TEICNIUIL-PRIORY CONSULTING ENGINEERS Ltd

Calculation Sheets

Project: Proposed Housing Development at Ardshanvooley, Park Rd, Killarney

Client: Wrightwood Development Ltd

ENGINEER: Matt Clarke Bsc(hons) MSc C. Build E FCABE MIEI
Chartered Building Engineer
Teicniuil-Priory Consulting Engineers Ltd

Contents

Met Eireann – Return Period Rainfall Depths

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 96545, Northing: 89651, Killarney

DURATION	Interval 6months	Interval 1year	Years 2	3	4	5	10	20	30	50	75	100	150	200	250	500
5 mins	3.3	4.3	4.8	5.6	6.1	6.4	7.6	8.9	9.7	10.9	11.8	12.6	13.7	14.6	15.3	N/A
10 mins	4.6	6.0	6.7	7.8	8.5	9.0	10.6	12.4	13.6	15.2	16.5	17.5	19.1	20.3	21.3	N/A
15 mins	5.4	7.1	7.9	9.1	10.0	10.6	12.5	14.6	16.0	17.8	19.4	20.6	22.5	23.9	25.0	N/A
30 mins	7.5	9.6	10.7	12.3	13.4	14.1	16.6	19.3	21.0	23.3	25.3	26.8	29.0	30.7	32.1	N/A
1 hours	10.3	13.1	14.6	16.6	17.9	18.9	22.1	25.4	27.5	30.4	32.8	34.7	37.5	39.6	41.3	N/A
2 hours	14.2	17.9	19.8	22.4	24.1	25.3	29.3	33.5	36.1	39.7	42.7	45.0	48.4	51.0	53.1	N/A
3 hours	17.2	21.5	23.6	26.6	28.6	30.0	34.6	39.4	42.4	46.4	49.8	52.4	56.3	59.2	61.5	N/A
4 hours	19.6	24.4	26.8	30.1	32.3	33.9	38.9	44.1	47.4	51.8	55.6	58.4	62.6	65.8	68.3	N/A
6 hours	23.7	29.3	32.0	35.9	38.4	40.2	45.9	51.9	55.6	60.6	64.9	68.0	72.7	76.3	79.1	N/A
9 hours	28.7	35.1	38.3	42.7	45.6	47.7	54.2	61.0	65.2	70.9	75.7	79.2	84.5	88.5	91.7	N/A
12 hours	32.8	40.0	43.5	48.4	51.5	53.8	61.0	68.4	73.1	79.2	84.4	88.3	94.0	98.3	101.8	N/A
18 hours	39.6	47.9	52.0	57.6	61.2	63.9	72.0	80.5	85.7	92.6	98.5	102.8	109.3	114.1	117.9	N/A
24 hours	45.3	54.5	59.0	65.2	69.2	72.1	81.1	90.3	96.0	103.5	109.9	114.6	121.6	126.8	130.9	144.8
2 days	59.0	70.2	75.5	82.9	87.6	91.0	101.6	112.3	118.9	127.7	134.9	140.4	148.3	154.2	158.9	174.6
3 days	70.7	83.6	89.7	98.1	103.3	107.3	119.1	131.2	138.6	148.3	156.4	162.4	171.2	177.7	182.9	200.1
4 days	81.5	95.7	102.5	111.8	117.6	121.9	135.0	148.2	156.3	166.9	175.8	182.3	191.9	199.0	204.6	223.2
6 days	101.1	118.0	125.9	136.8	143.6	148.7	163.8	179.1	188.4	200.6	210.8	218.3	229.2	237.3	243.7	264.9
8 days	119.3	138.5	147.5	159.8	167.5	173.2	190.2	207.4	217.8	231.4	242.7	251.1	263.2	272.2	279.3	302.7
10 days	136.6	158.0	167.9	181.6	190.1	196.3	215.1	234.0	245.4	260.4	272.7	281.8	295.1	304.9	312.7	338.1
12 days	153.3	176.6	187.6	202.4	211.7	218.5	238.9	259.4	271.8	287.9	301.3	311.1	325.4	336.0	344.4	371.8
16 days	185.3	212.5	225.1	242.3	253.0	260.8	284.3	307.8	321.9	340.3	355.5	366.7	383.0	394.9	404.4	435.4
20 days	216.3	247.0	261.2	280.6	292.5	301.3	327.6	353.8	369.6	390.1	407.1	419.5	437.5	450.8	461.3	495.6
25 days	253.9	288.8	304.9	326.8	340.3	350.2	379.8	409.3	427.0	450.0	468.9	482.7	502.9	517.7	529.4	567.5

NOTES:
N/A Data not available
These values are derived from a Depth Duration Frequency (DDF) Model
For details refer to:
'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',
Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

Green Field Flow Rates

EA_Defra method

Site characteristics

Location;	Other
Hydrological region;	9
Soil type (Wallingford Procedure W.R.A.P map);	2
Standard percentage runoff;	SPR = **0.30**
Average annual rainfall;	SAAR = **720** mm
5 year return period rainfall of 60 minute duration;	M5_60min = **18.9** mm
Ratio 60-minute to 2 day rainfalls of 5 year return;	r = **0.21**
Rainfall intensity increase due to global warming;	$p_{climate}$ = **20**%
Impervious area req. attenuation storage;	α = **100.0** %

Catchment details

Subcatchment	Name	Area (ha)	PIMP (%);	Impermeable. area (ha)
1;	green area;	2.23;	0.0;	0.00;
	Total	2.23;	0.0;	0.00;

Greenfield runoff rates

Catchment area;	AREA = **50.00** hectare
Greenfield runoff rate (50 hectare site);	$\bar{Q}_{rural} = 0.00108 m^3/s \times (AREA/1km^2)^{0.89} \times (SAAR/1mm)^{1.17} \times SPR^{2.17}$ = **94.2** l / s
Greenfield runoff rate;	$\bar{Q} = \bar{Q}_{rural} / AREA \times A$ = **4.2** l / s
Greenfield runoff rate per unit area;	$\bar{Q}_A = \bar{Q} / A$ = **1.9** l / s / hectare

Estimated site discharges

FSR growth rate (1 year);	FSR_{1yr} = **0.88**
Discharge (1 year);	$Q_{1yr} = \bar{Q} \times FSR_{1yr}$ = **3.7** l/s
FSR growth rate (30 year);	FSR_{30yr} = **1.78**
Discharge (30 year);	$Q_{30yr} = \bar{Q} \times FSR_{30yr}$ = **7.5** l/s
FSR growth rate (100 year);	FSR_{100yr} = **2.18**
Discharge (100 year);	$Q_{100yr} = \bar{Q} \times FSR_{100yr}$ = **9.2** l/s

Block A – Soakaway Design

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development - Ardshanavooley				91-24	
	Calcs for				Start page no./Revision	
	Roof - Block A				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.04

Design rainfall intensity

Location of catchment area	Other
Impermeable area drained to the system	A = **567.1** m^2
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = **1200** mm
Width of pit	w = **3300** mm
Length of pit	l = **9000** mm
Percentage free volume	V_{free} = **95** %

Soil infiltration rate (BRE digest 365)

