

DRAINAGE STRATEGY FOR HOUSING DEVELOPMENT AT OAKHILL

1. INTRODUCTION

- 1.1 This drainage strategy has been produced on behalf of Precious Ideals in connection with their planning application for the construction of 8No new houses at Oakhill school. The strategy will deal with both the storm water and foul drainage of the site.
- 1.2 The plan used is the site layout 0010

2. BASE INFORMATION

Available information

- 2.1 A topographical survey of the site has been carried out and is included as part of the planning application

Site geology

- 2.2 The site lying in a region characterised by slowly permeable seasonally wet clay soil, which are not conducive to infiltration.

Existing watercourses and features

- 2.3 There is an existing water course running through the site, which is to be used for final discharge of the storm water runoff.

United Utilities

- 2.4 A new adoptable sewer is proposed to be built as shown on the proposed site layout.

Private drainage

- 2.7 There is no existing private drainage on site.

3. DRAINAGE STRATEGY

- 3.1 A layout of the proposed drainage is shown on the layout plan

Surface water drainage

- 3.2 Guidance for the disposal of surface water from a development site is for soakaways to be considered as the primary solution. If this is not practical, discharge to a waterbody or watercourse is to be considered as the next available alternative. Only if neither of these options is available, and other sustainable drainage methods not possible, should the use of the public sewerage system be considered.
- 3.3 The soils are not conducive to infiltration.
- 3.4 Surface water from the existing site is collected by an onsite private surface water drainage system, via drainage gully's etc. We have used a run off rate of 3.5 litres per second to equate to greenfield run off.

- 3.5 The surface water drainage system has been calculated for each individual plot and for the roadway separately. Each plot will be provided with an attenuation tank of the size required in the enclosed calculation, the tanks to plots 1-7 will be formed using crates buried in the rear gardens, to plot 8 the attenuation will be formed using a pond. For the roadway the attenuation will be formed using large diameter pipes buried under the roadway.
- 3.6 Attenuation will be provided for rainfall events up to the 100 year critical rain storm plus 40% on stored volumes. The additional 40% is to allow for climate change and has been included in the surface water volume. As such there will be no change to the flood risk from this development
- 3.7 The proposal for the foul drainage is to construct a storage tank to contain 24 hours of waste and a double set of pumps under the turning circle in the roadway, the road at this point is not to be adopted. The sewage will be pumped to the adopted manhole along the roadway to the edge of the site and discharge into the public sewer. The pumps, storage tanks and private pipework will be maintained by the management company responsible for the site.

4. SUMMARY AND CONCLUSIONS

- 4.1 The nature of the local geology means that infiltration of surface water runoff back into the ground is not feasible on this site, the location of the water course means this can be utilised for the surface water drainage.
- 4.2 The site does not lend itself to a soakaway solution and the scheme as designed incorporates the principles of SUDS.

AJH Associates 21 Deanfield Court, Clitheroe

Oak hill housing car parking
and roads

Revision

Job No:

3440

Page:

C/01

Section: SUDS drainage scheme attenuation tank size

Prepared By:

TH

Date:

30/11/2018

GENERAL DATA

site location: **England and Wales**

60 min rainfall depth of 5 year return period 'R' [mm] = **20**

M5-60 to M5-2d rainfall ratio 'r' = **0.50**

proposed discharge rate 'v₁' [litre/s] = **3.50**

proposed discharge rate 'v₂' [litre/s] = **10.00**

allowance for climate change: **40%**

SUMMARY OF CALCULATIONS

required storage volume for discharge rate 'v₁' = **201.20** m³

required storage volume for discharge rate 'v₂' = **173.38** m³

AREA DATA

impermeability
[%]

effective area
[m²]

