APPENDIX H
Modified Rational Method: Indicative Attenuation Volume Calculations

Modified Rational Method

Length (m)	17	m
Area (ha)	0.102	Ha
Max Height	197.0	mAOD
Min Height	194.9	mAOD
DeltaH	2.1	
Slope (%)	12.35	
Te (mins)	5.45	mins
ARF	0.998	
SAAR	1181.000	mm
UCWI	127	mm
PIMP	100.0	%
SOIL	0.49	
Percentage Runoff PR	84.36	
DEEPSTOR	0.21	

Cv	0.84356	
Cr	1.3	
allowable outflow		
2 year	0.005	m^3/s

m3

Storage	RT years	Storage
	2 + 30% cc	3

Return Period flood 2 + 30% cc years

Post Development Rainfall 2 years

Development Area A1 to Outfall 1

Rainfall Duration (hours)	Rainfall Duration (days)	Rainfall Depth (mm)	30% increase	Effective Depth (mm)	Rainfall Intensity (mm/hr)	FLOW (l/s)	FLOW (l/s/ha)	RUN-OFF		Allowable Outflow (m^3)	Difference (m^3)
								FLOW (m^3)	RAIN (m^3)		
0.25	0.010	5.43	7.059	7.7	21.7	6.8	66.2	6	8	4.50	3
0.5	0.021	7.9	10.27	11.3	15.8	4.9	48.2	9	11	9.00	2
0.75	0.031	9.73	12.649	13.9	13.0	4.0	39.6	11	14	13.50	1
1	0.042	11.24	14.612	16.0	11.2	3.5	34.3	13	16	18.00	-2
1.25	0.052	12.54	16.302	17.9	10.0	3.1	30.6	14	18	22.50	-4
1.5	0.063	13.71	17.823	19.5	9.1	2.8	27.9	15	20	27.00	-7
1.75	0.073	14.76	19.188	21.0	8.4	2.6	25.7	17	21	31.50	-10
2	0.083	15.74	20.462	22.4	7.9	2.4	24.0	18	23	36.00	-13
2.25	0.094	16.65	21.645	23.7	7.4	2.3	22.6	19	24	40.50	-16
2.5	0.104	17.5	22.75	24.9	7.0	2.2	21.3	20	25	45.00	-20
2.75	0.115	18.31	23.803	26.1	6.7	2.1	20.3	20	27	49.50	-23
3	0.125	19.07	24.791	27.2	6.4	2.0	19.4	21	28	54.00	-26
3.25	0.135	19.8	25.74	28.2	6.1	1.9	18.6	22	29	58.50	-30
3.5	0.146	20.5	26.65	29.2	5.9	1.8	17.9	23	30	63.00	-33
3.75	0.156	21.17	27.521	30.2	5.6	1.8	17.2	24	31	67.50	-37
4	0.167	21.82	28.366	31.1	5.5	1.7	16.6	24	32	72.00	-40
4.25	0.177	22.44	29.172	32.0	5.3	1.6	16.1	25	33	76.50	-44
4.5	0.188	23.04	29.952	32.8	5.1	1.6	15.6	26	34	81.00	-47
4.75	0.198	23.63	30.719	33.7	5.0	1.5	15.2	26	34	85.50	-51
5	0.208	24.19	31.447	34.5	4.8	1.5	14.7	27	35	90.00	-55
5.25	0.219	24.74	32.162	35.3	4.7	1.5	14.4	28	36	94.50	-59
5.5	0.229	25.28	32.864	36.0	4.6	1.4	14.0	28	37	99.00	-62
5.75	0.240	25.8	33.54	36.8	4.5	1.4	13.7	29	38	103.50	-66
6	0.250	26.31	34.203	37.5	4.4	1.4	13.4	29	38	108.00	-70
6.25	0.260	26.81	34.853	38.2	4.3	1.3	13.1	30	39	112.50	-74
6.5	0.271	27.3	35.49	38.9	4.2	1.3	12.8	31	40	117.00	-77
6.75	0.281	27.77	36.101	39.6	4.1	1.3	12.5	31	40	121.50	-81
7	0.292	28.24	36.712	40.3	4.0	1.3	12.3	32	41	126.00	-85
7.25	0.302	28.69	37.297	40.9	4.0	1.2	12.1	32	42	130.50	-89
7.5	0.313	29.14	37.882	41.5	3.9	1.2	11.8	33	42	135.00	-93
7.75	0.323	29.58	38.454	42.2	3.8	1.2	11.6	33	43	139.50	-96
8	0.333	30.01	39.013	42.8	3.8	1.2	11.4	34	44	144.00	-100
8.25	0.344	30.44	39.572	43.4	3.7	1.1	11.2	34	44	148.50	-104
8.5	0.354	30.85	40.105	44.0	3.6	1.1	11.1	35	45	153.00	-108
8.75	0.365	31.26	40.638	44.6	3.6	1.1	10.9	35	45	157.50	-112
9	0.375	31.66	41.158	45.1	3.5	1.1	10.7	35	46	162.00	-116
9.25	0.385	32.06	41.678	45.7	3.5	1.1	10.6	36	47	166.50	-120
9.5	0.396	32.45	42.185	46.3	3.4	1.1	10.4	36	47	171.00	-124
9.75	0.406	32.84	42.692	46.8	3.4	1.0	10.3	37	48	175.50	-128
10	0.417	33.22	43.186	47.4	3.3	1.0	10.1	37	48	180.00	-132

Modified Rational Method

Length (m)	17	m
Area (ha)	0.102	Ha
Max Height	197.0	mAOD
Min Height	194.9	mAOD
DeltaH	2.1	
Slope (%)	12.35	
Te (mins)	5.45	mins
ARF	0.998	
SAAR	1181.000	mm
UCWI	127	mm
PIMP	100.0	%
SOIL	0.49	
Percentage Runoff PR	84.36	
DEEPSTOR	0.21	