Length of trial pit	l_{trial} = **2000** mm
Width of trial pit	b_{trial} = **1000** mm
Depth of trial pit (below invert)	d_{trial} = **1400** mm
Free volume (if fill used)	V_{trial} = **100** %
75% depth of pit	$d_{75} = (d_{trial} \times 0.75)$ = **1050.00** mm
50% depth of pit	$d_{50} = (d_{trial} \times 0.50)$ = **700.00** mm
25% depth of pit	$d_{25} = (d_{trial} \times 0.25)$ = **350.00** mm
Test 1 - time to fall from 75% depth to 25% depth	T1 = **59** min
Test 2 - time to fall from 75% depth to 25% depth	T2 = **64** min
Test 3 - time to fall from 75% depth to 25% depth	T3 = **63** min
Longest time to fall from 75% depth to 25% depth	t_{lg} = max(T1, T2, T3) = **64** min
Storage volume from 75% to 25% depth	$V_{p75\_25} = (l_{trial} \times b_{trial} \times (d_{75} - d_{25})) \times V_{trial}$ = **1.40** m^3
Internal surface area to 50% depth	$a_{p50} = ((l_{trial} \times b_{trial}) + (l_{trial} + b_{trial}) \times 2 \times d_{50})$ = **6.20** m^2
Surface area of soakaway to 50% storage depth	$A_{s50} = 2 \times (l_{trial} + b_{trial}) \times d_{trial} / 2$ = **4.200** m^2
Soil infiltration rate	$f = V_{p75\_25} / (a_{p50} \times t_{lg})$ = **58.8×10^{-6}** m/s
Wetted area of pit 50% full	$a_{s50} = l \times d + w \times d$ = **14760000** mm^2

Table equations

Inflow (cl.3.3.1)	$I = M100 \times A$
Outflow (cl.3.3.2)	$O = a_{s50} \times f \times D$
Storage (cl.3.3.3)	$S = I - O$

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m^3)	Outflow (m^3)	Storage required (m^3)
5	0.29;	6.6;	1.83;	12.0;	6.82;	0.26;	6.56
10	0.43;	9.8;	1.90;	18.6;	10.53;	0.52;	10.01
15	0.54;	12.2;	1.95;	23.8;	13.51;	0.78;	12.73

Tekla Tedds

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The Courtyard
Killarney

Project				Job no.	
Housing Development - Ardshanavooley				91-24	
Calcs for				Start page no./Revision	
Roof - Block A				2	
Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
MC	16/12/2025				

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m^3)	Outflow (m^3)	Storage required (m^3)
30	0.73;	16.6;	2.00;	33.2;	18.80;	1.56;	17.24
60	1.00;	22.7;	2.02;	45.8;	25.97;	3.12;	22.84
120	1.33;	30.2;	1.97;	59.4;	33.67;	6.25;	27.42
240	1.77;	40.1;	1.89;	75.8;	43.00;	12.50;	30.50
360	2.21;	50.1;	1.81;	90.7;	51.42;	18.75;	32.67
600	2.62;	59.4;	1.75;	103.7;	58.83;	31.25;	27.58
1440	3.60;	81.6;	1.61;	131.7;	74.70;	74.99;	0.00

Required storage volume $S_{req} = \mathbf{32.67}\ m^3$

Soakaway storage volume $S_{act} = I \times d \times w \times V_{free} = \mathbf{33.86}\ m^3$

PASS - Soakaway storage volume

Time for emptying soakaway to half volume $t_{s50} = S_{req} \times 0.5 / (a_{s50} \times f) = 5hr\ 13min\ 41s$

PASS - Soakaway discharge time less than or equal to 24 hours

Block B – Soakaway Design

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development - Ardshanavooley				91-24	
	Calcs for				Start page no./Revision	
	Roof - Block B				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.04

Design rainfall intensity

Location of catchment area	Other
Impermeable area drained to the system	A = **321.6** m^2
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = **1200** mm
Width of pit	w = **4000** mm
Length of pit	l = **4000** mm
Percentage free volume	V_{free} = **95** %

Soil infiltration rate (BRE digest 365)

Length of trial pit	l_{trial} = **2000** mm
Width of trial pit	b_{trial} = **1000** mm
Depth of trial pit (below invert)	d_{trial} = **1400** mm
Free volume (if fill used)	V_{trial} = **100** %
75% depth of pit	$d_{75} = (d_{trial} \times 0.75)$ = **1050.00** mm
50% depth of pit	$d_{50} = (d_{trial} \times 0.50)$ = **700.00** mm
25% depth of pit	$d_{25} = (d_{trial} \times 0.25)$ = **350.00** mm
Test 1 - time to fall from 75% depth to 25% depth	T1 = **59** min
Test 2 - time to fall from 75% depth to 25% depth	T2 = **64** min
Test 3 - time to fall from 75% depth to 25% depth	T3 = **63** min
Longest time to fall from 75% depth to 25% depth	t_{lg} = max(T1, T2, T3) = **64** min
Storage volume from 75% to 25% depth	$V_{p75\_25} = (l_{trial} \times b_{trial} \times (d_{75} - d_{25})) \times V_{trial}$ = **1.40** m^3
Internal surface area to 50% depth	$a_{p50} = ((l_{trial} \times b_{trial}) + (l_{trial} + b_{trial}) \times 2 \times d_{50})$ = **6.20** m^2
Surface area of soakaway to 50% storage depth	$A_{s50} = 2 \times (l_{trial} + b_{trial}) \times d_{trial} / 2$ = **4.200** m^2
Soil infiltration rate	$f = V_{p75\_25} / (a_{p50} \times t_{lg})$ = **58.8×10^{-6}** m/s
Wetted area of pit 50% full	$a_{s50} = l \times d + w \times d$ = **9600000** mm^2

Table equations

Inflow (cl.3.3.1)	$I = M100 \times A$
Outflow (cl.3.3.2)	$O = a_{s50} \times f \times D$
Storage (cl.3.3.3)	$S = I - O$

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m^3)	Outflow (m^3)	Storage required (m^3)
5	0.29;	6.6;	1.83;	12.0;	3.87;	0.17;	3.70
10	0.43;	9.8;	1.90;	18.6;	5.97;	0.34;	5.63
15	0.54;	12.2;	1.95;	23.8;	7.66;	0.51;	7.16

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Project				Job no.	
Housing Development - Ardshanavooley				91-24	
Calcs for				Start page no./Revision	
Roof - Block B				2	
Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
MC	16/12/2025				

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m^3)	Outflow (m^3)	Storage required (m^3)
30	0.73;	16.6;	2.00;	33.2;	10.66;	1.02;	9.65
60	1.00;	22.7;	2.02;	45.8;	14.73;	2.03;	12.70
120	1.33;	30.2;	1.97;	59.4;	19.10;	4.06;	15.03
240	1.77;	40.1;	1.89;	75.8;	24.39;	8.13;	16.26
360	2.21;	50.1;	1.81;	90.7;	29.16;	12.19;	16.97
600	2.62;	59.4;	1.75;	103.7;	33.36;	20.32;	13.04
1440	3.60;	81.6;	1.61;	131.7;	42.36;	48.77;	0.00

Required storage volume — S_{req} = **16.97** m^3

Soakaway storage volume — $S_{act} = I \times d \times w \times V_{free}$ = **18.24** m^3

PASS - Soakaway storage volume

Time for emptying soakaway to half volume — $t_{s50} = S_{req} \times 0.5 / (a_{s50} \times f)$ = 4hr 10min 31s

PASS - Soakaway discharge time less than or equal to 24 hours

Block C,D,E,F and J – Soakaway Design

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development - Ardshanavooley				91-24	
	Calcs for				Start page no./Revision	
	Roof - Block J C D E and F				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.04

Design rainfall intensity

Location of catchment area	Other
Impermeable area drained to the system	A = **2721.2** m^2
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = **1200** mm
Width of pit	w = **14000** mm
Length of pit	l = **14000** mm
Percentage free volume	V_{free} = **95** %

Soil infiltration rate (BRE digest 365)

