

STORMWATER DRAINAGE
On Site Detention Sizing by Mass Curve Technique
OSD 1

Project Name: Riverwood North Project

Project No.: 3704

Engineer: AM

Date: 2/02/2011

Revision: E

DURATION (hr)	RAINFALL INTENSITY 100 Year ARI (mm/hr)	CO-EFFICIENT OF RUNOFF (C ₁₀)	SITE AREA (m ²)	ACTUAL DISCHARGE (L/s)	ACTUAL DISCHARGE VOLUME (m ³)	PERMISSIBLE SITE DISCHARGE (L/s)	PERMISSABLE DISCHARGE VOLUME (m ³)	REQUIRED ON-SITE STORAGE (m ³)
0.083	173.0	0.90	4578	198.00	59.16	68.67	20.52	38.64
0.100	163.0	0.90	4578	186.55	67.16	68.67	24.72	42.44
0.167	135.0	0.90	4578	154.51	92.89	68.67	41.28	51.61
0.33	100.0	0.90	4578	114.45	137.20	68.67	82.32	54.88
0.50	83.0	0.90	4578	94.99	170.99	68.67	123.61	47.38
1	57.0	0.90	4578	65.24	234.85	68.67	247.21	-12.36
2	37.2	0.90	4578	42.58	306.54	68.67	494.42	-187.88
3	28.6	0.90	4578	32.73	353.51	68.67	741.64	-388.12
6	18.2	0.90	4578	20.83	449.93	68.67	1483.27	-1033.35
12	11.7	0.90	4578	13.39	578.48	68.67	2966.54	-2388.07
24	7.6	0.90	4578	8.71	752.51	68.67	5933.09	-5180.57
48	4.9	0.90	4578	5.56	961.16	68.67	11866.18	-10905.02
72	3.6	0.90	4578	4.15	1076.86	68.67	17799.26	-16722.41

MAX REQUIRED OSD (m³) 54.88

Notes :-

1. Permissible Site Discharge has been calculated based on 150L/s per Ha
2. Site area has been calculated as the nett development area
3. The Coefficient of Runoff has been taken from

STORMWATER DRAINAGE
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OSD 2

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DURATION (hr)	RAINFALL INTENSITY 100 Year ARI (mm/hr)	CO-EFFICIENT OF RUNOFF (C ₁₀)	SITE AREA (m ²)	ACTUAL DISCHARGE (L/s)	ACTUAL DISCHARGE VOLUME (m ³)	PERMISSIBLE SITE DISCHARGE (L/s)	PERMISSABLE DISCHARGE VOLUME (m ³)	REQUIRED ON-SITE STORAGE (m ³)
0.083	173.0	0.90	1996	86.33	25.79	29.94	8.95	16.85
0.100	163.0	0.90	1996	81.34	29.28	29.94	10.78	18.50
0.167	135.0	0.90	1996	67.37	40.50	29.94	18.00	22.50
0.33	100.0	0.90	1996	49.90	59.82	29.94	35.89	23.93
0.50	83.0	0.90	1996	41.42	74.55	29.94	53.89	20.66
1	57.0	0.90	1996	28.44	102.39	29.94	107.78	-5.39
2	37.2	0.90	1996	18.56	133.65	29.94	215.57	-81.92
3	28.6	0.90	1996	14.27	154.13	29.94	323.35	-169.22
6	18.2	0.90	1996	9.08	196.17	29.94	646.70	-450.54
12	11.7	0.90	1996	5.84	252.21	29.94	1293.41	-1041.19
24	7.6	0.90	1996	3.80	328.09	29.94	2586.82	-2258.72
48	4.9	0.90	1996	2.43	419.06	29.94	5173.63	-4754.57
72	3.6	0.90	1996	1.81	469.51	29.94	7760.45	-7290.94