Cv	0.84356	
Cr	1.3	
allowable outflow		
30 year	0.0144	m^3/s

m3

Storage	RT years	Storage
	30 + 30% cc	9

Return Period flood 30 + 30% cc years

Post Development Rainfall 30 years

Development Area A1 to Outfall 1

Rainfall Duration (hours)	Rainfall Duration (days)	Rainfall Depth (mm)	30% increase	Effective Depth (mm)	Rainfall Intensity (mm/hr)	FLOW (l/s)	FLOW (l/s/ha)	RUN-OFF		Allowable Outflow (m^3)	Difference (m^3)
								FLOW (m^3)	RAIN (m^3)		
0.25	0.010	15.29	19.877	21.8	61.2	19.0	186.5	17	22	12.96	9
0.5	0.021	21.04	27.352	30.0	42.1	13.1	128.3	24	31	25.92	5
0.75	0.031	25.08	32.604	35.8	33.4	10.4	101.9	28	36	38.88	-2
1	0.042	28.3	36.79	40.3	28.3	8.8	86.3	32	41	51.84	-11
1.25	0.052	31.03	40.339	44.2	24.8	7.7	75.7	35	45	64.80	-20
1.5	0.063	33.42	43.446	47.6	22.3	6.9	67.9	37	49	77.76	-29
1.75	0.073	35.56	46.228	50.7	20.3	6.3	61.9	40	52	90.72	-39
2	0.083	37.5	48.75	53.5	18.8	5.8	57.2	42	55	103.68	-49
2.25	0.094	39.3	51.09	56.0	17.5	5.4	53.2	44	57	116.64	-59
2.5	0.104	40.96	53.248	58.4	16.4	5.1	49.9	46	60	129.60	-70
2.75	0.115	42.52	55.276	60.6	15.5	4.8	47.1	48	62	142.56	-81
3	0.125	43.99	57.187	62.7	14.7	4.6	44.7	49	64	155.52	-92
3.25	0.135	45.38	58.994	64.7	14.0	4.3	42.6	51	66	168.48	-102
3.5	0.146	46.7	60.71	66.6	13.3	4.1	40.7	52	68	181.44	-114
3.75	0.156	47.96	62.348	68.4	12.8	4.0	39.0	54	70	194.40	-125
4	0.167	49.17	63.921	70.1	12.3	3.8	37.5	55	71	207.36	-136
4.25	0.177	50.33	65.429	71.8	11.8	3.7	36.1	56	73	220.32	-147
4.5	0.188	51.45	66.885	73.3	11.4	3.6	34.9	58	75	233.28	-158
4.75	0.198	52.52	68.276	74.9	11.1	3.4	33.7	59	76	246.24	-170
5	0.208	53.56	69.628	76.4	10.7	3.3	32.7	60	78	259.20	-181
5.25	0.219	54.57	70.941	77.8	10.4	3.2	31.7	61	79	272.16	-193
5.5	0.229	55.54	72.202	79.2	10.1	3.1	30.8	62	81	285.12	-204
5.75	0.240	56.49	73.437	80.5	9.8	3.1	30.0	63	82	298.08	-216
6	0.250	57.4	74.62	81.8	9.6	3.0	29.2	64	83	311.04	-228
6.25	0.260	58.3	75.79	83.1	9.3	2.9	28.4	65	85	324.00	-239
6.5	0.271	59.17	76.921	84.4	9.1	2.8	27.8	66	86	336.96	-251
6.75	0.281	60.02	78.026	85.6	8.9	2.8	27.1	67	87	349.92	-263
7	0.292	60.85	79.105	86.7	8.7	2.7	26.5	68	88	362.88	-274
7.25	0.302	61.66	80.158	87.9	8.5	2.6	25.9	69	90	375.84	-286
7.5	0.313	62.45	81.185	89.0	8.3	2.6	25.4	70	91	388.80	-298
7.75	0.323	63.23	82.199	90.1	8.2	2.5	24.9	71	92	401.76	-310
8	0.333	63.98	83.174	91.2	8.0	2.5	24.4	72	93	414.72	-322
8.25	0.344	64.73	84.149	92.3	7.8	2.4	23.9	72	94	427.68	-334
8.5	0.354	65.46	85.098	93.3	7.7	2.4	23.5	73	95	440.64	-345
8.75	0.365	66.17	86.021	94.3	7.6	2.4	23.1	74	96	453.60	-357
9	0.375	66.87	86.931	95.3	7.4	2.3	22.7	75	97	466.56	-369
9.25	0.385	67.56	87.828	96.3	7.3	2.3	22.3	76	98	479.52	-381
9.5	0.396	68.24	88.712	97.3	7.2	2.2	21.9	76	99	492.48	-393
9.75	0.406	68.9	89.57	98.2	7.1	2.2	21.5	77	100	505.44	-405
10	0.417	69.56	90.428	99.2	7.0	2.2	21.2	78	101	518.40	-417

Modified Rational Method

Length (m)	17	m
Area (ha)	0.102	Ha
Max Height	197.0	mAOD
Min Height	194.9	mAOD
DeltaH	2.1	
Slope (%)	12.35	
Te (mins)	5.45	mins
ARF	0.998	
SAAR	1181.000	mm
UCWI	127	mm
PIMP	100.0	%
SOIL	0.49	
Percentage Runoff PR	84.36	
DEEPSTOR	0.21	

Cv	0.84356	
Cr	1.3	
allowable outflow		
100 year	0.0222	m^3/s

Storage	RT years	Storage
	100 + 30% cc	14

Return Period: flood — 100 + 30% cc years
Post Development: Rainfall — 100 years

Development Area A1 to Outfall 1

Rainfall Duration (hours)	Rainfall Duration (days)	Rainfall Depth (mm)	30% increase	Effective Depth (mm)	Rainfall Intensity (mm/hr)	FLOW (l/s)	FLOW (l/s/ha)	RUN-OFF		Allowable Outflow (m^3)	Difference (m^3)
								FLOW (m^3)	RAIN (m^3)		
0.25	0.010	23.2	30.16	33.1	92.8	28.9	282.9	26	34	19.98	14
0.5	0.021	31.21	40.573	44.5	62.4	19.4	190.3	35	45	39.96	5
0.75	0.031	36.72	47.736	52.3	49.0	15.2	149.3	41	53	59.94	-7
1	0.042	41.06	53.378	58.5	41.1	12.8	125.2	46	60	79.92	-20
1.25	0.052	44.7	58.11	63.7	35.8	11.1	109.0	50	65	99.90	-35
1.5	0.063	47.85	62.205	68.2	31.9	9.9	97.3	54	70	119.88	-50
1.75	0.073	50.67	65.871	72.2	29.0	9.0	88.3	57	74	139.86	-66
2	0.083	53.21	69.173	75.9	26.6	8.3	81.1	60	77	159.84	-82
2.25	0.094	55.54	72.202	79.2	24.7	7.7	75.3	62	81	179.82	-99
2.5	0.104	57.7	75.01	82.3	23.1	7.2	70.4	65	84	199.80	-116
2.75	0.115	59.71	77.623	85.1	21.7	6.8	66.2	67	87	219.78	-133
3	0.125	61.6	80.08	87.8	20.5	6.4	62.6	69	90	239.76	-150
3.25	0.135	63.38	82.394	90.4	19.5	6.1	59.5	71	92	259.74	-168
3.5	0.146	65.07	84.591	92.8	18.6	5.8	56.7	73	95	279.72	-185
3.75	0.156	66.68	86.684	95.1	17.8	5.5	54.2	75	97	299.70	-203
4	0.167	68.22	88.686	97.3	17.1	5.3	52.0	76	99	319.68	-220
4.25	0.177	69.69	90.597	99.4	16.4	5.1	50.0	78	101	339.66	-238
4.5	0.188	71.1	92.43	101.4	15.8	4.9	48.2	80	103	359.64	-256
4.75	0.198	72.46	94.198	103.3	15.3	4.7	46.5	81	105	379.62	-274
5	0.208	73.77	95.901	105.2	14.8	4.6	45.0	83	107	399.60	-292
5.25	0.219	75.04	97.552	107.0	14.3	4.4	43.6	84	109	419.58	-310
5.5	0.229	76.27	99.151	108.7	13.9	4.3	42.3	85	111	439.56	-329
5.75	0.240	77.45	100.685	110.4	13.5	4.2	41.1	87	113	459.54	-347
6	0.250	78.6	102.18	112.1	13.1	4.1	39.9	88	114	479.52	-365
6.25	0.260	79.72	103.636	113.7	12.8	4.0	38.9	89	116	499.50	-384
6.5	0.271	80.81	105.053	115.2	12.4	3.9	37.9	90	118	519.48	-402
6.75	0.281	81.87	106.431	116.7	12.1	3.8	37.0	92	119	539.46	-420
7	0.292	82.91	107.783	118.2	11.8	3.7	36.1	93	121	559.44	-439
7.25	0.302	83.92	109.096	119.6	11.6	3.6	35.3	94	122	579.42	-457
7.5	0.313	84.9	110.37	121.0	11.3	3.5	34.5	95	123	599.40	-476
7.75	0.323	85.86	111.618	122.4	11.1	3.4	33.8	96	125	619.38	-495
8	0.333	86.8	112.84	123.7	10.9	3.4	33.1	97	126	639.36	-513
8.25	0.344	87.72	114.036	125.1	10.6	3.3	32.4	98	128	659.34	-532
8.5	0.354	88.63	115.219	126.4	10.4	3.2	31.8	99	129	679.32	-550
8.75	0.365	89.51	116.363	127.6	10.2	3.2	31.2	100	130	699.30	-569
9	0.375	90.38	117.494	128.8	10.0	3.1	30.6	101	131	719.28	-588
9.25	0.385	91.23	118.599	130.1	9.9	3.1	30.1	102	133	739.26	-607
9.5	0.396	92.06	119.678	131.2	9.7	3.0	29.5	103	134	759.24	-625
9.75	0.406	92.88	120.744	132.4	9.5	3.0	29.0	104	135	779.22	-644
10	0.417	93.69	121.797	133.6	9.4	2.9	28.6	105	136	799.20	-663