Length of trial pit	l_{trial} = **2000** mm
Width of trial pit	b_{trial} = **1000** mm
Depth of trial pit (below invert)	d_{trial} = **1400** mm
Free volume (if fill used)	V_{trial} = **100** %
75% depth of pit	d_{75} = (d_{trial} × 0.75) = **1050.00** mm
50% depth of pit	d_{50} = (d_{trial} × 0.50) = **700.00** mm
25% depth of pit	d_{25} = (d_{trial} × 0.25) = **350.00** mm
Test 1 - time to fall from 75% depth to 25% depth	T1 = **59** min
Test 2 - time to fall from 75% depth to 25% depth	T2 = **64** min
Test 3 - time to fall from 75% depth to 25% depth	T3 = **63** min
Longest time to fall from 75% depth to 25% depth	t_{lg} = max(T1, T2, T3) = **64** min
Storage volume from 75% to 25% depth	V_{p75_25} = (l_{trial} × b_{trial} × (d_{75} - d_{25})) × V_{trial} = **1.40** m^3
Internal surface area to 50% depth	a_{p50} = ((l_{trial} × b_{trial}) + (l_{trial} + b_{trial}) × 2 × d_{50}) = **6.20** m^2
Surface area of soakaway to 50% storage depth	A_{s50} = 2 × (l_{trial} + b_{trial}) × d_{trial} / 2 = **4.200** m^2
Soil infiltration rate	f = V_{p75_25} / (a_{p50} × t_{lg}) = **58.8×10^{-6}** m/s
Wetted area of pit 50% full	a_{s50} = l × d + w × d = **33600000** mm^2

Table equations

Inflow (cl.3.3.1)	$I = M100 \times A$
Outflow (cl.3.3.2)	$O = a_{s50} \times f \times D$
Storage (cl.3.3.3)	$S = I - O$

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m^3)	Outflow (m^3)	Storage required (m^3)
5	0.29;	6.6;	1.83;	12.0;	32.71;	0.59;	32.12
10	0.43;	9.8;	1.90;	18.6;	50.53;	1.19;	49.34
15	0.54;	12.2;	1.95;	23.8;	64.85;	1.78;	63.07

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Killarney

Project				Job no.	
Housing Development - Ardshanavooley				91-24	
Calcs for				Start page no./Revision	
Roof - Block J C D E and F				2	
Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
MC	16/12/2025				

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m^3)	Outflow (m^3)	Storage required (m^3)
30	0.73;	16.6;	2.00;	33.2;	90.22;	3.56;	86.66
60	1.00;	22.7;	2.02;	45.8;	124.62;	7.11;	117.51
120	1.33;	30.2;	1.97;	59.4;	161.60;	14.23;	147.37
240	1.77;	40.1;	1.89;	75.8;	206.34;	28.45;	177.88
360	2.21;	50.1;	1.81;	90.7;	246.76;	42.68;	204.08
600	2.62;	59.4;	1.75;	103.7;	282.31;	71.13;	211.18
1440	3.60;	81.6;	1.61;	131.7;	358.47;	170.71;	187.76

Required storage volume $S_{req} = \mathbf{211.18}\ m^3$

Soakaway storage volume $S_{act} = I \times d \times w \times V_{free} = \mathbf{223.44}\ m^3$

PASS - Soakaway storage volume

Time for emptying soakaway to half volume $t_{s50} = S_{req} \times 0.5 / (a_{s50} \times f) = 14hr\ 50min\ 42s$

PASS - Soakaway discharge time less than or equal to 24 hours

Block G -Soakaway Design

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development - Ardshanavooley				91-24	
	Calcs for				Start page no./Revision	
	Roof - Block G				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.04

Design rainfall intensity

Location of catchment area	Other
Impermeable area drained to the system	A = **455.3** m^2
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = **1200** mm
Width of pit	w = **5000** mm
Length of pit	l = **4000** mm
Percentage free volume	V_{free} = **95** %

Soil infiltration rate (BRE digest 365)

Length of trial pit	l_{trial} = **1800** mm
Width of trial pit	b_{trial} = **1500** mm
Depth of trial pit (below invert)	d_{trial} = **1100** mm
Free volume (if fill used)	V_{trial} = **100** %
75% depth of pit	$d_{75} = (d_{trial} \times 0.75)$ = **825.00** mm
50% depth of pit	$d_{50} = (d_{trial} \times 0.50)$ = **550.00** mm
25% depth of pit	$d_{25} = (d_{trial} \times 0.25)$ = **275.00** mm
Test 1 - time to fall from 75% depth to 25% depth	T1 = **27** min
Test 2 - time to fall from 75% depth to 25% depth	T2 = **30** min
Test 3 - time to fall from 75% depth to 25% depth	T3 = **32** min
Longest time to fall from 75% depth to 25% depth	t_{lg} = max(T1, T2, T3) = **32** min
Storage volume from 75% to 25% depth	$V_{p75\_25} = (l_{trial} \times b_{trial} \times (d_{75} - d_{25})) \times V_{trial}$ = **1.49** m^3
Internal surface area to 50% depth	$a_{p50} = ((l_{trial} \times b_{trial}) + (l_{trial} + b_{trial}) \times 2 \times d_{50})$ = **6.33** m^2
Surface area of soakaway to 50% storage depth	$A_{s50} = 2 \times (l_{trial} + b_{trial}) \times d_{trial} / 2$ = **3.630** m^2
Soil infiltration rate	$f = V_{p75\_25} / (a_{p50} \times t_{lg})$ = **122.×10^{-6}** m/s
Wetted area of pit 50% full	$a_{s50} = l \times d + w \times d$ = **10800000** mm^2

Table equations

Inflow (cl.3.3.1)	$I = M100 \times A$
Outflow (cl.3.3.2)	$O = a_{s50} \times f \times D$
Storage (cl.3.3.3)	$S = I - O$

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m^3)	Outflow (m^3)	Storage required (m^3)
5	0.29;	6.6;	1.83;	12.0;	5.47;	0.40;	5.08
10	0.43;	9.8;	1.90;	18.6;	8.45;	0.79;	7.66
15	0.54;	12.2;	1.95;	23.8;	10.85;	1.19;	9.66

Tekla Tedds

Teicniuil-Priory Consulting Engineers Ltd
The Courtyard
Killarney

Project				Job no.	
Housing Development - Ardshanavooley				91-24	
Calcs for				Start page no./Revision	
Roof - Block G				2	
Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
MC	16/12/2025				

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m^3)	Outflow (m^3)	Storage required (m^3)
30	0.73;	16.6;	2.00;	33.2;	15.09;	2.38;	12.72
60	1.00;	22.7;	2.02;	45.8;	20.85;	4.75;	16.10
120	1.33;	30.2;	1.97;	59.4;	27.04;	9.50;	17.54
240	1.77;	40.1;	1.89;	75.8;	34.52;	19.00;	15.52
360	2.21;	50.1;	1.81;	90.7;	41.29;	28.50;	12.78
600	2.62;	59.4;	1.75;	103.7;	47.24;	47.51;	0.00
1440	3.60;	81.6;	1.61;	131.7;	59.98;	114.01;	0.00

Required storage volume $S_{req} = \mathbf{17.54}\ m^3$

Soakaway storage volume $S_{act} = I \times d \times w \times V_{free} = \mathbf{22.80}\ m^3$

PASS - Soakaway storage volume

Time for emptying soakaway to half volume $t_{s50} = S_{req} \times 0.5 / (a_{s50} \times f) = 1hr\ 50min\ 46s$

PASS - Soakaway discharge time less than or equal to 24 hours

Block L – Soakaway Design

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development - Ardshanavooley				91-24	
	Calcs for				Start page no./Revision	
	Roof - Block L				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.04

Design rainfall intensity

Location of catchment area	Other
Impermeable area drained to the system	A = **400.1** m^2
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = **1200** mm
Width of pit	w = **5000** mm
Length of pit	l = **4000** mm
Percentage free volume	V_{free} = **95** %

Soil infiltration rate (BRE digest 365)