MAX REQUIRED OSD (m³) 23.93

Notes :-

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DURATION (hr)	RAINFALL INTENSITY 100 Year ARI (mm/hr)	CO-EFFICIENT OF RUNOFF (C ₁₀)	SITE AREA (m ²)	ACTUAL DISCHARGE (L/s)	ACTUAL DISCHARGE VOLUME (m ³)	PERMISSIBLE SITE DISCHARGE (L/s)	PERMISSABLE DISCHARGE VOLUME (m ³)	REQUIRED ON-SITE STORAGE (m ³)
0.083	173.0	0.90	2062	89.18	26.65	30.93	9.24	17.41
0.100	163.0	0.90	2062	84.03	30.25	30.93	11.13	19.11
0.167	135.0	0.90	2062	69.59	41.84	30.93	18.60	23.24
0.33	100.0	0.90	2062	51.55	61.80	30.93	37.08	24.72
0.50	83.0	0.90	2062	42.79	77.02	30.93	55.67	21.34
1	57.0	0.90	2062	29.38	105.78	30.93	111.35	-5.57
2	37.2	0.90	2062	19.18	138.07	30.93	222.70	-84.62
3	28.6	0.90	2062	14.74	159.23	30.93	334.04	-174.82
6	18.2	0.90	2062	9.38	202.65	30.93	668.09	-465.43
12	11.7	0.90	2062	6.03	260.55	30.93	1336.18	-1075.62
24	7.6	0.90	2062	3.92	338.94	30.93	2672.35	-2333.41
48	4.9	0.90	2062	2.51	432.92	30.93	5344.70	-4911.78
72	3.6	0.90	2062	1.87	485.03	30.93	8017.06	-7532.02

MAX REQUIRED OSD (m³) 24.72

Notes :-

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DURATION (hr)	RAINFALL INTENSITY 100 Year ARI (mm/hr)	CO-EFFICIENT OF RUNOFF (C ₁₀)	SITE AREA (m ²)	ACTUAL DISCHARGE (L/s)	ACTUAL DISCHARGE VOLUME (m ³)	PERMISSIBLE SITE DISCHARGE (L/s)	PERMISSABLE DISCHARGE VOLUME (m ³)	REQUIRED ON-SITE STORAGE (m ³)
0.083	173.0	0.90	1064	46.02	13.75	15.96	4.77	8.98
0.100	163.0	0.90	1064	43.36	15.61	15.96	5.75	9.86
0.167	135.0	0.90	1064	35.91	21.59	15.96	9.60	11.99
0.33	100.0	0.90	1064	26.60	31.89	15.96	19.13	12.76
0.50	83.0	0.90	1064	22.08	39.74	15.96	28.73	11.01
1	57.0	0.90	1064	15.16	54.58	15.96	57.46	-2.87
2	37.2	0.90	1064	9.90	71.25	15.96	114.91	-43.67
3	28.6	0.90	1064	7.61	82.16	15.96	172.37	-90.21
6	18.2	0.90	1064	4.84	104.57	15.96	344.74	-240.17
12	11.7	0.90	1064	3.11	134.45	15.96	689.47	-555.02
24	7.6	0.90	1064	2.02	174.90	15.96	1378.94	-1204.05
48	4.9	0.90	1064	1.29	223.39	15.96	2757.89	-2534.50
72	3.6	0.90	1064	0.97	250.28	15.96	4136.83	-3886.55