Modified Rational Method

Length (m)	48	m
Area (ha)	0.120	Ha
Max Height	196.3	mAOD
Min Height	194.7	mAOD
DeltaH	1.6	
Slope (%)	3.27	
Te (mins)	9.00	mins
ARF	0.999	
SAAR	1181.000	mm
UCWI	127	mm
PIMP	100.0	%
SOIL	0.49	
Percentage Runoff PR	84.36	
DEEPSTOR	0.40	

Cv	0.84356	
Cr	1.3	
allowable outflow		
2 year	0.0059	m^3/s

m3

Storage	RT years	Storage
	2 + 30% cc	4

Return Period flood 2 + 30% cc years

Post Development Rainfall 2 years

Development Area A1 to Outfall 2

Rainfall Duration (hours)	Rainfall Duration (days)	Rainfall Depth (mm)	30% increase	Effective Depth (mm)	Rainfall Intensity (mm/hr)	FLOW (l/s)	FLOW (l/s/ha)	RUN-OFF		Allowable Outflow (m^3)	Difference (m^3)
								FLOW (m^3)	RAIN (m^3)		
0.25	0.010	5.43	7.059	7.7	21.7	7.9	66.2	7	9	5.31	4
0.5	0.021	7.9	10.27	11.3	15.8	5.8	48.2	10	14	10.62	3
0.75	0.031	9.73	12.649	13.9	13.0	4.7	39.6	13	17	15.93	1
1	0.042	11.24	14.612	16.0	11.2	4.1	34.3	15	19	21.24	-2
1.25	0.052	12.54	16.302	17.9	10.0	3.7	30.6	17	21	26.55	-5
1.5	0.063	13.71	17.823	19.5	9.1	3.3	27.9	18	23	31.86	-8
1.75	0.073	14.76	19.188	21.0	8.4	3.1	25.7	19	25	37.17	-12
2	0.083	15.74	20.462	22.4	7.9	2.9	24.0	21	27	42.48	-16
2.25	0.094	16.65	21.645	23.7	7.4	2.7	22.6	22	28	47.79	-19
2.5	0.104	17.5	22.75	24.9	7.0	2.6	21.3	23	30	53.10	-23
2.75	0.115	18.31	23.803	26.1	6.7	2.4	20.3	24	31	58.41	-27
3	0.125	19.07	24.791	27.2	6.4	2.3	19.4	25	33	63.72	-31
3.25	0.135	19.8	25.74	28.2	6.1	2.2	18.6	26	34	69.03	-35
3.5	0.146	20.5	26.65	29.2	5.9	2.1	17.9	27	35	74.34	-39
3.75	0.156	21.17	27.521	30.2	5.6	2.1	17.2	28	36	79.65	-43
4	0.167	21.82	28.366	31.1	5.5	2.0	16.6	29	37	84.96	-48
4.25	0.177	22.44	29.172	32.0	5.3	1.9	16.1	30	38	90.27	-52
4.5	0.188	23.04	29.952	32.8	5.1	1.9	15.6	30	39	95.58	-56
4.75	0.198	23.63	30.719	33.7	5.0	1.8	15.2	31	40	100.89	-60
5	0.208	24.19	31.447	34.5	4.8	1.8	14.7	32	41	106.20	-65
5.25	0.219	24.74	32.162	35.3	4.7	1.7	14.4	33	42	111.51	-69
5.5	0.229	25.28	32.864	36.0	4.6	1.7	14.0	33	43	116.82	-74
5.75	0.240	25.8	33.54	36.8	4.5	1.6	13.7	34	44	122.13	-78
6	0.250	26.31	34.203	37.5	4.4	1.6	13.4	35	45	127.44	-82
6.25	0.260	26.81	34.853	38.2	4.3	1.6	13.1	35	46	132.75	-87
6.5	0.271	27.3	35.49	38.9	4.2	1.5	12.8	36	47	138.06	-91
6.75	0.281	27.77	36.101	39.6	4.1	1.5	12.5	37	48	143.37	-96
7	0.292	28.24	36.712	40.3	4.0	1.5	12.3	37	48	148.68	-100
7.25	0.302	28.69	37.297	40.9	4.0	1.4	12.1	38	49	153.99	-105
7.5	0.313	29.14	37.882	41.5	3.9	1.4	11.8	38	50	159.30	-109
7.75	0.323	29.58	38.454	42.2	3.8	1.4	11.6	39	51	164.61	-114
8	0.333	30.01	39.013	42.8	3.8	1.4	11.4	40	51	169.92	-119
8.25	0.344	30.44	39.572	43.4	3.7	1.3	11.2	40	52	175.23	-123
8.5	0.354	30.85	40.105	44.0	3.6	1.3	11.1	41	53	180.54	-128
8.75	0.365	31.26	40.638	44.6	3.6	1.3	10.9	41	53	185.85	-132
9	0.375	31.66	41.158	45.1	3.5	1.3	10.7	42	54	191.16	-137
9.25	0.385	32.06	41.678	45.7	3.5	1.3	10.6	42	55	196.47	-142
9.5	0.396	32.45	42.185	46.3	3.4	1.2	10.4	43	56	201.78	-146
9.75	0.406	32.84	42.692	46.8	3.4	1.2	10.3	43	56	207.09	-151
10	0.417	33.22	43.186	47.4	3.3	1.2	10.1	44	57	212.40	-156

Modified Rational Method

Length (m)	48	m
Area (ha)	0.120	Ha
Max Height	196.3	mAOD
Min Height	194.7	mAOD
DeltaH	1.6	
Slope (%)	3.27	
Te (mins)	9.00	mins
ARF	0.999	
SAAR	1181.000	mm
UCWI	127	mm
PIMP	100.0	%
SOIL	0.49	
Percentage Runoff PR	84.36	
DEEPSTOR	0.40	