Length of trial pit	l_{trial} = **2000** mm
Width of trial pit	b_{trial} = **1000** mm
Depth of trial pit (below invert)	d_{trial} = **1400** mm
Free volume (if fill used)	V_{trial} = **100** %
75% depth of pit	$d_{75} = (d_{trial} \times 0.75)$ = **1050.00** mm
50% depth of pit	$d_{50} = (d_{trial} \times 0.50)$ = **700.00** mm
25% depth of pit	$d_{25} = (d_{trial} \times 0.25)$ = **350.00** mm
Test 1 - time to fall from 75% depth to 25% depth	T1 = **59** min
Test 2 - time to fall from 75% depth to 25% depth	T2 = **64** min
Test 3 - time to fall from 75% depth to 25% depth	T3 = **63** min
Longest time to fall from 75% depth to 25% depth	t_{ig} = max(T1, T2, T3) = **64** min
Storage volume from 75% to 25% depth	$V_{p75\_25} = (l_{trial} \times b_{trial} \times (d_{75} - d_{25})) \times V_{trial}$ = **1.40** m^3
Internal surface area to 50% depth	$a_{p50} = ((l_{trial} \times b_{trial}) + (l_{trial} + b_{trial}) \times 2 \times d_{50})$ = **6.20** m^2
Surface area of soakaway to 50% storage depth	$A_{s50} = 2 \times (l_{trial} + b_{trial}) \times d_{trial} / 2$ = **4.200** m^2
Soil infiltration rate	$f = V_{p75\_25} / (a_{p50} \times t_{ig})$ = **58.8×10^{-6}** m/s
Wetted area of pit 50% full	$a_{s50} = l \times d + w \times d$ = **10800000** mm^2

Table equations

Inflow (cl.3.3.1) $I = M100 \times A$

Outflow (cl.3.3.2) $O = a_{s50} \times f \times D$

Storage (cl.3.3.3) $S = I - O$

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m^3)	Outflow (m^3)	Storage required (m^3)
5	0.29;	6.6;	1.83;	12.0;	4.81;	0.19;	4.62
10	0.43;	9.8;	1.90;	18.6;	7.43;	0.38;	7.05
15	0.54;	12.2;	1.95;	23.8;	9.54;	0.57;	8.96

Tekla Tedds

Teicniuil-Priory Consulting Engineers Ltd
The Courtyard
Killarney

Project				Job no.	
Housing Development - Ardshanavooley				91-24	
Calcs for				Start page no./Revision	
Roof - Block L				2	
Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
MC	16/12/2025				

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m^3)	Outflow (m^3)	Storage required (m^3)
30	0.73;	16.6;	2.00;	33.2;	13.26;	1.14;	12.12
60	1.00;	22.7;	2.02;	45.8;	18.32;	2.29;	16.04
120	1.33;	30.2;	1.97;	59.4;	23.76;	4.57;	19.19
240	1.77;	40.1;	1.89;	75.8;	30.34;	9.15;	21.19
360	2.21;	50.1;	1.81;	90.7;	36.28;	13.72;	22.56
600	2.62;	59.4;	1.75;	103.7;	41.51;	22.86;	18.65
1440	3.60;	81.6;	1.61;	131.7;	52.71;	54.87;	0.00

Required storage volume $S_{req} = \mathbf{22.56}\ m^3$

Soakaway storage volume $S_{act} = I \times d \times w \times V_{free} = \mathbf{22.80}\ m^3$

PASS - Soakaway storage volume

Time for emptying soakaway to half volume $t_{s50} = S_{req} \times 0.5 / (a_{s50} \times f)$ = 4hr 56min 2s

PASS - Soakaway discharge time less than or equal to 24 hours

Block H and K – Soakaway Design

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development - Ardshanavooley				91-24	
	Calcs for				Start page no./Revision	
	Roof - Blocks H and K				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.

Design rainfall intensity

Location of catchment area	Other
Impermeable area drained to the system	A = **875.2** m^2
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = **1200** mm
Width of pit	w = **4500** mm
Length of pit	l = **12000** mm
Percentage free volume	V_{free} = **95** %

Soil infiltration rate (BRE digest 365)

Length of trial pit	l_{trial} = **2000** mm
Width of trial pit	b_{trial} = **1000** mm
Depth of trial pit (below invert)	d_{trial} = **1400** mm
Free volume (if fill used)	V_{trial} = **100** %
75% depth of pit	$d_{75} = (d_{trial} \times 0.75)$ = **1050.00** mm
50% depth of pit	$d_{50} = (d_{trial} \times 0.50)$ = **700.00** mm
25% depth of pit	$d_{25} = (d_{trial} \times 0.25)$ = **350.00** mm
Test 1 - time to fall from 75% depth to 25% depth	T1 = **59** min
Test 2 - time to fall from 75% depth to 25% depth	T2 = **64** min
Test 3 - time to fall from 75% depth to 25% depth	T3 = **63** min
Longest time to fall from 75% depth to 25% depth	t_{lg} = max(T1, T2, T3) = **64** min
Storage volume from 75% to 25% depth	$V_{p75\_25} = (l_{trial} \times b_{trial} \times (d_{75} - d_{25})) \times V_{trial}$ = **1.40** m^3
Internal surface area to 50% depth	$a_{p50} = ((l_{trial} \times b_{trial}) + (l_{trial} + b_{trial}) \times 2 \times d_{50})$ = **6.20** m^2
Surface area of soakaway to 50% storage depth	$A_{s50} = 2 \times (l_{trial} + b_{trial}) \times d_{trial} / 2$ = **4.200** m^2
Soil infiltration rate	$f = V_{p75\_25} / (a_{p50} \times t_{lg})$ = **58.8×10^{-6}** m/s
Wetted area of pit 50% full	$a_{s50} = l \times d + w \times d$ = **19800000** mm^2

Table equations

Inflow (cl.3.3.1)	$I = M100 \times A$
Outflow (cl.3.3.2)	$O = a_{s50} \times f \times D$
Storage (cl.3.3.3)	$S = I - O$

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m^3)	Outflow (m^3)	Storage required (m^3)
5	0.29;	6.6;	1.83;	12.0;	10.52;	0.35;	10.17
10	0.43;	9.8;	1.90;	18.6;	16.25;	0.70;	15.55
15	0.54;	12.2;	1.95;	23.8;	20.86;	1.05;	19.81

Tekla Tedds

Teicniuil-Priory Consulting Engineers Ltd
The Courtyard
Killarney

Project				Job no.
Housing Development - Ardshanavooley				91-24
Calcs for				Start page no./Revision
Roof - Blocks H and K				2
Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
MC	16/12/2025				

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m^3)	Outflow (m^3)	Storage required (m^3)
30	0.73;	16.6;	2.00;	33.2;	29.02;	2.10;	26.92
60	1.00;	22.7;	2.02;	45.8;	40.08;	4.19;	35.89
120	1.33;	30.2;	1.97;	59.4;	51.97;	8.38;	43.59
240	1.77;	40.1;	1.89;	75.8;	66.36;	16.77;	49.60
360	2.21;	50.1;	1.81;	90.7;	79.36;	25.15;	54.21
600	2.62;	59.4;	1.75;	103.7;	90.80;	41.92;	48.88
1440	3.60;	81.6;	1.61;	131.7;	115.29;	100.60;	14.69

Required storage volume $S_{req} = \mathbf{54.21}\ m^3$

Soakaway storage volume $S_{act} = l \times d \times w \times V_{free} = \mathbf{61.56}\ m^3$

PASS - Soakaway storage volume

Time for emptying soakaway to half volume $t_{s50} = S_{req} \times 0.5 / (a_{s50} \times f) = 6hr\ 28min$

PASS - Soakaway discharge time less than or equal to 24 hours

Block M – Design Rainfall , Return Period 1:2yr.

