0.8	3.1	0.48	-0.50	59.625	59.150	0.36	59.51	1.00	0.86	0.79	3.14	0.036	0.04	60.36	60.32	60.63	60.15	64.00
R1	A5	0.34	0.34	0.75	0.26	0.26	14.67	5.32	1.36	1.36	7	12	0.500	0.013																					

\*THE DRAINAGE CALCULATIONS LISTED ABOVE ARE BASED ON THE 3-YEAR STORM EVENT PER CITY OF MANVEL DESIGN GUIDELINES.


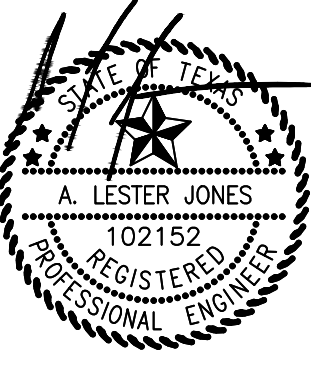
CUMULATIVE STORM SEWER CALCULATIONS

Storm Sewer Design Analysis  
 Sedona Lakes Retail Development  
 CR 101 @ CR 94  
 Brazoria County, Texas

Design Frequency: 100 years  
 100-Year Multiplier: 1.25  
 Downstream WS ELEV: 59.67 feet

Manhole No. From	Manhole No. To	Drainage Area (acres)	Total Area (acres)	Runoff Coefficient C	DA C * A	Total C * A	Time of Conc. (min)	Intensity I (in/hr)	Drainage Area Flow (cfs)	Total Flow (cfs)	Reach Length (ft)	Diameter (in)	Slope %	Manning's Roughness Coefficient "n"	Design Capacity (cfs)	Design Velocity (ft/sec)	Full Pipe Flow			Drop from Downstream Manhole (ft)	Flowline Elevation Upstream (ft)	Flowline Elevation Downstream (ft)	Minimum Depth Ratio (y/d or y/h)	Minimum W.S. Elev. Downstream (ft)	Actual Depth Ratio (y/d or y/h)	Actual Flow per Barrel			Change in Head (ft)	Elevation of Hyd. Grad. Upstream (ft)	Elevation of Hyd. Grad. Downstream (ft)	Top of Pipe Elevation Upstream (ft)	Top of Pipe Elevation Downstream (ft)	Pvmt / Grate Elevation Upstream (ft)	
																	Area (sq ft)	Wetted Perimeter (ft)	Fall (ft)							Area (sq ft)	Wetted Perimeter (ft)	Hydraulic Gradient %							
A6	A5	0.08	0.08	0.75	0.08	0.08	10.63	9.47	0.71	0.71	114	12	0.440	0.013	2.4	3.0	0.8	3.1	0.50	0.25	61.415	60.913	0.37	61.28	1.00	0.90	0.79	3.14	0.040	0.05	63.35	63.30	62.42	61.91	64.20
A5	A4	0.15	0.57	0.75	0.14	0.53	11.21	9.33	1.31	4.99	104	18	0.260	0.013	5.4	3.0	1.8	4.7	0.27	0.00	60.663	60.393	0.76	61.53	1.00	2.82	1.77	4.71	0.225	0.23	63.30	63.07	62.16	61.89	64.15
A4	A3	0.13	0.70	0.75	0.12	0.66	11.96	9.16	1.12	6.01	134	18	0.260	0.013	5.4	3.0	1.8	4.7	0.35	0.00	60.393	60.045	1.00	61.55	1.00	3.40	1.77	4.71	0.328	0.44	63.07	62.63	61.89	61.55	64.10
A3	A2	0.18	0.88	0.75	0.17	0.83	12.63	9.02	1.52	7.44	122	18	0.260	0.013	5.4	3.0	1.8	4.7	0.32	0.00	60.045	59.728	1.00	61.23	1.00	4.21	1.77	4.71	0.501	0.61	62.63	62.02	61.55	61.23	64.00
A2	A1	0.14	1.02	0.75	0.13	0.96	13.36	8.86	1.16	8.48	131	18	0.260	0.013	5.4	3.0	1.8	4.7	0.34	0.25	59.728	59.387	1.00	60.89	1.00	4.80	1.77	4.71	0.651	0.85	62.02	61.17	61.23	60.89	64.20
A1	EX1	0.30	1.49	0.75	0.28	1.40	13.48	8.84	2.49	12.35	22	24	0.170	0.013	9.3	3.0	3.1	6.3	0.04	-1.00	59.137	59.100	1.00	61.10	1.00	3.93	3.14	6.28	0.298	0.07	61.17	61.10	61.14	61.10	63.60
B2	B1	0.09	0.09	0.75	0.08	0.08	14.03	8.73	0.74	0.74	99	8	0.750	0.013	1.0	3.0	0.3	2.1	0.74	0.17	60.535	59.792	0.61	60.20	1.00	2.11	0.35	2.09	0.372	0.37	61.69	61.33	61.20	60.46	63.35
B1	A1	0.08	0.17	0.75	0.08	0.16	14.63	8.61	0.65	1.37	108	12	0.440	0.013	2.4	3.0	0.8	3.1	0.48	-0.50	59.625	59.150	0.54	59.69	1.00	1.75	0.79	3.14	0.148	0.16	61.33	61.17	60.63	60.15	64.00
R1	A5	0.34	0.34	0.75	0.32	0.32	14.67	8.61	2.74	2.74	7	12	0.500	0.013																					

\*THE DRAINAGE CALCULATIONS LISTED ABOVE ARE BASED ON THE 100-YEAR STORM EVENT PER CITY OF MANVEL DESIGN GUIDELINES.

 <p><b>ALJ Lindsey</b>          Civil Engineers, Surveyors          281.301.5655          Houston, TX 77068          FRN F-1126</p>	 <p>A. LESTER JONES          102152          REGISTERED PROFESSIONAL ENGINEER</p>
07 AUGUST 2019	
ALJ PROJECT NO. 0081915V1067 DATE: AUGUST 2019 SCALE: 1:30 DRAWN BY: LFC CHECKED BY: OMR	<p><b>STORM SEWER CALCULATIONS</b></p>
<p><b>SEDONA LAKES RETAIL DEVELOPMENT</b>                  1875 CR 101                  BRAZORIA COUNTY, TEXAS 77578</p>	
SHEET <p><b>C3.1</b></p>	