

Lombardo Homes: The Villas at Aragon																				
15 Year-20 Minute Storm Calculations																				
LineNo.	LineID	Pipe Length (ft)	Pipe Size (in)	Invert Down (ft)	Invert Up (ft)	Slope (%)	n Value	Top El Down (ft)	Top El Up (ft)	HGL (Down) (ft)	HGL (Up) (ft)	Juntion Loss	Velocity Average (ft/s)	Deflec. Angle (Deg)	Energy Loss (ft)	Known Q (cfs)	Flow Rate (cfs)	Minor Loss (ft)	Capacity (Full) (cfs)	Free-board (ft)
1	FE 8 - DCI 9	45.40	24	496.00	496.91	2.00	0.013	498.00	506.13	498.69	498.96	0.00	5.57	36.50	0.27	0.76	17.51	0.00	32.02	7.17
2	DCI 9 - CI 10	157.39	24	501.06	505.37	2.74	0.013	506.13	510.39	501.94	506.74	0.70	8.85	57.90	2.65	0.85	14.88	0.46	37.43	3.65
3	CI 10 - GI 11	61.19	24	505.37	505.98	1.00	0.013	510.39	513.18	507.20	507.31	0.35	5.50	26.30	0.30	1.83	14.03	0.22	22.58	5.87
4	GI 11 - GI 12	208.08	24	505.98	508.92	1.41	0.013	513.18	515.26	507.53	510.16	0.42	5.33	37.60	0.95	2.31	12.20	0.23	26.88	5.10
5	GI 12 - GI 13	184.29	15	508.92	511.45	1.37	0.013	515.26	517.10	510.39	513.05	0.00	6.32	-0.40	2.66	2.17	7.76	0.00	7.57	4.05
6	GI 13 - GI 14	174.93	15	511.45	513.20	1.00	0.013	517.10	518.85	513.05	514.11	0.11	4.70	9.20	1.23	3.92	5.04	0.05	6.46	4.74
7	GI 14 - AI 15	104.89	12	513.20	514.65	1.38	0.013	518.85	518.90	514.15	515.10	0.65	2.36	-80.00	0.35	1.12	1.12	0.11	4.19	3.80
8	DCI 9 - DCI 16	35.54	12	501.06	501.88	2.31	0.013	506.13	506.13	501.47	502.46	0.38	5.09	-32.20	0.52	1.87	1.87	0.09	5.41	3.67
9	GI 12 - AI 17	121.67	12	508.92	510.89	1.62	0.013	515.26	514.91	510.39	511.51	0.70	3.44	-90.00	0.66	0.56	2.13	0.19	4.53	3.40
10	AI 17 - YD 17A	38.00	12	510.89	511.47	1.53	0.013	514.91	516.43	511.70	511.89	0.70	2.29	90.10	0.12	0.16	0.98	0.11	4.40	4.54
11	YD 17A - AI 17B	56.00	12	511.47	512.33	1.54	0.013	516.43	516.43	512.00	512.71	0.00	2.45	0.00	0.20	0.79	0.82	0.00	4.41	3.72
12	AI 17B - YD 17C	56.00	6	512.33	513.89	2.79	0.013	516.43	517.43	512.71	513.98	0.00	0.74	0.00	0.18	0.03	0.03	0.00	0.94	3.45
13	AI 17 - YD 17D	38.00	6	510.89	511.37	1.26	0.013	514.91	515.55	511.70	512.12	0.70	3.01	-90.00	0.42	0.16	0.59	0.10	0.63	3.43
14	YD 17D - YD 17E	56.00	6	511.37	512.07	1.25	0.013	515.55	514.55	512.22	512.52	0.00	2.25	0.00	0.31	0.20	0.43	0.00	0.63	2.03
15	YD 17E - YD 17F	56.00	6	512.07	512.77	1.25	0.013	514.55	514.55	512.52	513.01	0.00	1.83	0.00	0.25	0.23	0.23	0.00	0.63	1.54
16	GI 13 - AI 18	122.32	12	511.45	512.73	1.05	0.013	517.10	516.78	513.05	513.14	0.70	1.26	-85.40	0.13	0.42	0.55	0.04	3.64	3.64
17	AI 18 - YD 18A	44.88	6	512.73	513.53	1.78	0.013	516.78	518.23	513.18	513.71	0.70	1.35	94.30	0.16	0.03	0.13	0.04	0.75	4.52