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **5** min
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.29**
Rainfall for 5min storm with 5 year return period	$M5\_5min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **6.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.79**
Rainfall for 5min storm with 2 year return period	$M2\_5min = Z2 \times M5\_5min_i$ = **5.2** mm
Design rainfall intensity	$I_{max} = M2\_5min / D$ = **62.4** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **12.5** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **10** min
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.43**
Rainfall for 10min storm with 5 year return period	$M5\_10min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **9.8** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.79**
Rainfall for 10min storm with 2 year return period	$M2\_10min = Z2 \times M5\_10min_i$ = **7.7** mm
Design rainfall intensity	I_{max} = M2_10min / D = **46.2** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **9.3** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **15** min
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.54**
Rainfall for 15min storm with 5 year return period	$M5\_15min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **12.2** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.79**
Rainfall for 15min storm with 2 year return period	$M2\_15min = Z2 \times M5\_15min_i$ = **9.7** mm
Design rainfall intensity	$I_{max} = M2\_15min / D$ = **38.9** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **7.8** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **30** min
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.73**
Rainfall for 30min storm with 5 year return period	$M5\_30min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **16.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.80**
Rainfall for 30min storm with 2 year return period	$M2\_30min = Z2 \times M5\_30min_i$ = **13.3** mm
Design rainfall intensity	$I_{max} = M2\_30min / D$ = **26.6** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **5.3** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **1** hr
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.00**
Rainfall for 1hr storm with 5 year return period	$M5\_1hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **22.7** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.82**
Rainfall for 1hr storm with 2 year return period	$M2\_1hr = Z2 \times M5\_1hr_1$ = **18.5** mm
Design rainfall intensity	$I_{max} = M2\_1hr / D$ = **18.5** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **3.7** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **2** hr
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.33**
Rainfall for 2hr storm with 5 year return period	$M5\_2hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **30.2** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.83**
Rainfall for 2hr storm with 2 year return period	$M2\_2hr = Z2 \times M5\_2hr_1$ = **25.0** mm
Design rainfall intensity	$I_{max} = M2\_2hr / D$ = **12.5** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **2.5** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **4** hr
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.77**
Rainfall for 4hr storm with 5 year return period	$M5\_4hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **40.1** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.84**
Rainfall for 4hr storm with 2 year return period	$M2\_4hr = Z2 \times M5\_4hr_1$ = **33.7** mm
Design rainfall intensity	I_{max} = M2_4hr / D = **8.4** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **1.7** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **6** hr
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **2.21**
Rainfall for 6hr storm with 5 year return period	$M5\_6hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **50.1** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.85**
Rainfall for 6hr storm with 2 year return period	$M2\_6hr = Z2 \times M5\_6hr_1$ = **42.6** mm
Design rainfall intensity	I_{max} = M2_6hr / D = **7.1** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **1.4** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **10** hr
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **2.62**
Rainfall for 10hr storm with 5 year return period	$M5\_10hr_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **59.4** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.86**
Rainfall for 10hr storm with 2 year return period	$M2\_10hr = Z2 \times M5\_10hr_i$ = **51.0** mm
Design rainfall intensity	$I_{max} = M2\_10hr / D$ = **5.1** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **1.0** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **24** hr
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **3.60**
Rainfall for 24hr storm with 5 year return period	$M5\_24hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **81.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.87**
Rainfall for 24hr storm with 2 year return period	$M2\_24hr = Z2 \times M5\_24hr_1$ = **71.3** mm
Design rainfall intensity	I_{max} = M2_24hr / D = **3.0** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.6** l/s

Block M – Design Rainfall , Return Period 1:10yr.

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **5** min
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.29**
Rainfall for 5min storm with 5 year return period	$M5\_5min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **6.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.20**
Rainfall for 5min storm with 10 year return period	$M10\_5min = Z2 \times M5\_5min_i$ = **7.9** mm
Design rainfall intensity	I_{max} = M10_5min / D = **94.7** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **19.0** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M Design Rainfall 10min duration				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **10** min
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.43**
Rainfall for 10min storm with 5 year return period	$M5\_10min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **9.8** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.22**
Rainfall for 10min storm with 10 year return period	$M10\_10min = Z2 \times M5\_10min_i$ = **11.9** mm
Design rainfall intensity	I_{max} = M10_10min / D = **71.3** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **14.3** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall 15mins				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **15** min
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.54**
Rainfall for 15min storm with 5 year return period	$M5\_15min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **12.2** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.23**
Rainfall for 15min storm with 10 year return period	$M10\_15min = Z2 \times M5\_15min_i$ = **15.1** mm
Design rainfall intensity	I_{max} = M10_15min / D = **60.2** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **12.1** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall 30mins				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **30** min
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.73**
Rainfall for 30min storm with 5 year return period	$M5\_30min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **16.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.24**
Rainfall for 30min storm with 10 year return period	$M10\_30min = Z2 \times M5\_30min_i$ = **20.5** mm
Design rainfall intensity	I_{max} = M10_30min / D = **41.1** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **8.2** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall 1hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **1** hr
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.00**
Rainfall for 1hr storm with 5 year return period	$M5\_1hr_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **22.7** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.24**
Rainfall for 1hr storm with 10 year return period	$M10\_1hr = Z2 \times M5\_1hr_i$ = **28.1** mm
Design rainfall intensity	I_{max} = M10_1hr / D = **28.1** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **5.6** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M Design Rainfall 2hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **2** hr
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.33**
Rainfall for 2hr storm with 5 year return period	$M5\_2hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **30.2** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.22**
Rainfall for 2hr storm with 10 year return period	$M10\_2hr = Z2 \times M5\_2hr_1$ = **36.8** mm
Design rainfall intensity	I_{max} = M10_2hr / D = **18.4** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **3.7** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall 4hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **4** hr
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.77**
Rainfall for 4hr storm with 5 year return period	$M5\_4hr_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **40.1** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.19**
Rainfall for 4hr storm with 10 year return period	$M10\_4hr = Z2 \times M5\_4hr_i$ = **47.8** mm
Design rainfall intensity	I_{max} = M10_4hr / D = **11.9** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **2.4** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M Design Rainfall 6hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **6** hr
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **2.21**
Rainfall for 6hr storm with 5 year return period	$M5\_6hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **50.1** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.17**
Rainfall for 6hr storm with 10 year return period	$M10\_6hr = Z2 \times M5\_6hr_1$ = **58.6** mm
Design rainfall intensity	I_{max} = M10_6hr / D = **9.8** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **2.0** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M Design Rainfall 10hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **10** hr
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **2.62**
Rainfall for 10hr storm with 5 year return period	$M5\_10hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **59.4** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.16**
Rainfall for 10hr storm with 10 year return period	$M10\_10hr = Z2 \times M5\_10hr_1$ = **68.9** mm
Design rainfall intensity	I_{max} = M10_10hr / D = **6.9** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **1.4** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall 24hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **24** hr
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **3.60**
Rainfall for 24hr storm with 5 year return period	$M5\_24hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **81.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.14**
Rainfall for 24hr storm with 10 year return period	$M10\_24hr = Z2 \times M5\_24hr_1$ = **92.9** mm
Design rainfall intensity	I_{max} = M10_24hr / D = **3.9** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.8** l/s