Cv	0.84356	
Cr	1.3	
allowable outflow		
30 year	0.017	m^3/s

Storage	RT years	Storage
		m3
	30 + 30% cc	11

Return Period flood 30 + 30% cc years

Post Development Rainfall 30 years

Development Area A1 to Outfall 2

Rainfall Duration (hours)	Rainfall Duration (days)	Rainfall Depth (mm)	30% increase	Effective Depth (mm)	Rainfall Intensity (mm/hr)	FLOW (l/s)	FLOW (l/s/ha)	RUN-OFF		Allowable Outflow (m^3)	Difference (m^3)
								FLOW (m^3)	RAIN (m^3)		
0.25	0.010	15.29	19.877	21.8	61.2	22.4	186.5	20	26	15.30	11
0.5	0.021	21.04	27.352	30.0	42.1	15.4	128.3	28	36	30.60	5
0.75	0.031	25.08	32.604	35.8	33.4	12.2	101.9	33	43	45.90	-3
1	0.042	28.3	36.79	40.3	28.3	10.4	86.3	37	48	61.20	-13
1.25	0.052	31.03	40.339	44.2	24.8	9.1	75.7	41	53	76.50	-23
1.5	0.063	33.42	43.446	47.6	22.3	8.2	67.9	44	57	91.80	-35
1.75	0.073	35.56	46.228	50.7	20.3	7.4	61.9	47	61	107.10	-46
2	0.083	37.5	48.75	53.5	18.8	6.9	57.2	49	64	122.40	-58
2.25	0.094	39.3	51.09	56.0	17.5	6.4	53.2	52	67	137.70	-70
2.5	0.104	40.96	53.248	58.4	16.4	6.0	49.9	54	70	153.00	-83
2.75	0.115	42.52	55.276	60.6	15.5	5.7	47.1	56	73	168.30	-96
3	0.125	43.99	57.187	62.7	14.7	5.4	44.7	58	75	183.60	-108
3.25	0.135	45.38	58.994	64.7	14.0	5.1	42.6	60	78	198.90	-121
3.5	0.146	46.7	60.71	66.6	13.3	4.9	40.7	62	80	214.20	-134
3.75	0.156	47.96	62.348	68.4	12.8	4.7	39.0	63	82	229.50	-147
4	0.167	49.17	63.921	70.1	12.3	4.5	37.5	65	84	244.80	-161
4.25	0.177	50.33	65.429	71.8	11.8	4.3	36.1	66	86	260.10	-174
4.5	0.188	51.45	66.885	73.3	11.4	4.2	34.9	68	88	275.40	-187
4.75	0.198	52.52	68.276	74.9	11.1	4.0	33.7	69	90	290.70	-201
5	0.208	53.56	69.628	76.4	10.7	3.9	32.7	71	92	306.00	-214
5.25	0.219	54.57	70.941	77.8	10.4	3.8	31.7	72	93	321.30	-228
5.5	0.229	55.54	72.202	79.2	10.1	3.7	30.8	73	95	336.60	-242
5.75	0.240	56.49	73.437	80.5	9.8	3.6	30.0	74	97	351.90	-255
6	0.250	57.4	74.62	81.8	9.6	3.5	29.2	76	98	367.20	-269
6.25	0.260	58.3	75.79	83.1	9.3	3.4	28.4	77	100	382.50	-283
6.5	0.271	59.17	76.921	84.4	9.1	3.3	27.8	78	101	397.80	-297
6.75	0.281	60.02	78.026	85.6	8.9	3.3	27.1	79	103	413.10	-310
7	0.292	60.85	79.105	86.7	8.7	3.2	26.5	80	104	428.40	-324
7.25	0.302	61.66	80.158	87.9	8.5	3.1	25.9	81	105	443.70	-338
7.5	0.313	62.45	81.185	89.0	8.3	3.0	25.4	82	107	459.00	-352
7.75	0.323	63.23	82.199	90.1	8.2	3.0	24.9	83	108	474.30	-366
8	0.333	63.98	83.174	91.2	8.0	2.9	24.4	84	109	489.60	-380
8.25	0.344	64.73	84.149	92.3	7.8	2.9	23.9	85	111	504.90	-394
8.5	0.354	65.46	85.098	93.3	7.7	2.8	23.5	86	112	520.20	-408
8.75	0.365	66.17	86.021	94.3	7.6	2.8	23.1	87	113	535.50	-422
9	0.375	66.87	86.931	95.3	7.4	2.7	22.7	88	114	550.80	-436
9.25	0.385	67.56	87.828	96.3	7.3	2.7	22.3	89	116	566.10	-451
9.5	0.396	68.24	88.712	97.3	7.2	2.6	21.9	90	117	581.40	-465
9.75	0.406	68.9	89.57	98.2	7.1	2.6	21.5	91	118	596.70	-479
10	0.417	69.56	90.428	99.2	7.0	2.5	21.2	92	119	612.00	-493

Modified Rational Method

Length (m)	48	m
Area (ha)	0.120	Ha
Max Height	196.3	mAOD
Min Height	194.7	mAOD
DeltaH	1.6	
Slope (%)	3.27	
Te (mins)	9.00	mins
ARF	0.999	
SAAR	1181.000	mm
UCWI	127	mm
PIMP	100.0	%
SOIL	0.49	
Percentage Runoff PR	84.36	
DEEPSTOR	0.40	

Cv	0.84356	
Cr	1.3	
allowable outflow		
100 year	0.0261	m^3/s

Storage	RT years	Storage
	100 + 30% cc	16

Return Period: flood — 100 + 30% cc years

Post Development: Rainfall — 100 years

Development Area A1 to Outfall 2

Rainfall Duration (hours)	Rainfall Duration (days)	Rainfall Depth (mm)	30% increase	Effective Depth (mm)	Rainfall Intensity (mm/hr)	FLOW (l/s)	FLOW (l/s/ha)	RUN-OFF		Allowable Outflow (m^3)	Difference (m^3)
								FLOW (m^3)	RAIN (m^3)		
0.25	0.010	23.2	30.16	33.1	92.8	33.9	282.9	31	40	23.49	16
0.5	0.021	31.21	40.573	44.5	62.4	22.8	190.3	41	53	46.98	6
0.75	0.031	36.72	47.736	52.3	49.0	17.9	149.3	48	63	70.47	-8
1	0.042	41.06	53.378	58.5	41.1	15.0	125.2	54	70	93.96	-24
1.25	0.052	44.7	58.11	63.7	35.8	13.1	109.0	59	76	117.45	-41
1.5	0.063	47.85	62.205	68.2	31.9	11.7	97.3	63	82	140.94	-59
1.75	0.073	50.67	65.871	72.2	29.0	10.6	88.3	67	87	164.43	-78
2	0.083	53.21	69.173	75.9	26.6	9.7	81.1	70	91	187.92	-97
2.25	0.094	55.54	72.202	79.2	24.7	9.0	75.3	73	95	211.41	-116
2.5	0.104	57.7	75.01	82.3	23.1	8.4	70.4	76	99	234.90	-136
2.75	0.115	59.71	77.623	85.1	21.7	7.9	66.2	79	102	258.39	-156
3	0.125	61.6	80.08	87.8	20.5	7.5	62.6	81	105	281.88	-176
3.25	0.135	63.38	82.394	90.4	19.5	7.1	59.5	83	108	305.37	-197
3.5	0.146	65.07	84.591	92.8	18.6	6.8	56.7	86	111	328.86	-218
3.75	0.156	66.68	86.684	95.1	17.8	6.5	54.2	88	114	352.35	-238
4	0.167	68.22	88.686	97.3	17.1	6.2	52.0	90	117	375.84	-259
4.25	0.177	69.69	90.597	99.4	16.4	6.0	50.0	92	119	399.33	-280
4.5	0.188	71.1	92.43	101.4	15.8	5.8	48.2	94	122	422.82	-301
4.75	0.198	72.46	94.198	103.3	15.3	5.6	46.5	95	124	446.31	-322
5	0.208	73.77	95.901	105.2	14.8	5.4	45.0	97	126	469.80	-344
5.25	0.219	75.04	97.552	107.0	14.3	5.2	43.6	99	128	493.29	-365
5.5	0.229	76.27	99.151	108.7	13.9	5.1	42.3	100	130	516.78	-386
5.75	0.240	77.45	100.685	110.4	13.5	4.9	41.1	102	132	540.27	-408
6	0.250	78.6	102.18	112.1	13.1	4.8	39.9	104	134	563.76	-429
6.25	0.260	79.72	103.636	113.7	12.8	4.7	38.9	105	136	587.25	-451
6.5	0.271	80.81	105.053	115.2	12.4	4.5	37.9	106	138	610.74	-472
6.75	0.281	81.87	106.431	116.7	12.1	4.4	37.0	108	140	634.23	-494
7	0.292	82.91	107.783	118.2	11.8	4.3	36.1	109	142	657.72	-516
7.25	0.302	83.92	109.096	119.6	11.6	4.2	35.3	111	144	681.21	-538
7.5	0.313	84.9	110.37	121.0	11.3	4.1	34.5	112	145	704.70	-559
7.75	0.323	85.86	111.618	122.4	11.1	4.1	33.8	113	147	728.19	-581
8	0.333	86.8	112.84	123.7	10.9	4.0	33.1	114	148	751.68	-603
8.25	0.344	87.72	114.036	125.1	10.6	3.9	32.4	116	150	775.17	-625
8.5	0.354	88.63	115.219	126.4	10.4	3.8	31.8	117	152	798.66	-647
8.75	0.365	89.51	116.363	127.6	10.2	3.7	31.2	118	153	822.15	-669
9	0.375	90.38	117.494	128.8	10.0	3.7	30.6	119	155	845.64	-691
9.25	0.385	91.23	118.599	130.1	9.9	3.6	30.1	120	156	869.13	-713
9.5	0.396	92.06	119.678	131.2	9.7	3.5	29.5	121	157	892.62	-735
9.75	0.406	92.88	120.744	132.4	9.5	3.5	29.0	122	159	916.11	-757
10	0.417	93.69	121.797	133.6	9.4	3.4	28.6	123	160	939.60	-779