18	YD 18A - YD 18B	56.00	6	513.53	514.51	1.75	0.013	518.23	518.23	513.76	514.67	0.00	1.50	0.60	0.23	0.05	0.10	0.00	0.74	3.56
19	YD 18B - YD 18C	56.00	6	514.51	515.50	1.77	0.013	518.23	519.23	514.67	515.61	0.00	1.21	0.10	0.22	0.05	0.05	0.00	0.75	3.62
20	FE 19 - AI 20	62.72	18	496.00	496.75	1.20	0.013	498.00	509.00	498.69	499.51	0.00	6.80	-63.80	0.82	0.21	12.02	0.00	11.48	9.49
21	AI 20 - MH 21	89.75	18	501.99	502.86	0.97	0.013	509.00	509.63	503.49	504.63	0.36	6.68	-30.60	1.14	0.00	11.81	0.25	10.34	5.00
22	MH 21 - GI 22	68.63	18	502.86	503.55	1.01	0.013	509.63	509.67	504.88	505.74	0.58	6.68	-65.70	0.87	2.31	11.81	0.40	10.53	3.93
23	GI 22 - GI 23	188.00	18	503.55	506.27	1.45	0.013	509.67	511.55	506.15	507.20	0.30	4.28	-90.00	0.91	2.33	5.98	0.12	12.63	4.35
24	GI 23 - GI 24	188.00	12	506.27	508.27	1.06	0.013	511.55	513.43	509.27	509.27	0.00	4.65	0.00	1.94	2.78	3.65	0.00	3.67	4.16
25	GI 24 - AI 25	200.64	12	508.27	510.33	1.03	0.013	513.43	513.33	509.27	510.73	0.11	2.06	9.30	0.61	0.87	0.87	0.02	3.61	3.60
26	GI 22 - AI 26	121.67	15	503.55	505.07	1.25	0.013	509.67	509.32	506.15	506.51	0.58	2.87	0.00	0.36	0.57	3.52	0.07	7.22	2.81
27	AI 26 - AI 26A	94.00	12	505.07	506.01	1.00	0.013	509.32	510.84	506.58	507.23	0.70	3.76	-90.10	0.65	1.92	2.95	0.15	3.56	3.61
28	AI 26A - AI 27	94.00	12	506.01	506.95	1.00	0.013	510.84	511.20	507.38	507.48	0.00	1.87	0.10	0.17	0.44	1.03	0.00	3.56	3.72
29	AI 27 - AI 27A	94.00	12	506.95	508.20	1.33	0.013	511.20	512.72	507.48	508.53	0.00	2.02	0.00	0.29	0.08	0.59	0.00	4.11	4.19
30	AI 27A - AI 28	94.00	12	508.20	509.45	1.33	0.013	512.72	513.70	508.53	509.75	0.00	2.42	0.00	0.43	0.39	0.51	0.00	4.11	3.95
31	AI 28 - YD 28A	38.00	6	509.45	510.21	2.00	0.013	513.70	514.60	509.75	510.39	0.00	1.45	0.00	0.14	0.03	0.12	0.00	0.79	4.21
32	YD 28A - YD 28B	56.00	6	510.21	511.33	2.00	0.013	514.60	514.60	510.39	511.48	0.00	1.62	0.00	0.28	0.05	0.09	0.00	0.79	3.12
33	YD 28B - YD 28C	56.00	6	511.33	512.45	2.00	0.013	514.60	515.60	511.48	512.55	0.00	1.09	-0.10	0.21	0.04	0.04	0.00	0.79	3.05
34	FE 29 - DCI 30	64.81	12	488.00	488.65	1.00	0.013	489.00	502.32	490.38	492.42	0.00	8.05	-92.90	2.04	1.68	6.32	0.00	3.57	9.90
35	DCI 30 - GI 31	139.18	12	497.85	499.75	1.37	0.013	502.32	505.76	498.85	501.21	0.58	5.91	-66.20	2.36	2.25	4.64	0.31	4.16	4.55
36	GI 31 - GI 32	203.00	12	499.75	501.78	1.00	0.013	505.76	507.79	501.53	502.50	0.31	3.50	-25.30	1.07	1.69	2.39	0.08	3.56	5.29
37	GI 32 - AI 33	128.34	12	501.78	503.06	1.00	0.013	507.79	507.31	502.57	503.41	0.70	1.93	90.00	0.37	0.70	0.70	0.09	3.56	3.90
38	FE 34 - OS 35	51.69	36	490.50	491.12	1.20	0.013	493.50	497.45	493.50	493.50	0.00	5.46	-104.60	0.15	35.52	35.52	0.00	73.04	3.95