Block M – Design Rainfall , Return Period 1:100yr

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **5** min
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.29**
Rainfall for 5min storm with 5 year return period	$M5\_5min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **6.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.83**
Rainfall for 5min storm with 100 year return period	$M100\_5min = Z2 \times M5\_5min_i$ = **12.0** mm
Design rainfall intensity	I_{max} = M100_5min / D = **144.3** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **28.9** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **10** min
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.43**
Rainfall for 10min storm with 5 year return period	$M5\_10min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **9.8** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.90**
Rainfall for 10min storm with 100 year return period	$M100\_10min = Z2 \times M5\_10min_i$ = **18.6** mm
Design rainfall intensity	I_{max} = M100_10min / D = **111.4** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **22.3** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **15** min
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.54**
Rainfall for 15min storm with 5 year return period	$M5\_15min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **12.2** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.95**
Rainfall for 15min storm with 100 year return period	M100_15min = Z2 × $M5\_15min_i$ = **23.8** mm
Design rainfall intensity	I_{max} = M100_15min / D = **95.3** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **19.1** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **30** min
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.73**
Rainfall for 30min storm with 5 year return period	$M5\_30min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **16.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **2.00**
Rainfall for 30min storm with 100 year return period	$M100\_30min = Z2 \times M5\_30min_i$ = **33.2** mm
Design rainfall intensity	I_{max} = M100_30min / D = **66.3** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **13.3** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **1** hr
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.00**
Rainfall for 1hr storm with 5 year return period	$M5\_1hr_l = Z1 \times M5\_60min \times (1 + p_{climate})$ = **22.7** mm
Factor Z2 (Wallingford procedure)	Z2 = **2.02**
Rainfall for 1hr storm with 100 year return period	$M100\_1hr = Z2 \times M5\_1hr_l$ = **45.8** mm
Design rainfall intensity	I_{max} = M100_1hr / D = **45.8** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **9.2** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **2** hr
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.33**
Rainfall for 2hr storm with 5 year return period	$M5\_2hr_I = Z1 \times M5\_60min \times (1 + p_{climate})$ = **30.2** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.97**
Rainfall for 2hr storm with 100 year return period	M100_2hr = Z2 × $M5\_2hr_I$ = **59.4** mm
Design rainfall intensity	I_{max} = M100_2hr / D = **29.7** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **6.0** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **4** hr
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.77**
Rainfall for 4hr storm with 5 year return period	$M5\_4hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **40.1** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.89**
Rainfall for 4hr storm with 100 year return period	$M100\_4hr = Z2 \times M5\_4hr_1$ = **75.8** mm
Design rainfall intensity	I_{max} = M100_4hr / D = **19.0** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **3.8** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **6** hr
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **2.21**
Rainfall for 6hr storm with 5 year return period	$M5\_6hr_I = Z1 \times M5\_60min \times (1 + p_{climate})$ = **50.1** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.81**
Rainfall for 6hr storm with 100 year return period	$M100\_6hr = Z2 \times M5\_6hr_I$ = **90.7** mm
Design rainfall intensity	I_{max} = M100_6hr / D = **15.1** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **3.0** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **10** hr
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **2.62**
Rainfall for 10hr storm with 5 year return period	$M5\_10hr_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **59.4** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.75**
Rainfall for 10hr storm with 100 year return period	$M100\_10hr = Z2 \times M5\_10hr_i$ = **103.7** mm
Design rainfall intensity	I_{max} = M100_10hr / D = **10.4** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **2.1** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Block M - Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **24** hr
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **3.60**
Rainfall for 24hr storm with 5 year return period	$M5\_24hr_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **81.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.61**
Rainfall for 24hr storm with 100 year return period	$M100\_24hr = Z2 \times M5\_24hr_i$ = **131.7** mm
Design rainfall intensity	I_{max} = M100_24hr / D = **5.5** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **722** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **1.1** l/s

Partial Road Sub-catchment – Design Rainfall , Return Period 1:10yr.

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall 5 min				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **5** min
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.29**
Rainfall for 5min storm with 5 year return period	$M5\_5min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **6.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.20**
Rainfall for 5min storm with 10 year return period	$M10\_5min = Z2 \times M5\_5min_i$ = **7.9** mm
Design rainfall intensity	I_{max} = M10_5min / D = **94.7** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **69.1** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **10** min
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.43**
Rainfall for 10min storm with 5 year return period	$M5\_10min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **9.8** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.22**
Rainfall for 10min storm with 10 year return period	$M10\_10min = Z2 \times M5\_10min_i$ = **11.9** mm
Design rainfall intensity	I_{max} = M10_10min / D = **71.3** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **52.0** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **15** min
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.54**
Rainfall for 15min storm with 5 year return period	$M5\_15min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **12.2** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.23**
Rainfall for 15min storm with 10 year return period	$M10\_15min = Z2 \times M5\_15min_i$ = **15.1** mm
Design rainfall intensity	I_{max} = M10_15min / D = **60.2** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **44.0** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **30** min
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.73**
Rainfall for 30min storm with 5 year return period	$M5\_30min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **16.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.24**
Rainfall for 30min storm with 10 year return period	$M10\_30min = Z2 \times M5\_30min_i$ = **20.5** mm
Design rainfall intensity	I_{max} = M10_30min / D = **41.1** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **30.0** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **1** hr
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.00**
Rainfall for 1hr storm with 5 year return period	$M5\_1hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **22.7** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.24**
Rainfall for 1hr storm with 10 year return period	$M10\_1hr = Z2 \times M5\_1hr_1$ = **28.1** mm
Design rainfall intensity	I_{max} = M10_1hr / D = **28.1** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **20.5** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **2** hr
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.33**
Rainfall for 2hr storm with 5 year return period	$M5\_2hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **30.2** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.22**
Rainfall for 2hr storm with 10 year return period	$M10\_2hr = Z2 \times M5\_2hr_1$ = **36.8** mm
Design rainfall intensity	I_{max} = M10_2hr / D = **18.4** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **13.4** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **4** hr
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.77**
Rainfall for 4hr storm with 5 year return period	$M5\_4hr_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **40.1** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.19**
Rainfall for 4hr storm with 10 year return period	$M10\_4hr = Z2 \times M5\_4hr_i$ = **47.8** mm
Design rainfall intensity	I_{max} = M10_4hr / D = **11.9** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **8.7** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **6** hr
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **2.21**
Rainfall for 6hr storm with 5 year return period	$M5\_6hr_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **50.1** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.17**
Rainfall for 6hr storm with 10 year return period	$M10\_6hr = Z2 \times M5\_6hr_i$ = **58.6** mm
Design rainfall intensity	I_{max} = M10_6hr / D = **9.8** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **7.1** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **10** hr
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **2.62**
Rainfall for 10hr storm with 5 year return period	$M5\_10hr = Z1 \times M5\_60min \times (1 + p_{climate})$ = **59.4** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.16**
Rainfall for 10hr storm with 10 year return period	M10_10hr = Z2 × M5_10hr = **68.9** mm
Design rainfall intensity	I_{max} = M10_10hr / D = **6.9** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **5.0** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **24** hr
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **3.60**
Rainfall for 24hr storm with 5 year return period	$M5\_24hr_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **81.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.14**
Rainfall for 24hr storm with 10 year return period	M10_24hr = Z2 × $M5\_24hr_i$ = **92.9** mm
Design rainfall intensity	I_{max} = M10_24hr / D = **3.9** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **2.8** l/s