Modified Rational Method

Length (m)	48	m
Area (ha)	0.463	Ha
Max Height	196.3	mAOD
Min Height	194.7	mAOD
DeltaH	1.6	
Slope (%)	3.27	
Te (mins)	9.00	mins
ARF	0.998	
SAAR	1181.000	mm
UCWI	127	mm
PIMP	100.0	%
SOIL	0.49	
Percentage Runoff PR	84.36	
DEEPSTOR	0.40	

Cv	0.84356	
Cr	1.3	
allowable outflow		
2 year	0.0223	m^3/s

Storage	RT years	Storage
	2 + 30% cc	16

m3

Return Period flood 2 + 30% cc years — Development Area A1, A2 & A3 to Outfall 3

Post Development Rainfall 2 years

Rainfall Duration (hours)	Rainfall Duration (days)	Rainfall Depth (mm)	30% increase	Effective Depth (mm)	Rainfall Intensity (mm/hr)	FLOW (l/s)	FLOW (l/s/ha)	RUN-OFF		Allowable Outflow (m^3)	Difference (m^3)
								FLOW (m^3)	RAIN (m^3)		
0.25	0.010	5.43	7.059	7.7	21.7	30.7	66.2	28	36	20.07	16
0.5	0.021	7.9	10.27	11.3	15.8	22.3	48.2	40	52	40.14	12
0.75	0.031	9.73	12.649	13.9	13.0	18.3	39.6	49	64	60.21	4
1	0.042	11.24	14.612	16.0	11.2	15.9	34.3	57	74	80.28	-6
1.25	0.052	12.54	16.302	17.9	10.0	14.2	30.6	64	83	100.35	-18
1.5	0.063	13.71	17.823	19.5	9.1	12.9	27.9	70	90	120.42	-30
1.75	0.073	14.76	19.188	21.0	8.4	11.9	25.7	75	97	140.49	-43
2	0.083	15.74	20.462	22.4	7.9	11.1	24.0	80	104	160.56	-57
2.25	0.094	16.65	21.645	23.7	7.4	10.4	22.6	85	110	180.63	-71
2.5	0.104	17.5	22.75	24.9	7.0	9.9	21.3	89	116	200.70	-85
2.75	0.115	18.31	23.803	26.1	6.7	9.4	20.3	93	121	220.77	-100
3	0.125	19.07	24.791	27.2	6.4	9.0	19.4	97	126	240.84	-115
3.25	0.135	19.8	25.74	28.2	6.1	8.6	18.6	101	131	260.91	-130
3.5	0.146	20.5	26.65	29.2	5.9	8.3	17.9	104	135	280.98	-146
3.75	0.156	21.17	27.521	30.2	5.6	8.0	17.2	108	140	301.05	-161
4	0.167	21.82	28.366	31.1	5.5	7.7	16.6	111	144	321.12	-177
4.25	0.177	22.44	29.172	32.0	5.3	7.5	16.1	114	148	341.19	-193
4.5	0.188	23.04	29.952	32.8	5.1	7.2	15.6	117	152	361.26	-209
4.75	0.198	23.63	30.719	33.7	5.0	7.0	15.2	120	156	381.33	-225
5	0.208	24.19	31.447	34.5	4.8	6.8	14.7	123	160	401.40	-242
5.25	0.219	24.74	32.162	35.3	4.7	6.7	14.4	126	163	421.47	-258
5.5	0.229	25.28	32.864	36.0	4.6	6.5	14.0	128	167	441.54	-275
5.75	0.240	25.8	33.54	36.8	4.5	6.3	13.7	131	170	461.61	-291
6	0.250	26.31	34.203	37.5	4.4	6.2	13.4	134	174	481.68	-308
6.25	0.260	26.81	34.853	38.2	4.3	6.1	13.1	136	177	501.75	-325
6.5	0.271	27.3	35.49	38.9	4.2	5.9	12.8	139	180	521.82	-342
6.75	0.281	27.77	36.101	39.6	4.1	5.8	12.5	141	183	541.89	-359
7	0.292	28.24	36.712	40.3	4.0	5.7	12.3	144	186	561.96	-376
7.25	0.302	28.69	37.297	40.9	4.0	5.6	12.1	146	189	582.03	-393
7.5	0.313	29.14	37.882	41.5	3.9	5.5	11.8	148	192	602.10	-410
7.75	0.323	29.58	38.454	42.2	3.8	5.4	11.6	150	195	622.17	-427
8	0.333	30.01	39.013	42.8	3.8	5.3	11.4	152	198	642.24	-444
8.25	0.344	30.44	39.572	43.4	3.7	5.2	11.2	155	201	662.31	-461
8.5	0.354	30.85	40.105	44.0	3.6	5.1	11.1	157	204	682.38	-479
8.75	0.365	31.26	40.638	44.6	3.6	5.0	10.9	159	206	702.45	-496
9	0.375	31.66	41.158	45.1	3.5	5.0	10.7	161	209	722.52	-514
9.25	0.385	32.06	41.678	45.7	3.5	4.9	10.6	163	212	742.59	-531
9.5	0.396	32.45	42.185	46.3	3.4	4.8	10.4	165	214	762.66	-548
9.75	0.406	32.84	42.692	46.8	3.4	4.8	10.3	167	217	782.73	-566
10	0.417	33.22	43.186	47.4	3.3	4.7	10.1	169	219	802.80	-584

Modified Rational Method

Length (m)	48	m
Area (ha)	0.463	Ha
Max Height	196.3	mAOD
Min Height	194.7	mAOD
DeltaH	1.6	
Slope (%)	3.27	
Te (mins)	9.00	mins
ARF	0.998	
SAAR	1181.000	mm
UCWI	127	mm
PIMP	100.0	%
SOIL	0.49	
Percentage Runoff PR	84.36	
DEEPSTOR	0.40	

Cv	0.84356	
Cr	1.3	
allowable outflow		
30 year	0.0655	m^3/s

m3

Storage	RT years	Storage
	30 + 30% cc	42

Return Period flood **30 + 30% cc** years **Development Area A1, A2 & A3 to Outfall 3**