39	FE 36 - OS 37	46.97	15	484.00	484.50	1.06	0.013	485.50	489.00	485.25	486.10	0.00	7.08	-161.70	0.85	8.69	8.69	0.00	6.66	2.90

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100 Year-20 Minute Storm Calculations																				
LineNo.	LineID	Pipe Length (ft)	Pipe Size (in)	Invert Down (ft)	Invert Up (ft)	Slope (%)	n Value	Top El Down (ft)	Top El Up (ft)	HGL (Down) (ft)	HGL (Up) (ft)	Juntion Loss	Velocity Average (ft/s)	Deflec. Angle (Deg)	Energy Loss (ft)	Known Q (cfs)	Flow Rate (cfs)	Minor Loss (ft)	Capacity (Full) (cfs)	Free-board (ft)
1	FE 8 - DCI 9	45.40	24	496.00	496.91	2.00	0.013	498.00	506.13	498.69	499.19	0.00	7.52	36.50	0.50	1.02	23.62	0.00	32.02	6.94
2	DCI 9 - CI 10	157.39	24	501.06	505.37	2.74	0.013	506.13	510.39	502.10	506.96	0.70	9.80	57.90	2.80	1.15	20.07	0.61	37.43	3.43
3	CI 10 - GI 11	61.19	24	505.37	505.98	1.00	0.013	510.39	513.18	507.57	507.98	0.35	6.02	26.30	0.42	2.47	18.92	0.20	22.58	5.20
4	GI 11 - GI 12	208.08	24	505.98	508.92	1.41	0.013	513.18	515.26	508.17	510.36	0.42	6.02	37.60	1.29	3.12	16.45	0.30	26.88	4.90
5	GI 12 - GI 13	184.29	15	508.92	511.45	1.37	0.013	515.26	517.10	510.66	515.51	0.00	8.53	-0.40	4.85	2.93	10.47	0.00	7.57	1.59
6	GI 13 - GI 14	174.93	15	511.45	513.20	1.00	0.013	517.10	518.85	515.51	517.46	0.11	5.56	9.20	1.95	5.30	6.82	0.05	6.46	1.39
7	GI 14 - AI 15	104.89	12	513.20	514.65	1.38	0.013	518.85	518.90	517.51	517.70	0.65	1.94	-80.00	0.19	1.52	1.52	0.04	4.19	1.20
8	DCI 9 - DCI 16	35.54	12	501.06	501.88	2.31	0.013	506.13	506.13	501.54	502.55	0.38	5.62	-32.20	0.55	2.53	2.53	0.12	5.41	3.58
9	GI 12 - AI 17	121.67	12	508.92	510.89	1.62	0.013	515.26	514.91	510.66	511.61	0.70	4.19	-90.80	0.92	0.76	2.86	0.24	4.53	3.30
10	AI 17 - YD 17A	38.00	12	510.89	511.47	1.53	0.013	514.91	516.43	511.85	511.96	0.70	2.58	90.10	0.14	0.21	1.31	0.13	4.40	4.47
11	YD 17A - AI 17B	56.00	12	511.47	512.33	1.54	0.013	516.43	516.43	512.09	512.77	0.00	2.71	0.00	0.22	1.06	1.10	0.00	4.41	3.66
12	AI 17B - YD 17C	56.00	6	512.33	513.89	2.79	0.013	516.43	517.43	512.77	513.99	0.00	0.81	0.00	0.18	0.04	0.04	0.00	0.94	3.44
13	AI 17 - YD 17D	38.00	6	510.89	511.37	1.26	0.013	514.91	515.55	511.85	512.61	0.70	4.02	-90.00	0.75	0.21	0.79	0.18	0.63	2.94
14	YD 17D - YD 17E	56.00	6	511.37	512.07	1.25	0.013	515.55	514.55	512.78	513.38	0.00	2.95	0.00	0.60	0.27	0.58	0.00	0.63	1.17
15	YD 17E - YD 17F	56.00	6	512.07	512.77	1.25	0.013	514.55	514.55	513.38	513.55	0.00	1.58	0.00	0.17	0.31	0.31	0.00	0.63	1.00
16	GI 13 - AI 18	122.32	12	511.45	512.73	1.05	0.013	517.10	516.78	515.51	515.56	0.70	0.92	-85.40	0.05	0.56	0.72	0.01	3.64	1.22
17	AI 18 - YD 18A	44.88	6	512.73	513.53	1.78	0.013	516.78	518.23	515.56	515.60</									