impermeable area 'A₁' [m²] = **4046**

100.00

4046

landscaping and/or green roof area 'A₂' [m²] = **287**

80.00

229.6

other partially permeable area 'A₃' [m²] = **0**

20.00

0

AREA DRAINED TO ATTENUATION TANK = **4275.6 m²**

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v₁

rainfall duration [min]	rainfall factor Z1	M5-D rainfalls [mm]	M10-D			M20-D			M30-D			outflow from attenuation tank [m ³]	required storage [m ³]
			Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]		
5	0.39	7.80	1.21	13.18	56.34	1.39	15.16	64.81	1.46	15.97	68.27	1.05	67.22
10	0.54	10.80	1.22	18.49	79.08	1.41	21.39	91.46	1.50	22.62	96.70	2.10	94.60
15	0.65	13.00	1.23	22.42	95.87	1.43	25.99	111.12	1.51	27.52	117.66	3.15	114.51
30	0.82	16.40	1.24	28.47	121.73	1.44	33.13	141.64	1.53	35.16	150.33	6.30	144.03
60	1.00	20.00	1.24	34.72	148.45	1.45	40.60	173.59	1.54	43.21	184.76	12.60	172.16
120	1.19	23.80	1.24	41.32	176.65	1.44	48.06	205.49	1.54	51.17	218.79	25.20	193.59
240	1.38	27.60	1.23	47.51	203.14	1.43	55.24	236.18	1.52	58.85	251.60	50.40	201.20
360	1.51	30.20	1.22	51.56	220.43	1.42	60.00	256.55	1.51	63.94	273.40	75.60	197.80
600	1.68	33.60	1.21	56.88	243.20	1.41	66.12	282.70	1.50	70.40	300.99	126.00	174.99
1440	2.03	40.60	1.19	67.57	288.91	1.38	78.30	334.79	1.46	83.21	355.76	302.40	53.36

* Z2 is a growth factor from M5 rainfalls

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v₂

rainfall duration [min]	rainfall factor Z1	M5-D rainfalls [mm]	M10-D			M30-D			M50-D			outflow from attenuation tank [m ³]	required storage [m ³]
			Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]		
5	0.39	7.80	1.21	13.18	56.34	1.46	15.97	68.27	1.61	17.59	75.19	3.00	72.19
10	0.54	10.80	1.22	18.49	79.08	1.50	22.62	96.70	1.66	25.07	107.18	6.00	101.18
15	0.65	13.00	1.23	22.42	95.87	1.51	27.52	117.66	1.68	30.58	130.73	9.00	121.73
30	0.82	16.40	1.24	28.47	121.73	1.53	35.16	150.33	1.71	39.22	167.71	18.00	149.71
60	1.00	20.00	1.24	34.72	148.45	1.54	43.21	184.76	1.73	48.44	207.11	36.00	171.11
120	1.19	23.80	1.24	41.32	176.65	1.54	51.17	218.79	1.72	57.39	245.38	72.00	173.38
240	1.38	27.60	1.23	47.51	203.14	1.52	58.85	251.60	1.71	66.06	282.44	144.00	138.44
360	1.51	30.20	1.22	51.56	220.43	1.51	63.94	273.40	1.70	71.83	307.10	216.00	91.10
600	1.68	33.60	1.21	56.88	243.20	1.50	70.40	300.99	1.68	78.95	337.57	360.00	0.00
1440	2.03	40.60	1.19	67.57	288.91	1.46	83.21	355.76	1.64	93.01	397.69	864.00	0.00

* Z2 is a growth factor from M5 rainfalls

AJH Associates 21 Deanfield Court, Clitheroe

Oak hill housing plot 1

Revision

Job No:

3440

Page:

C/01

Section: **SUDS drainage scheme attenuation tank size**

Prepared By:

TH

Date:

30/11/2018

GENERAL DATA

site location: **England and Wales**

60 min rainfall depth of 5 year return period 'R' [mm] = **20**

M5-60 to M5-2d rainfall ratio 'r' = **0.40**

proposed discharge rate 'v₁' [litre/s] = **3.50**

proposed discharge rate 'v₂' [litre/s] = **10.00**

allowance for climate change: **40%**

SUMMARY OF CALCULATIONS

required storage volume for discharge rate 'v₁' = **35.38** m³

required storage volume for discharge rate 'v₂' = **24.61** m³

AREA DATA

impermeability
[%]

effective area
[m²]