Post Development Rainfall **30** years

Rainfall Duration (hours)	Rainfall Duration (days)	Rainfall Depth (mm)	30% increase	Effective Depth (mm)	Rainfall Intensity (mm/hr)	FLOW (l/s)	FLOW (l/s/ha)	RUN-OFF		Allowable Outflow (m^3)	Difference (m^3)
								FLOW (m^3)	RAIN (m^3)		
0.25	0.010	15.29	19.877	21.8	61.2	86.3	186.5	78	101	58.95	42
0.5	0.021	21.04	27.352	30.0	42.1	59.4	128.3	107	139	117.90	21
0.75	0.031	25.08	32.604	35.8	33.4	47.2	101.9	127	166	176.85	-11
1	0.042	28.3	36.79	40.3	28.3	39.9	86.3	144	187	235.80	-49
1.25	0.052	31.03	40.339	44.2	24.8	35.0	75.7	158	205	294.75	-90
1.5	0.063	33.42	43.446	47.6	22.3	31.4	67.9	170	221	353.70	-133
1.75	0.073	35.56	46.228	50.7	20.3	28.7	61.9	181	235	412.65	-178
2	0.083	37.5	48.75	53.5	18.8	26.5	57.2	191	248	471.60	-224
2.25	0.094	39.3	51.09	56.0	17.5	24.7	53.2	200	259	530.55	-271
2.5	0.104	40.96	53.248	58.4	16.4	23.1	49.9	208	270	589.50	-319
2.75	0.115	42.52	55.276	60.6	15.5	21.8	47.1	216	281	648.45	-368
3	0.125	43.99	57.187	62.7	14.7	20.7	44.7	224	290	707.40	-417
3.25	0.135	45.38	58.994	64.7	14.0	19.7	42.6	231	300	766.35	-467
3.5	0.146	46.7	60.71	66.6	13.3	18.8	40.7	237	308	825.30	-517
3.75	0.156	47.96	62.348	68.4	12.8	18.1	39.0	244	317	884.25	-568
4	0.167	49.17	63.921	70.1	12.3	17.4	37.5	250	325	943.20	-619
4.25	0.177	50.33	65.429	71.8	11.8	16.7	36.1	256	332	1002.15	-670
4.5	0.188	51.45	66.885	73.3	11.4	16.1	34.9	261	340	1061.10	-721
4.75	0.198	52.52	68.276	74.9	11.1	15.6	33.7	267	347	1120.05	-773
5	0.208	53.56	69.628	76.4	10.7	15.1	32.7	272	354	1179.00	-825
5.25	0.219	54.57	70.941	77.8	10.4	14.7	31.7	277	360	1237.95	-878
5.5	0.229	55.54	72.202	79.2	10.1	14.3	30.8	282	367	1296.90	-930
5.75	0.240	56.49	73.437	80.5	9.8	13.9	30.0	287	373	1355.85	-983
6	0.250	57.4	74.62	81.8	9.6	13.5	29.2	292	379	1414.80	-1036
6.25	0.260	58.3	75.79	83.1	9.3	13.2	28.4	296	385	1473.75	-1089
6.5	0.271	59.17	76.921	84.4	9.1	12.8	27.8	301	391	1532.70	-1142
6.75	0.281	60.02	78.026	85.6	8.9	12.6	27.1	305	396	1591.65	-1195
7	0.292	60.85	79.105	86.7	8.7	12.3	26.5	309	402	1650.60	-1249
7.25	0.302	61.66	80.158	87.9	8.5	12.0	25.9	313	407	1709.55	-1303
7.5	0.313	62.45	81.185	89.0	8.3	11.8	25.4	317	412	1768.50	-1356
7.75	0.323	63.23	82.199	90.1	8.2	11.5	24.9	321	417	1827.45	-1410
8	0.333	63.98	83.174	91.2	8.0	11.3	24.4	325	422	1886.40	-1464
8.25	0.344	64.73	84.149	92.3	7.8	11.1	23.9	329	427	1945.35	-1518
8.5	0.354	65.46	85.098	93.3	7.7	10.9	23.5	333	432	2004.30	-1572
8.75	0.365	66.17	86.021	94.3	7.6	10.7	23.1	336	437	2063.25	-1626
9	0.375	66.87	86.931	95.3	7.4	10.5	22.7	340	441	2122.20	-1681
9.25	0.385	67.56	87.828	96.3	7.3	10.3	22.3	343	446	2181.15	-1735
9.5	0.396	68.24	88.712	97.3	7.2	10.1	21.9	347	450	2240.10	-1790
9.75	0.406	68.9	89.57	98.2	7.1	10.0	21.5	350	455	2299.05	-1844
10	0.417	69.56	90.428	99.2	7.0	9.8	21.2	353	459	2358.00	-1899

Modified Rational Method

Length (m)	48	m
Area (ha)	0.463	Ha
Max Height	196.3	mAOD
Min Height	194.7	mAOD
DeltaH	1.6	
Slope (%)	3.27	
Te (mins)	9.00	mins
ARF	0.998	
SAAR	1181.000	mm
UCWI	127	mm
PIMP	100.0	%
SOIL	0.49	
Percentage Runoff PR	84.36	
DEEPSTOR	0.40	

Cv	0.84356	
Cr	1.3	
allowable outflow		
100 year	0.1009	m^3/s

Storage	RT years	Storage
	100 + 30% cc	62

Return Period: flood 100 + 30% cc years
Post Development: Rainfall 100 years

Development Area A1, A2 & A3 to Outfall 3

Rainfall Duration (hours)	Rainfall Duration (days)	Rainfall Depth (mm)	30% increase	Effective Depth (mm)	Rainfall Intensity (mm/hr)	FLOW (l/s)	FLOW (l/s/ha)	RUN-OFF		Allowable Outflow (m^3)	Difference (m^3)
								FLOW (m^3)	RAIN (m^3)		
0.25	0.010	23.2	30.16	33.1	92.8	131.0	282.9	118	153	90.81	62
0.5	0.021	31.21	40.573	44.5	62.4	88.1	190.3	159	206	181.62	24
0.75	0.031	36.72	47.736	52.3	49.0	69.1	149.3	187	242	272.43	-30
1	0.042	41.06	53.378	58.5	41.1	58.0	125.2	209	271	363.24	-92
1.25	0.052	44.7	58.11	63.7	35.8	50.5	109.0	227	295	454.05	-159
1.5	0.063	47.85	62.205	68.2	31.9	45.0	97.3	243	316	544.86	-229
1.75	0.073	50.67	65.871	72.2	29.0	40.9	88.3	257	334	635.67	-301
2	0.083	53.21	69.173	75.9	26.6	37.6	81.1	270	351	726.48	-375
2.25	0.094	55.54	72.202	79.2	24.7	34.8	75.3	282	367	817.29	-451
2.5	0.104	57.7	75.01	82.3	23.1	32.6	70.4	293	381	908.10	-527
2.75	0.115	59.71	77.623	85.1	21.7	30.6	66.2	303	394	998.91	-605
3	0.125	61.6	80.08	87.8	20.5	29.0	62.6	313	407	1089.72	-683
3.25	0.135	63.38	82.394	90.4	19.5	27.5	59.5	322	418	1180.53	-762
3.5	0.146	65.07	84.591	92.8	18.6	26.2	56.7	331	430	1271.34	-842
3.75	0.156	66.68	86.684	95.1	17.8	25.1	54.2	339	440	1362.15	-922
4	0.167	68.22	88.686	97.3	17.1	24.1	52.0	347	450	1452.96	-1003
4.25	0.177	69.69	90.597	99.4	16.4	23.1	50.0	354	460	1543.77	-1084
4.5	0.188	71.1	92.43	101.4	15.8	22.3	48.2	361	469	1634.58	-1165
4.75	0.198	72.46	94.198	103.3	15.3	21.5	46.5	368	478	1725.39	-1247
5	0.208	73.77	95.901	105.2	14.8	20.8	45.0	375	487	1816.20	-1329
5.25	0.219	75.04	97.552	107.0	14.3	20.2	43.6	381	495	1907.01	-1412
5.5	0.229	76.27	99.151	108.7	13.9	19.6	42.3	388	503	1997.82	-1494
5.75	0.240	77.45	100.685	110.4	13.5	19.0	41.1	394	511	2088.63	-1577
6	0.250	78.6	102.18	112.1	13.1	18.5	39.9	399	519	2179.44	-1661
6.25	0.260	79.72	103.636	113.7	12.8	18.0	38.9	405	526	2270.25	-1744
6.5	0.271	80.81	105.053	115.2	12.4	17.5	37.9	411	533	2361.06	-1828
6.75	0.281	81.87	106.431	116.7	12.1	17.1	37.0	416	540	2451.87	-1911
7	0.292	82.91	107.783	118.2	11.8	16.7	36.1	421	547	2542.68	-1995
7.25	0.302	83.92	109.096	119.6	11.6	16.3	35.3	426	554	2633.49	-2080
7.5	0.313	84.9	110.37	121.0	11.3	16.0	34.5	431	560	2724.30	-2164
7.75	0.323	85.86	111.618	122.4	11.1	15.6	33.8	436	567	2815.11	-2248
8	0.333	86.8	112.84	123.7	10.9	15.3	33.1	441	573	2905.92	-2333
8.25	0.344	87.72	114.036	125.1	10.6	15.0	32.4	446	579	2996.73	-2418
8.5	0.354	88.63	115.219	126.4	10.4	14.7	31.8	450	585	3087.54	-2503
8.75	0.365	89.51	116.363	127.6	10.2	14.4	31.2	455	591	3178.35	-2588
9	0.375	90.38	117.494	128.8	10.0	14.2	30.6	459	597	3269.16	-2673
9.25	0.385	91.23	118.599	130.1	9.9	13.9	30.1	464	602	3359.97	-2758
9.5	0.396	92.06	119.678	131.2	9.7	13.7	29.5	468	608	3450.78	-2843
9.75	0.406	92.88	120.744	132.4	9.5	13.4	29.0	472	613	3541.59	-2929
10	0.417	93.69	121.797	133.6	9.4	13.2	28.6	476	618	3632.40	-3014