MAX REQUIRED OSD (m³) 12.76

Notes :-

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DURATION (hr)	RAINFALL INTENSITY 100 Year ARI (mm/hr)	CO-EFFICIENT OF RUNOFF (C ₁₀)	SITE AREA (m ²)	ACTUAL DISCHARGE (L/s)	ACTUAL DISCHARGE VOLUME (m ³)	PERMISSIBLE SITE DISCHARGE (L/s)	PERMISSABLE DISCHARGE VOLUME (m ³)	REQUIRED ON-SITE STORAGE (m ³)
0.083	173.0	0.90	1160	50.17	14.99	17.40	5.20	9.79
0.100	163.0	0.90	1160	47.27	17.02	17.40	6.26	10.75
0.167	135.0	0.90	1160	39.15	23.54	17.40	10.46	13.08
0.33	100.0	0.90	1160	29.00	34.77	17.40	20.86	13.91
0.50	83.0	0.90	1160	24.07	43.33	17.40	31.32	12.01
1	57.0	0.90	1160	16.53	59.51	17.40	62.64	-3.13
2	37.2	0.90	1160	10.79	77.67	17.40	125.28	-47.61
3	28.6	0.90	1160	8.29	89.58	17.40	187.92	-98.34
6	18.2	0.90	1160	5.28	114.00	17.40	375.84	-261.84
12	11.7	0.90	1160	3.39	146.58	17.40	751.68	-605.10
24	7.6	0.90	1160	2.21	190.68	17.40	1503.36	-1312.68
48	4.9	0.90	1160	1.41	243.54	17.40	3006.72	-2763.18
72	3.6	0.90	1160	1.05	272.86	17.40	4510.08	-4237.22

MAX REQUIRED OSD (m³) 13.91

Notes :-

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DURATION (hr)	RAINFALL INTENSITY 100 Year ARI (mm/hr)	CO-EFFICIENT OF RUNOFF (C ₁₀)	SITE AREA (m ²)	ACTUAL DISCHARGE (L/s)	ACTUAL DISCHARGE VOLUME (m ³)	PERMISSIBLE SITE DISCHARGE (L/s)	PERMISSABLE DISCHARGE VOLUME (m ³)	REQUIRED ON-SITE STORAGE (m ³)
0.083	173.0	0.90	477	20.63	6.16	7.16	2.14	4.03
0.100	163.0	0.90	477	19.44	7.00	7.16	2.58	4.42
0.167	135.0	0.90	477	16.10	9.68	7.16	4.30	5.38
0.33	100.0	0.90	477	11.93	14.30	7.16	8.58	5.72
0.50	83.0	0.90	477	9.90	17.82	7.16	12.88	4.94
1	57.0	0.90	477	6.80	24.47	7.16	25.76	-1.29
2	37.2	0.90	477	4.44	31.94	7.16	51.52	-19.58
3	28.6	0.90	477	3.41	36.83	7.16	77.27	-40.44
6	18.2	0.90	477	2.17	46.88	7.16	154.55	-107.67
12	11.7	0.90	477	1.40	60.27	7.16	309.10	-248.82
24	7.6	0.90	477	0.91	78.41	7.16	618.19	-539.78
48	4.9	0.90	477	0.58	100.15	7.16	1236.38	-1136.24
72	3.6	0.90	477	0.43	112.20	7.16	1854.58	-1742.37

MAX REQUIRED OSD (m³) 5.72

Notes :-

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DURATION	RAINFALL INTENSITY 100 Year ARI	CO-EFFICIENT OF RUNOFF	SITE AREA	ACTUAL DISCHARGE	ACTUAL DISCHARGE VOLUME	PERMISSIBLE SITE DISCHARGE	PERMISSABLE DISCHARGE VOLUME	REQUIRED ON-SITE STORAGE
(hr)	(mm/hr)	(C ₁₀)	(m ²)	(L/s)	(m ³)	(L/s)	(m ³)	(m ³)
0.083	173.0	0.90	1480	64.01	19.13	22.20	6.63	12.49
0.100	163.0	0.90	1480	60.31	21.71	22.20	7.99	13.72
0.167	135.0	0.90	1480	49.95	30.03	22.20	13.35	16.68
0.33	100.0	0.90	1480	37.00	44.36	22.20	26.61	17.74
0.50	83.0	0.90	1480	30.71	55.28	22.20	39.96	15.32
1	57.0	0.90	1480	21.09	75.92	22.20	79.92	-4.00
2	37.2	0.90	1480	13.76	99.10	22.20	159.84	-60.74
3	28.6	0.90	1480	10.58	114.29	22.20	239.76	-125.47
6	18.2	0.90	1480	6.73	145.45	22.20	479.52	-334.07
12	11.7	0.90	1480	4.33	187.01	22.20	959.04	-772.03
24	7.6	0.90	1480	2.82	243.28	22.20	1918.08	-1674.80
48	4.9	0.90	1480	1.80	310.73	22.20	3836.16	-3525.43
72	3.6	0.90	1480	1.34	348.13	22.20	5754.24	-5406.11