impermeable area 'A₁' [m²] = **349**

100.00

349

landscaping and/or green roof area 'A₂' [m²] = **881**

80.00

704.8

other partially permeable area 'A₃' [m²] = **282**

20.00

56.4

AREA DRAINED TO ATTENUATION TANK = 1110.2 m²

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v₁

rainfall duration [min]	rainfall factor Z1	M5-D rainfalls [mm]	M10-D			M20-D			M30-D			outflow from attenuation tank [m ³]	required storage [m ³]
			Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]		
5	0.37	7.47	1.20	12.59	13.98	1.38	14.47	16.07	1.46	15.24	16.92	1.05	15.87
10	0.52	10.47	1.22	17.90	19.88	1.41	20.70	22.98	1.49	21.88	24.30	2.10	22.20
15	0.63	12.67	1.23	21.82	24.23	1.43	25.29	28.07	1.51	26.77	29.72	3.15	26.57
30	0.80	16.07	1.24	27.89	30.97	1.44	32.44	36.01	1.53	34.42	38.21	6.30	31.91
60	1.00	20.00	1.24	34.72	38.55	1.45	40.60	45.07	1.54	43.21	47.98	12.60	35.38
120	1.21	24.13	1.24	41.90	46.51	1.44	48.71	54.08	1.54	51.86	57.58	25.20	32.38
240	1.45	28.93	1.22	49.59	55.06	1.42	57.69	64.05	1.52	61.47	68.25	50.40	17.85
360	1.60	32.07	1.21	54.49	60.50	1.41	63.38	70.36	1.50	67.51	74.94	75.60	0.00
600	1.79	35.87	1.20	60.38	67.03	1.40	70.12	77.85	1.49	74.61	82.84	128.00	0.00
1440	2.24	44.80	1.18	74.03	82.19	1.36	85.35	94.75	1.44	90.58	100.57	302.40	0.00

* Z2 is a growth factor from M5 rainfalls

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v₂

rainfall duration [min]	rainfall factor Z1	M5-D rainfalls [mm]	M10-D			M30-D			M50-D			outflow from attenuation tank [m ³]	required storage [m ³]
			Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]		
5	0.37	7.47	1.20	12.59	13.98	1.46	15.24	16.92	1.60	16.77	18.62	3.00	15.62
10	0.52	10.47	1.22	17.90	19.88	1.49	21.88	24.30	1.65	24.25	26.92	6.00	20.92
15	0.63	12.67	1.23	21.82	24.23	1.51	26.77	29.72	1.68	29.73	33.01	9.00	24.01
30	0.80	16.07	1.24	27.89	30.97	1.53	34.42	38.21	1.71	38.38	42.61	18.00	24.61
60	1.00	20.00	1.24	34.72	38.55	1.54	43.21	47.98	1.73	48.44	53.78	36.00	17.78
120	1.21	24.13	1.24	41.90	46.51	1.54	51.86	57.58	1.72	58.17	64.58	72.00	0.00
240	1.45	28.93	1.22	49.59	55.06	1.52	61.47	68.25	1.70	69.03	76.64	144.00	0.00
360	1.60	32.07	1.21	54.49	60.50	1.50	67.51	74.94	1.69	75.76	84.11	216.00	0.00
600	1.79	35.87	1.20	60.38	67.03	1.49	74.61	82.84	1.66	83.60	92.81	360.00	0.00
1440	2.24	44.80	1.18	74.03	82.19	1.44	90.58	100.57	1.61	101.05	112.19	864.00	0.00

* Z2 is a growth factor from M5 rainfalls

AJH Associates 21 Deanfield Court, Clitheroe

Oak hill housing plot 2

Revision

Job No:

3440

Page:

C/01

Section: SUDS drainage scheme attenuation tank size

Prepared By:

TH

Date:

30/11/2018

GENERAL DATA

site location: **England and Wales**

60 min rainfall depth of 5 year return period 'R' [mm] = **20**

M5-60 to M5-2d rainfall ratio 'r' = **0.50**

proposed discharge rate 'v₁' [litre/s] = **3.50**

proposed discharge rate 'v₂' [litre/s] = **10.00**

allowance for climate change: **40%**

SUMMARY OF CALCULATIONS

required storage volume for discharge rate 'v₁' = **23.61** m³

required storage volume for discharge rate 'v₂' = **16.62** m³

AREA DATA

impermeability
[%]

effective area
[m²]

impermeable area 'A₁' [m²] = **349**

100.00

349

landscaping and/or green roof area 'A₂' [m²] = **550**

80.00

440

other partially permeable area 'A₃' [m²] = **245**

20.00

49

AREA DRAINED TO ATTENUATION TANK = **838 m²**

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v₁

rainfall duration [min]	rainfall factor Z1	M5-D rainfalls [mm]	M10-D			M20-D			M30-D			outflow from attenuation tank [m ³]	required storage [m ³]
			Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]		
5	0.39	7.80	1.21	13.18	11.04	1.39	15.16	12.70	1.46	15.97	13.38	1.05	12.33
10	0.54	10.80	1.22	18.49	15.50	1.41	21.39	17.93	1.50	22.82	18.95	2.10	16.85
15	0.65	13.00	1.23	22.42	18.79	1.43	25.99	21.78	1.51	27.52	23.06	3.15	19.91
30	0.82	16.40	1.24	28.47	23.86	1.44	33.13	27.76	1.53	35.16	29.46	6.30	23.16
60	1.00	20.00	1.24	34.72	29.10	1.45	40.60	34.02	1.54	43.21	36.21	12.60	23.61
120	1.19	23.80	1.24	41.32	34.62	1.44	48.06	40.27	1.54	51.17	42.88	25.20	17.68
240	1.38	27.60	1.23	47.51	39.81	1.43	55.24	46.29	1.52	58.85	49.31	50.40	0.00
360	1.51	30.20	1.22	51.56	43.20	1.42	60.00	50.28	1.51	63.94	53.59	75.60	0.00
600	1.68	33.60	1.21	56.88	47.67	1.41	66.12	55.41	1.50	70.40	58.99	126.00	0.00
1440	2.03	40.60	1.19	67.57	56.62	1.38	78.30	65.62	1.46	83.21	69.73	302.40	0.00

* Z2 is a growth factor from M5 rainfalls

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v₂

rainfall duration [min]	rainfall factor Z1	M5-D rainfalls [mm]	M10-D			M30-D			M50-D			outflow from attenuation tank [m ³]	required storage [m ³]
			Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]		
5	0.39	7.80	1.21	13.18	11.04	1.46	15.97	13.38	1.61	17.59	14.74	3.00	11.74
10	0.54	10.80	1.22	18.49	15.50	1.50	22.62	18.95	1.66	25.07	21.01	6.00	15.01
15	0.65	13.00	1.23	22.42	18.79	1.51	27.52	23.06	1.68	30.58	25.62	9.00	16.62
30	0.82	16.40	1.24	28.47	23.86	1.53	35.16	29.46	1.71	39.22	32.87	18.00	14.87
60	1.00	20.00	1.24	34.72	29.10	1.54	43.21	36.21	1.73	48.44	40.59	36.00	4.59
120	1.19	23.80	1.24	41.32	34.62	1.54	51.17	42.88	1.72	57.39	48.09	72.00	0.00
240	1.38	27.60	1.23	47.51	39.81	1.52	58.85	49.31	1.71	66.06	55.36	144.00	0.00
360	1.51	30.20	1.22	51.56	43.20	1.51	63.94	53.59	1.70	71.83	60.19	216.00	0.00
600	1.68	33.60	1.21	56.88	47.67	1.50	70.40	58.99	1.68	78.95	66.16	360.00	0.00
1440	2.03	40.60	1.19	67.57	56.62	1.46	83.21	69.73	1.64	93.01	77.94	864.00	0.00

* Z2 is a growth factor from M5 rainfalls

AJH Associates 21 Deanfield Court, Clitheroe

Oak hill housing plot 3

Revision

Job No:

3440

Page:

C/01

Section: SUDS drainage scheme attenuation tank size

Prepared By:

TH

Date:

30/11/2018

GENERAL DATA

site location: **England and Wales**

60 min rainfall depth of 5 year return period 'R' [mm] = **20**

M5-60 to M5-2d rainfall ratio 'r' = **0.50**

proposed discharge rate 'v₁' [litre/s] = **3.50**

proposed discharge rate 'v₂' [litre/s] = **10.00**

allowance for climate change: **40%**

SUMMARY OF CALCULATIONS

required storage volume for discharge rate 'v₁' = **28.45** m³

required storage volume for discharge rate 'v₂' = **20.05** m³

AREA DATA

impermeability [%] effective area [m²]

impermeable area 'A₁' [m²] = **349** 100.00 349

landscaping and/or green roof area 'A₂' [m²] = **676** 80.00 540.8

other partially permeable area 'A₃' [m²] = **301** 20.00 60.2

AREA DRAINED TO ATTENUATION TANK = **950 m²**

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v₁

rainfall duration [min]	rainfall factor Z1	M5-D rainfalls [mm]	M10-D			M20-D			M30-D			outflow from attenuation tank [m ³]	required storage [m ³]
			Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]		
5	0.39	7.80	1.21	13.18	12.52	1.39	15.16	14.40	1.46	15.97	15.17	1.05	14.12
10	0.54	10.80	1.22	18.49	17.57	1.41	21.39	20.32	1.50	22.62	21.49	2.10	19.39
15	0.65	13.00	1.23	22.42	21.30	1.43	25.99	24.69	1.51	27.52	26.14	3.15	22.99
30	0.82	16.40	1.24	28.47	27.05	1.44	33.13	31.47	1.53	35.16	33.40	6.30	27.10
60	1.00	20.00	1.24	34.72	32.98	1.45	40.60	38.57	1.54	43.21	41.05	12.60	28.45
120	1.19	23.80	1.24	41.32	39.25	1.44	48.06	45.66	1.54	51.17	48.61	25.20	23.41
240	1.38	27.60	1.23	47.51	45.14	1.43	55.24	52.48	1.52	58.85	55.90	50.40	5.50
360	1.51	30.20	1.22	51.56	48.98	1.42	60.00	57.00	1.51	63.94	60.75	75.60	0.00
600	1.68	33.60	1.21	56.88	54.04	1.41	66.12	62.81	1.50	70.40	66.88	126.00	0.00
1440	2.03	40.60	1.19	67.57	64.19	1.38	78.30	74.39	1.46	83.21	79.05	302.40	0.00

* Z2 is a growth factor from M5 rainfalls

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v₂

rainfall duration [min]	rainfall factor Z1	M5-D rainfalls [mm]	M10-D			M30-D			M50-D			outflow from attenuation tank [m ³]	required storage [m ³]
			Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]		
5	0.39	7.80	1.21	13.18	12.52	1.46	15.97	15.17	1.61	17.59	16.71	3.00	13.71
10	0.54	10.80	1.22	18.49	17.57	1.50	22.62	21.49	1.66	25.07	23.82	6.00	17.82
15	0.65	13.00	1.23	22.42	21.30	1.51	27.52	26.14	1.68	30.58	29.05	9.00	20.05
30	0.82	16.40	1.24	28.47	27.05	1.53	35.16	33.40	1.71	39.22	37.26	18.00	19.26
60	1.00	20.00	1.24	34.72	32.98	1.54	43.21	41.05	1.73	48.44	46.02	36.00	10.02
120	1.19	23.80	1.24	41.32	39.25	1.54	51.17	48.61	1.72	57.39	54.52	72.00	0.00
240	1.38	27.60	1.23	47.51	45.14	1.52	58.85	55.90	1.71	66.06	62.76	144.00	0.00
360	1.51	30.20	1.22	51.56	48.98	1.51	63.94	60.75	1.70	71.83	68.23	216.00	0.00
600	1.68	33.60	1.21	56.88	54.04	1.50	70.40	66.88	1.68	78.95	75.00	360.00	0.00
1440	2.03	40.60	1.19	67.57	64.19	1.46	83.21	79.05	1.64	93.01	88.36	864.00	0.00

* Z2 is a growth factor from M5 rainfalls

AJH Associates 21 Deanfield Court, Clitheroe

Oak hill housing plot 4

Revision

Job No:

3440

Page:

C/01

Section: SUDS drainage scheme attenuation tank size

Prepared By:

TH

Date:

30/11/2018

GENERAL DATA

site location: **England and Wales**

60 min rainfall depth of 5 year return period 'R' [mm] = **20**

M5-60 to M5-2d rainfall ratio 'r' = **0.50**

proposed discharge rate 'v₁' [litre/s] = **3.50**

proposed discharge rate 'v₂' [litre/s] = **10.00**

allowance for climate change: **40%**

SUMMARY OF CALCULATIONS

required storage volume for discharge rate 'v₁' = **51.54** m³

required storage volume for discharge rate 'v₂' = **40.22** m³

AREA DATA

impermeability
[%]

effective area
[m²]

impermeable area 'A₁' [m²] = **349**

100.00

349

landscaping and/or green roof area 'A₂' [m²] = **1341**

80.00

1072.8

other partially permeable area 'A₃' [m²] = **312**

20.00

62.4

AREA DRAINED TO ATTENUATION TANK = **1484.2 m²**

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v₁

rainfall duration [min]	rainfall factor Z1	M5-D rainfalls [mm]	M10-D			M20-D			M30-D			outflow from attenuation tank [m ³]	required storage [m ³]
			Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]		
5	0.39	7.80	1.21	13.18	19.56	1.39	15.16	22.50	1.46	15.97	23.70	1.05	22.65
10	0.54	10.80	1.22	18.49	27.45	1.41	21.39	31.75	1.50	22.62	33.57	2.10	31.47
15	0.65	13.00	1.23	22.42	33.28	1.43	25.99	38.57	1.51	27.52	40.84	3.15	37.69
30	0.82	16.40	1.24	28.47	42.26	1.44	33.13	49.17	1.53	35.16	52.18	6.30	45.88
60	1.00	20.00	1.24	34.72	51.53	1.45	40.60	60.26	1.54	43.21	64.14	12.60	51.54
120	1.19	23.80	1.24	41.32	61.32	1.44	48.06	71.33	1.54	51.17	75.95	25.20	50.75
240	1.38	27.60	1.23	47.51	70.52	1.43	55.24	81.99	1.52	58.85	87.34	50.40	36.94
360	1.51	30.20	1.22	51.56	76.52	1.42	60.00	89.06	1.51	63.94	94.91	75.60	19.31
600	1.68	33.60	1.21	56.88	84.42	1.41	66.12	98.13	1.50	70.40	104.48	126.00	0.00
1440	2.03	40.60	1.19	67.57	100.29	1.38	78.30	116.22	1.46	83.21	123.49	302.40	0.00

* Z2 is a growth factor from M5 rainfalls

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v₂

rainfall duration [min]	rainfall factor Z1	M5-D rainfalls [mm]	M10-D			M30-D			M50-D			outflow from attenuation tank [m ³]	required storage [m ³]
			Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]	Z2	rainfalls [mm]	inflow [m ³]		
5	0.39	7.80	1.21	13.18	19.56	1.46	15.97	23.70	1.61	17.59	26.10	3.00	23.10
10	0.54	10.80	1.22	18.49	27.45	1.50	22.62	33.57	1.66	25.07	37.21	6.00	31.21
15	0.65	13.00	1.23	22.42	33.28	1.51	27.52	40.84	1.68	30.58	45.38	9.00	36.38
30	0.82	16.40	1.24	28.47	42.26	1.53	35.16	52.18	1.71	39.22	58.22	18.00	40.22
60	1.00	20.00	1.24	34.72	51.53	1.54	43.21	64.14	1.73	48.44	71.89	36.00	35.89
120	1.19	23.80	1.24	41.32	61.32	1.54	51.17	75.95	1.72	57.39	85.18	72.00	13.18
240	1.38	27.60	1.23	47.51	70.52	1.52	58.85	87.34	1.71	66.06	98.04	144.00	0.00
360	1.51	30.20	1.22	51.56	76.52	1.51	63.94	94.91	1.70	71.83	106.60	216.00	0.00
600	1.68	33.60	1.21	56.88	84.42	1.50	70.40	104.48	1.68	78.95	117.18	360.00	0.00
1440	2.03	40.60	1.19	67.57	100.29	1.46	83.21	123.49	1.64	93.01	138.05	864.00	0.00

* Z2 is a growth factor from M5 rainfalls