Partial Road Sub-catchment – Design Rainfall , Return Period 1:100yr

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **5** min
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.29**
Rainfall for 5min storm with 5 year return period	$M5\_5min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **6.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.83**
Rainfall for 5min storm with 100 year return period	$M100\_5min = Z2 \times M5\_5min_i$ = **12.0** mm
Design rainfall intensity	I_{max} = M100_5min / D = **144.3** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **105.3** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **10** min
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.43**
Rainfall for 10min storm with 5 year return period	$M5\_10min = Z1 \times M5\_60min \times (1 + p_{climate})$ = **9.8** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.90**
Rainfall for 10min storm with 100 year return period	M100_10min = Z2 × M5_10min = **18.6** mm
Design rainfall intensity	I_{max} = M100_10min / D = **111.4** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **81.3** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **15** min
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.54**
Rainfall for 15min storm with 5 year return period	$M5\_15min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **12.2** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.95**
Rainfall for 15min storm with 100 year return period	$M100\_15min = Z2 \times M5\_15min_i$ = **23.8** mm
Design rainfall intensity	I_{max} = M100_15min / D = **95.3** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **69.6** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **30** min
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.73**
Rainfall for 30min storm with 5 year return period	$M5\_30min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **16.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **2.00**
Rainfall for 30min storm with 100 year return period	$M100\_30min = Z2 \times M5\_30min_i$ = **33.2** mm
Design rainfall intensity	I_{max} = M100_30min / D = **66.3** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **48.4** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall - Partial Rd				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **1** hr
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.00**
Rainfall for 1hr storm with 5 year return period	$M5\_1hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **22.7** mm
Factor Z2 (Wallingford procedure)	Z2 = **2.02**
Rainfall for 1hr storm with 100 year return period	$M100\_1hr = Z2 \times M5\_1hr_1$ = **45.8** mm
Design rainfall intensity	I_{max} = M100_1hr / D = **45.8** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **33.4** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall - Partial Rd				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **2** hr
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.33**
Rainfall for 2hr storm with 5 year return period	$M5\_2hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **30.2** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.97**
Rainfall for 2hr storm with 100 year return period	$M100\_2hr = Z2 \times M5\_2hr_1$ = **59.4** mm
Design rainfall intensity	I_{max} = M100_2hr / D = **29.7** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **21.7** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **4** hr
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.77**
Rainfall for 4hr storm with 5 year return period	$M5\_4hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **40.1** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.89**
Rainfall for 4hr storm with 100 year return period	$M100\_4hr = Z2 \times M5\_4hr_1$ = **75.8** mm
Design rainfall intensity	I_{max} = M100_4hr / D = **19.0** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **13.8** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **6** hr
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **2.21**
Rainfall for 6hr storm with 5 year return period	$M5\_6hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **50.1** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.81**
Rainfall for 6hr storm with 100 year return period	$M100\_6hr = Z2 \times M5\_6hr_1$ = **90.7** mm
Design rainfall intensity	I_{max} = M100_6hr / D = **15.1** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **11.0** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for Design Rainfall				Start page no./Revision 1	
	Calcs by MC	Calcs date 17/12/2025	Checked by	Checked date	Approved by	Approved date

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **10** hr
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **2.62**
Rainfall for 10hr storm with 5 year return period	$M5\_10hr_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **59.4** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.75**
Rainfall for 10hr storm with 100 year return period	$M100\_10hr = Z2 \times M5\_10hr_i$ = **103.7** mm
Design rainfall intensity	I_{max} = M100_10hr / D = **10.4** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **7.6** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **24** hr
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **3.60**
Rainfall for 24hr storm with 5 year return period	$M5\_24hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **81.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.61**
Rainfall for 24hr storm with 100 year return period	$M100\_24hr = Z2 \times M5\_24hr_1$ = **131.7** mm
Design rainfall intensity	I_{max} = M100_24hr / D = **5.5** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **2628** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **4.0** l/s

Permeable paving, return period 1:100yr.

Tekla Tedds	Housing Development at Ardshanavooley, Killarney				91-24
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Calcs for Permeable Pavement - Carparking Areas				Start page no./Revision 1
	Calcs by MC	Calcs date 16/12/2025	Checked by	Checked date	Approved by	Approved date

PLANE INFILTRATION SYSTEM DESIGN

In accordance with CIRIA C753 SUDS

Tedds calculation version 2.0.04

Design rainfall intensity

Location of catchment area	Other
Impermeable area drained to the system	A = **17.5** m^2
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %

Infiltration blanket details

Base area of blanket	A_b = **12.5** m^2
Porosity	n = **0.3**
Drainage ratio	R = A / A_b = **1.4**
Soil infiltration rate	f = **58.8**×10^{-6} m/s

Table equations

Rainfall intensity	i = M100 / D
Minimum depth required (Eq. 25.1)	H = D / n × (R × i - f)

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Intensity, i (mm/hr)	Depth (mm)
5	0.29;	6.6;	1.83;	12.0;	144.27;	0;
10	0.43;	9.8;	1.90;	18.6;	111.41;	0;
15	0.54;	12.2;	1.95;	23.8;	95.33;	0;
30	0.73;	16.6;	2.00;	33.2;	66.31;	0;
60	1.00;	22.7;	2.02;	45.8;	45.80;	0;
120	1.33;	30.2;	1.97;	59.4;	29.69;	0;
240	1.77;	40.1;	1.89;	75.8;	18.96;	0;
360	2.21;	50.1;	1.81;	90.7;	15.11;	0;
600	2.62;	59.4;	1.75;	103.7;	10.37;	0;
1440	3.60;	81.6;	1.61;	131.7;	5.49;	0;

Min depth of blanket req'd	H_{max} = **0** mm
Time to empty blanket to half volume - Eq.25.6(1)	t_{s50} = n × H_{max} / (2 × f) = 0s

PASS - Infiltration system discharge time less than or equal to 24 hours

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooley				91-24	
	Calcs for				Start page no./Revision	
	Structural - car parking areas.				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	16/12/2025				

FOOTWAY DESIGN USING THE DESIGN MANUAL FOR ROADS AND BRIDGES

Tedds calculation version 1.0.01 -

Light vehicle footway with very occasional heavy vehicle overrun

Subgrade assessment

California Bearing Ratio — CBR = **7.00**%

From HD 39/01 Figure 3.3 - Light vehicle footways with very occasional heavy vehicle overrun

Surfacing type	**Concrete blocks**
Surfacing depth	Surface = **60** mm
Bedding type	**Bedding sand (compacted)**
Bedding depth	Bedding = **30** mm

Foundation design

Sub-base type	**Type 1**
Sub-base thickness	Sub = **200** mm

Total depth of construction

Total depth of construction — Depth = **290** mm

Design summary

60 mm (min) Concrete blocks
30 mm Bedding sand (compacted)
200 mm Type 1 sub-base

Tree Pits-Design Rainfall 1-2 yrs

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pits - Design Rainfall - 1:2 year - 5mins				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **5** min
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.29**
Rainfall for 5min storm with 5 year return period	$M5\_5min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **6.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.79**
Rainfall for 5min storm with 2 year return period	$M2\_5min = Z2 \times M5\_5min_i$ = **5.2** mm
Design rainfall intensity	I_{max} = M2_5min / D = **62.4** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **1.9** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **10** min
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.43**
Rainfall for 10min storm with 5 year return period	$M5\_10min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **9.8** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.79**
Rainfall for 10min storm with 2 year return period	$M2\_10min = Z2 \times M5\_10min_i$ = **7.7** mm
Design rainfall intensity	I_{max} = M2_10min / D = **46.2** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **1.4** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree pit Design Rainfall - 15mins				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **15** min
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.54**
Rainfall for 15min storm with 5 year return period	$M5\_15min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **12.2** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.79**
Rainfall for 15min storm with 2 year return period	$M2\_15min = Z2 \times M5\_15min_i$ = **9.7** mm
Design rainfall intensity	I_{max} = M2_15min / D = **38.9** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **1.2** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit - Design Rainfall 30mins				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **30** min
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.73**
Rainfall for 30min storm with 5 year return period	$M5\_30min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **16.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.80**
Rainfall for 30min storm with 2 year return period	$M2\_30min = Z2 \times M5\_30min_i$ = **13.3** mm
Design rainfall intensity	$I_{max} = M2\_30min / D$ = **26.6** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.8** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit Design Rainfall - 1hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **1** hr
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.00**
Rainfall for 1hr storm with 5 year return period	$M5\_1hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **22.7** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.82**
Rainfall for 1hr storm with 2 year return period	$M2\_1hr = Z2 \times M5\_1hr_1$ = **18.5** mm
Design rainfall intensity	I_{max} = M2_1hr / D = **18.5** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.6** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit Design Rainfall - 2hrs				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **2** hr
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.33**
Rainfall for 2hr storm with 5 year return period	$M5\_2hr_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **30.2** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.83**
Rainfall for 2hr storm with 2 year return period	$M2\_2hr = Z2 \times M5\_2hr_i$ = **25.0** mm
Design rainfall intensity	I_{max} = M2_2hr / D = **12.5** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.4** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit Design Rainfall - 4hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **4** hr
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.77**
Rainfall for 4hr storm with 5 year return period	$M5\_4hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **40.1** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.84**
Rainfall for 4hr storm with 2 year return period	$M2\_4hr = Z2 \times M5\_4hr_1$ = **33.7** mm
Design rainfall intensity	$I_{max} = M2\_4hr / D$ = **8.4** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.3** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit Design Rainfall - 6hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **6** hr
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **2.21**
Rainfall for 6hr storm with 5 year return period	$M5\_6hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **50.1** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.85**
Rainfall for 6hr storm with 2 year return period	$M2\_6hr = Z2 \times M5\_6hr_1$ = **42.6** mm
Design rainfall intensity	I_{max} = M2_6hr / D = **7.1** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.2** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit Design Rainfall - 10hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **10** hr
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **2.62**
Rainfall for 10hr storm with 5 year return period	$M5\_10hr_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **59.4** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.86**
Rainfall for 10hr storm with 2 year return period	$M2\_10hr = Z2 \times M5\_10hr_i$ = **51.0** mm
Design rainfall intensity	$I_{max} = M2\_10hr / D$ = **5.1** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.2** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit Design Rainfall - 10hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **24** hr
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **3.60**
Rainfall for 24hr storm with 5 year return period	$M5\_24hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **81.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.87**
Rainfall for 24hr storm with 2 year return period	$M2\_24hr = Z2 \times M5\_24hr_1$ = **71.3** mm
Design rainfall intensity	I_{max} = M2_24hr / D = **3.0** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.1** l/s