Modified Rational Method

Length (m)	100	m
Area (ha)	0.215	Ha
Max Height	194.2	mAOD
Min Height	193.3	mAOD
DeltaH	0.9	
Slope (%)	0.95	
Te (mins)	13.92	mins
ARF	0.999	
SAAR	1181.000	mm
UCWI	127	mm
PIMP	100.0	%
SOIL	0.49	
Percentage Runoff PR	84.36	
DEEPSTOR	0.73	

Cv	0.84356	
Cr	1.3	
allowable outflow		
2 year	0.0059	m^3/s

m3

Storage	RT years	Storage
	2 + 30% cc	14

Return Period flood 2 + 30% cc years

Post Development Rainfall 2 years

Development Area B to Outfall 4

Rainfall Duration (hours)	Rainfall Duration (days)	Rainfall Depth (mm)	30% increase	Effective Depth (mm)	Rainfall Intensity (mm/hr)	FLOW (l/s)	FLOW (l/s/ha)	RUN-OFF		Allowable Outflow (m^3)	Difference (m^3)
								FLOW (m^3)	RAIN (m^3)		
0.25	0.010	5.43	7.059	7.7	21.7	14.2	66.2	13	17	5.31	11
0.5	0.021	7.9	10.27	11.3	15.8	10.4	48.2	19	24	10.62	14
0.75	0.031	9.73	12.649	13.9	13.0	8.5	39.6	23	30	15.93	14
1	0.042	11.24	14.612	16.0	11.2	7.4	34.3	27	34	21.24	13
1.25	0.052	12.54	16.302	17.9	10.0	6.6	30.6	30	38	26.55	12
1.5	0.063	13.71	17.823	19.5	9.1	6.0	27.9	32	42	31.86	10
1.75	0.073	14.76	19.188	21.0	8.4	5.5	25.7	35	45	37.17	8
2	0.083	15.74	20.462	22.4	7.9	5.2	24.0	37	48	42.48	6
2.25	0.094	16.65	21.645	23.7	7.4	4.9	22.6	39	51	47.79	3
2.5	0.104	17.5	22.75	24.9	7.0	4.6	21.3	41	54	53.10	1
2.75	0.115	18.31	23.803	26.1	6.7	4.4	20.3	43	56	58.41	-2
3	0.125	19.07	24.791	27.2	6.4	4.2	19.4	45	58	63.72	-5
3.25	0.135	19.8	25.74	28.2	6.1	4.0	18.6	47	61	69.03	-8
3.5	0.146	20.5	26.65	29.2	5.9	3.8	17.9	48	63	74.34	-12
3.75	0.156	21.17	27.521	30.2	5.6	3.7	17.2	50	65	79.65	-15
4	0.167	21.82	28.366	31.1	5.5	3.6	16.6	51	67	84.96	-18
4.25	0.177	22.44	29.172	32.0	5.3	3.5	16.1	53	69	90.27	-21
4.5	0.188	23.04	29.952	32.8	5.1	3.4	15.6	54	71	95.58	-25
4.75	0.198	23.63	30.719	33.7	5.0	3.3	15.2	56	72	100.89	-28
5	0.208	24.19	31.447	34.5	4.8	3.2	14.7	57	74	106.20	-32
5.25	0.219	24.74	32.162	35.3	4.7	3.1	14.4	58	76	111.51	-36
5.5	0.229	25.28	32.864	36.0	4.6	3.0	14.0	60	77	116.82	-39
5.75	0.240	25.8	33.54	36.8	4.5	2.9	13.7	61	79	122.13	-43
6	0.250	26.31	34.203	37.5	4.4	2.9	13.4	62	81	127.44	-47
6.25	0.260	26.81	34.853	38.2	4.3	2.8	13.1	63	82	132.75	-51
6.5	0.271	27.3	35.49	38.9	4.2	2.8	12.8	64	84	138.06	-54
6.75	0.281	27.77	36.101	39.6	4.1	2.7	12.5	66	85	143.37	-58
7	0.292	28.24	36.712	40.3	4.0	2.6	12.3	67	87	148.68	-62
7.25	0.302	28.69	37.297	40.9	4.0	2.6	12.1	68	88	153.99	-66
7.5	0.313	29.14	37.882	41.5	3.9	2.5	11.8	69	89	159.30	-70
7.75	0.323	29.58	38.454	42.2	3.8	2.5	11.6	70	91	164.61	-74
8	0.333	30.01	39.013	42.8	3.8	2.5	11.4	71	92	169.92	-78
8.25	0.344	30.44	39.572	43.4	3.7	2.4	11.2	72	93	175.23	-82
8.5	0.354	30.85	40.105	44.0	3.6	2.4	11.1	73	95	180.54	-86
8.75	0.365	31.26	40.638	44.6	3.6	2.3	10.9	74	96	185.85	-90
9	0.375	31.66	41.158	45.1	3.5	2.3	10.7	75	97	191.16	-94
9.25	0.385	32.06	41.678	45.7	3.5	2.3	10.6	76	98	196.47	-98
9.5	0.396	32.45	42.185	46.3	3.4	2.2	10.4	77	99	201.78	-102
9.75	0.406	32.84	42.692	46.8	3.4	2.2	10.3	77	101	207.09	-106
10	0.417	33.22	43.186	47.4	3.3	2.2	10.1	78	102	212.40	-111

Modified Rational Method

Length (m)	100	m
Area (ha)	0.215	Ha
Max Height	194.2	mAOD
Min Height	193.3	mAOD
DeltaH	0.9	
Slope (%)	0.95	
Te (mins)	13.92	mins
ARF	0.999	
SAAR	1181.000	mm
UCWI	127	mm
PIMP	100.0	%
SOIL	0.49	
Percentage Runoff PR	84.36	
DEEPSTOR	0.73	