MAX REQUIRED OSD (m³) 17.74

Notes :-

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DURATION (hr)	RAINFALL INTENSITY 100 Year ARI (mm/hr)	CO-EFFICIENT OF RUNOFF (C ₁₀)	SITE AREA (m ²)	ACTUAL DISCHARGE (L/s)	ACTUAL DISCHARGE VOLUME (m ³)	PERMISSIBLE SITE DISCHARGE (L/s)	PERMISSABLE DISCHARGE VOLUME (m ³)	REQUIRED ON-SITE STORAGE (m ³)
0.083	173.0	0.90	2014	87.11	26.03	30.21	9.03	17.00
0.100	163.0	0.90	2014	82.07	29.55	30.21	10.88	18.67
0.167	135.0	0.90	2014	67.97	40.87	30.21	18.16	22.70
0.33	100.0	0.90	2014	50.35	60.36	30.21	36.22	24.14
0.50	83.0	0.90	2014	41.79	75.22	30.21	54.38	20.84
1	57.0	0.90	2014	28.70	103.32	30.21	108.76	-5.44
2	37.2	0.90	2014	18.73	134.86	30.21	217.51	-82.65
3	28.6	0.90	2014	14.40	155.52	30.21	326.27	-170.75
6	18.2	0.90	2014	9.16	197.94	30.21	652.54	-454.60
12	11.7	0.90	2014	5.89	254.49	30.21	1305.07	-1050.58
24	7.6	0.90	2014	3.83	331.05	30.21	2610.14	-2279.09
48	4.9	0.90	2014	2.45	422.84	30.21	5220.29	-4797.44
72	3.6	0.90	2014	1.83	473.74	30.21	7830.43	-7356.69

MAX REQUIRED OSD (m³) 24.14

Notes :-

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OSD 9

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DURATION (hr)	RAINFALL INTENSITY 100 Year ARI (mm/hr)	CO-EFFICIENT OF RUNOFF (C ₁₀)	SITE AREA (m ²)	ACTUAL DISCHARGE (L/s)	ACTUAL DISCHARGE VOLUME (m ³)	PERMISSIBLE SITE DISCHARGE (L/s)	PERMISSABLE DISCHARGE VOLUME (m ³)	REQUIRED ON-SITE STORAGE (m ³)
0.083	173.0	0.90	2363	102.20	30.54	35.45	10.59	19.95
0.100	163.0	0.90	2363	96.29	34.67	35.45	12.76	21.91
0.167	135.0	0.90	2363	79.75	47.95	35.45	21.31	26.64
0.33	100.0	0.90	2363	59.08	70.82	35.45	42.49	28.33
0.50	83.0	0.90	2363	49.03	88.26	35.45	63.80	24.46
1	57.0	0.90	2363	33.67	121.22	35.45	127.60	-6.38
2	37.2	0.90	2363	21.98	158.23	35.45	255.20	-96.98
3	28.6	0.90	2363	16.90	182.47	35.45	382.81	-200.34
6	18.2	0.90	2363	10.75	232.24	35.45	765.61	-533.38
12	11.7	0.90	2363	6.91	298.59	35.45	1531.22	-1232.64
24	7.6	0.90	2363	4.50	388.42	35.45	3062.45	-2674.03
48	4.9	0.90	2363	2.87	496.12	35.45	6124.90	-5628.78
72	3.6	0.90	2363	2.14	555.83	35.45	9187.34	-8631.51

MAX REQUIRED OSD (m³) 28.33

Notes :-

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