Cv	0.84356	
Cr	1.3	
allowable outflow		
30 year	0.0172	m^3/s

m3

Storage	RT years	Storage
	30 + 30% cc	34

Return Period flood 30 + 30% cc years

Post Development Rainfall 30 years

Development Area B to Outfall 4

Rainfall Duration (hours)	Rainfall Duration (days)	Rainfall Depth (mm)	30% increase	Effective Depth (mm)	Rainfall Intensity (mm/hr)	FLOW (l/s)	FLOW (l/s/ha)	RUN-OFF		Allowable Outflow (m^3)	Difference (m^3)
								FLOW (m^3)	RAIN (m^3)		
0.25	0.010	15.29	19.877	21.8	61.2	40.1	186.5	36	47	15.48	31
0.5	0.021	21.04	27.352	30.0	42.1	27.6	128.3	50	64	30.96	34
0.75	0.031	25.08	32.604	35.8	33.4	21.9	101.9	59	77	46.44	30
1	0.042	28.3	36.79	40.3	28.3	18.5	86.3	67	87	61.92	25
1.25	0.052	31.03	40.339	44.2	24.8	16.3	75.7	73	95	77.40	18
1.5	0.063	33.42	43.446	47.6	22.3	14.6	67.9	79	102	92.88	10
1.75	0.073	35.56	46.228	50.7	20.3	13.3	61.9	84	109	108.36	1
2	0.083	37.5	48.75	53.5	18.8	12.3	57.2	88	115	123.84	-9
2.25	0.094	39.3	51.09	56.0	17.5	11.4	53.2	93	120	139.32	-19
2.5	0.104	40.96	53.248	58.4	16.4	10.7	49.9	97	126	154.80	-29
2.75	0.115	42.52	55.276	60.6	15.5	10.1	47.1	100	130	170.28	-40
3	0.125	43.99	57.187	62.7	14.7	9.6	44.7	104	135	185.76	-51
3.25	0.135	45.38	58.994	64.7	14.0	9.2	42.6	107	139	201.24	-62
3.5	0.146	46.7	60.71	66.6	13.3	8.7	40.7	110	143	216.72	-74
3.75	0.156	47.96	62.348	68.4	12.8	8.4	39.0	113	147	232.20	-85
4	0.167	49.17	63.921	70.1	12.3	8.1	37.5	116	151	247.68	-97
4.25	0.177	50.33	65.429	71.8	11.8	7.8	36.1	119	154	263.16	-109
4.5	0.188	51.45	66.885	73.3	11.4	7.5	34.9	121	158	278.64	-121
4.75	0.198	52.52	68.276	74.9	11.1	7.2	33.7	124	161	294.12	-133
5	0.208	53.56	69.628	76.4	10.7	7.0	32.7	126	164	309.60	-145
5.25	0.219	54.57	70.941	77.8	10.4	6.8	31.7	129	167	325.08	-158
5.5	0.229	55.54	72.202	79.2	10.1	6.6	30.8	131	170	340.56	-170
5.75	0.240	56.49	73.437	80.5	9.8	6.4	30.0	133	173	356.04	-183
6	0.250	57.4	74.62	81.8	9.6	6.3	29.2	135	176	371.52	-196
6.25	0.260	58.3	75.79	83.1	9.3	6.1	28.4	138	179	387.00	-208
6.5	0.271	59.17	76.921	84.4	9.1	6.0	27.8	140	181	402.48	-221
6.75	0.281	60.02	78.026	85.6	8.9	5.8	27.1	142	184	417.96	-234
7	0.292	60.85	79.105	86.7	8.7	5.7	26.5	144	187	433.44	-247
7.25	0.302	61.66	80.158	87.9	8.5	5.6	25.9	145	189	448.92	-260
7.5	0.313	62.45	81.185	89.0	8.3	5.5	25.4	147	191	464.40	-273
7.75	0.323	63.23	82.199	90.1	8.2	5.3	24.9	149	194	479.88	-286
8	0.333	63.98	83.174	91.2	8.0	5.2	24.4	151	196	495.36	-299
8.25	0.344	64.73	84.149	92.3	7.8	5.1	23.9	153	198	510.84	-312
8.5	0.354	65.46	85.098	93.3	7.7	5.0	23.5	154	201	526.32	-326
8.75	0.365	66.17	86.021	94.3	7.6	5.0	23.1	156	203	541.80	-339
9	0.375	66.87	86.931	95.3	7.4	4.9	22.7	158	205	557.28	-352
9.25	0.385	67.56	87.828	96.3	7.3	4.8	22.3	159	207	572.76	-366
9.5	0.396	68.24	88.712	97.3	7.2	4.7	21.9	161	209	588.24	-379
9.75	0.406	68.9	89.57	98.2	7.1	4.6	21.5	163	211	603.72	-393
10	0.417	69.56	90.428	99.2	7.0	4.6	21.2	164	213	619.20	-406

Modified Rational Method

Length (m)	100	m
Area (ha)	0.215	Ha
Max Height	194.2	mAOD
Min Height	193.3	mAOD
DeltaH	0.9	
Slope (%)	0.95	
Te (mins)	13.92	mins
ARF	0.999	
SAAR	1181.000	mm
UCWI	127	mm
PIMP	100.0	%
SOIL	0.49	
Percentage Runoff PR	84.36	
DEEPSTOR	0.73	

Cv	0.84356	
Cr	1.3	
allowable outflow		
100 year	0.0263	m^3/s

Storage	RT years	Storage
	100 + 30% cc	48

Return Period: flood — 100 + 30% cc years
Post Development: Rainfall — 100 years

Development Area B to Outfall 4

Rainfall Duration (hours)	Rainfall Duration (days)	Rainfall Depth (mm)	30% increase	Effective Depth (mm)	Rainfall Intensity (mm/hr)	FLOW (l/s)	FLOW (l/s/ha)	RUN-OFF		Allowable Outflow (m^3)	Difference (m^3)
								FLOW (m^3)	RAIN (m^3)		
0.25	0.010	23.2	30.16	33.1	92.8	60.8	282.9	55	71	23.67	47
0.5	0.021	31.21	40.573	44.5	62.4	40.9	190.3	74	96	47.34	48
0.75	0.031	36.72	47.736	52.3	49.0	32.1	149.3	87	113	71.01	42
1	0.042	41.06	53.378	58.5	41.1	26.9	125.2	97	126	94.68	31
1.25	0.052	44.7	58.11	63.7	35.8	23.4	109.0	105	137	118.35	19
1.5	0.063	47.85	62.205	68.2	31.9	20.9	97.3	113	147	142.02	5
1.75	0.073	50.67	65.871	72.2	29.0	19.0	88.3	120	155	165.69	-10
2	0.083	53.21	69.173	75.9	26.6	17.4	81.1	126	163	189.36	-26
2.25	0.094	55.54	72.202	79.2	24.7	16.2	75.3	131	170	213.03	-43
2.5	0.104	57.7	75.01	82.3	23.1	15.1	70.4	136	177	236.70	-60
2.75	0.115	59.71	77.623	85.1	21.7	14.2	66.2	141	183	260.37	-77
3	0.125	61.6	80.08	87.8	20.5	13.5	62.6	145	189	284.04	-95
3.25	0.135	63.38	82.394	90.4	19.5	12.8	59.5	150	194	307.71	-113
3.5	0.146	65.07	84.591	92.8	18.6	12.2	56.7	154	199	331.38	-132
3.75	0.156	66.68	86.684	95.1	17.8	11.7	54.2	157	204	355.05	-151
4	0.167	68.22	88.686	97.3	17.1	11.2	52.0	161	209	378.72	-170
4.25	0.177	69.69	90.597	99.4	16.4	10.7	50.0	164	214	402.39	-189
4.5	0.188	71.1	92.43	101.4	15.8	10.4	48.2	168	218	426.06	-208
4.75	0.198	72.46	94.198	103.3	15.3	10.0	46.5	171	222	449.73	-228
5	0.208	73.77	95.901	105.2	14.8	9.7	45.0	174	226	473.40	-247
5.25	0.219	75.04	97.552	107.0	14.3	9.4	43.6	177	230	497.07	-267
5.5	0.229	76.27	99.151	108.7	13.9	9.1	42.3	180	234	520.74	-287
5.75	0.240	77.45	100.685	110.4	13.5	8.8	41.1	183	237	544.41	-307
6	0.250	78.6	102.18	112.1	13.1	8.6	39.9	185	241	568.08	-327
6.25	0.260	79.72	103.636	113.7	12.8	8.4	38.9	188	244	591.75	-347
6.5	0.271	80.81	105.053	115.2	12.4	8.1	37.9	191	248	615.42	-368
6.75	0.281	81.87	106.431	116.7	12.1	7.9	37.0	193	251	639.09	-388
7	0.292	82.91	107.783	118.2	11.8	7.8	36.1	196	254	662.76	-409
7.25	0.302	83.92	109.096	119.6	11.6	7.6	35.3	198	257	686.43	-429
7.5	0.313	84.9	110.37	121.0	11.3	7.4	34.5	200	260	710.10	-450
7.75	0.323	85.86	111.618	122.4	11.1	7.3	33.8	203	263	733.77	-471
8	0.333	86.8	112.84	123.7	10.9	7.1	33.1	205	266	757.44	-491
8.25	0.344	87.72	114.036	125.1	10.6	7.0	32.4	207	269	781.11	-512
8.5	0.354	88.63	115.219	126.4	10.4	6.8	31.8	209	272	804.78	-533
8.75	0.365	89.51	116.363	127.6	10.2	6.7	31.2	211	274	828.45	-554
9	0.375	90.38	117.494	128.8	10.0	6.6	30.6	213	277	852.12	-575
9.25	0.385	91.23	118.599	130.1	9.9	6.5	30.1	215	280	875.79	-596
9.5	0.396	92.06	119.678	131.2	9.7	6.4	29.5	217	282	899.46	-617
9.75	0.406	92.88	120.744	132.4	9.5	6.2	29.0	219	285	923.13	-638
10	0.417	93.69	121.797	133.6	9.4	6.1	28.6	221	287	946.80	-660