Tree Pits- Design Rainfall 1-10 yr

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pits - Design Rainfall - 1:10 year - 5mins				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity	
Location of catchment area	Other
Storm duration	D = **5** min
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.29**
Rainfall for 5min storm with 5 year return period	$M5\_5min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **6.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.20**
Rainfall for 5min storm with 10 year return period	$M10\_5min = Z2 \times M5\_5min_i$ = **7.9** mm
Design rainfall intensity	I_{max} = M10_5min / D = **94.7** mm/hr
Maximum surface water runoff	
Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **2.9** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **10** min
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.43**
Rainfall for 10min storm with 5 year return period	$M5\_10min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **9.8** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.22**
Rainfall for 10min storm with 10 year return period	$M10\_10min = Z2 \times M5\_10min_i$ = **11.9** mm
Design rainfall intensity	I_{max} = M10_10min / D = **71.3** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **2.2** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for Tree pit Design Rainfall - 15mins				Start page no./Revision 1	
	Calcs by MC	Calcs date 17/12/2025	Checked by	Checked date	Approved by	Approved date

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **15** min
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.54**
Rainfall for 15min storm with 5 year return period	$M5\_15min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **12.2** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.23**
Rainfall for 15min storm with 10 year return period	$M10\_15min = Z2 \times M5\_15min_i$ = **15.1** mm
Design rainfall intensity	I_{max} = M10_15min / D = **60.2** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **1.8** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit - Design Rainfall 30mins				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **30** min
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.73**
Rainfall for 30min storm with 5 year return period	$M5\_30min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **16.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.24**
Rainfall for 30min storm with 10 year return period	$M10\_30min = Z2 \times M5\_30min_i$ = **20.5** mm
Design rainfall intensity	I_{max} = M10_30min / D = **41.1** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **1.3** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit Design Rainfall - 1hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **1** hr
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.00**
Rainfall for 1hr storm with 5 year return period	$M5\_1hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **22.7** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.24**
Rainfall for 1hr storm with 10 year return period	$M10\_1hr = Z2 \times M5\_1hr_1$ = **28.1** mm
Design rainfall intensity	I_{max} = M10_1hr / D = **28.1** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.9** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit Design Rainfall - 2hrs				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **2** hr
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.33**
Rainfall for 2hr storm with 5 year return period	$M5\_2hr = Z1 \times M5\_60min \times (1 + p_{climate})$ = **30.2** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.22**
Rainfall for 2hr storm with 10 year return period	$M10\_2hr = Z2 \times M5\_2hr$ = **36.8** mm
Design rainfall intensity	$I_{max} = M10\_2hr / D$ = **18.4** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.6** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit Design Rainfall - 4hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **4** hr
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.77**
Rainfall for 4hr storm with 5 year return period	$M5\_4hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **40.1** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.19**
Rainfall for 4hr storm with 10 year return period	$M10\_4hr = Z2 \times M5\_4hr_1$ = **47.8** mm
Design rainfall intensity	I_{max} = M10_4hr / D = **11.9** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.4** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit Design Rainfall - 6hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **6** hr
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **2.21**
Rainfall for 6hr storm with 5 year return period	$M5\_6hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **50.1** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.17**
Rainfall for 6hr storm with 10 year return period	$M10\_6hr = Z2 \times M5\_6hr_1$ = **58.6** mm
Design rainfall intensity	I_{max} = M10_6hr / D = **9.8** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.3** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit Design Rainfall - 10hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **10** hr
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **2.62**
Rainfall for 10hr storm with 5 year return period	$M5\_10hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **59.4** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.16**
Rainfall for 10hr storm with 10 year return period	$M10\_10hr = Z2 \times M5\_10hr_1$ = **68.9** mm
Design rainfall intensity	I_{max} = M10_10hr / D = **6.9** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.2** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit Design Rainfall - 10hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **24** hr
Return period	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **3.60**
Rainfall for 24hr storm with 5 year return period	$M5\_24hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **81.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.14**
Rainfall for 24hr storm with 10 year return period	$M10\_24hr = Z2 \times M5\_24hr_1$ = **92.9** mm
Design rainfall intensity	I_{max} = M10_24hr / D = **3.9** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.1** l/s

Tree Pits- Design Rainfall 1-100 yr

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pits - Design Rainfall - 5mins				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **5** min
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.29**
Rainfall for 5min storm with 5 year return period	$M5\_5min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **6.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.83**
Rainfall for 5min storm with 100 year return period	$M100\_5min = Z2 \times M5\_5min_i$ = **12.0** mm
Design rainfall intensity	I_{max} = M100_5min / D = **144.3** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **4.4** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Design Rainfall				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **10** min
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.43**
Rainfall for 10min storm with 5 year return period	$M5\_10min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **9.8** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.90**
Rainfall for 10min storm with 100 year return period	$M100\_10min = Z2 \times M5\_10min_i$ = **18.6** mm
Design rainfall intensity	I_{max} = M100_10min / D = **111.4** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **3.4** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree pit Design Rainfall - 15mins				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **15** min
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.54**
Rainfall for 15min storm with 5 year return period	$M5\_15min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **12.2** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.95**
Rainfall for 15min storm with 100 year return period	$M100\_15min = Z2 \times M5\_15min_i$ = **23.8** mm
Design rainfall intensity	I_{max} = M100_15min / D = **95.3** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **2.9** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit - Design Rainfall 30mins				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **30** min
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **0.73**
Rainfall for 30min storm with 5 year return period	$M5\_30min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **16.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **2.00**
Rainfall for 30min storm with 100 year return period	$M100\_30min = Z2 \times M5\_30min_i$ = **33.2** mm
Design rainfall intensity	I_{max} = M100_30min / D = **66.3** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **2.0** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit Design Rainfall - 1hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **1** hr
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.00**
Rainfall for 1hr storm with 5 year return period	$M5\_1hr_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **22.7** mm
Factor Z2 (Wallingford procedure)	Z2 = **2.02**
Rainfall for 1hr storm with 100 year return period	M100_1hr = Z2 × $M5\_1hr_i$ = **45.8** mm
Design rainfall intensity	I_{max} = M100_1hr / D = **45.8** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **1.4** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit Design Rainfall - 2hrs				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **2** hr
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.33**
Rainfall for 2hr storm with 5 year return period	$M5\_2hr_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **30.2** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.97**
Rainfall for 2hr storm with 100 year return period	$M100\_2hr = Z2 \times M5\_2hr_i$ = **59.4** mm
Design rainfall intensity	I_{max} = M100_2hr / D = **29.7** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.9** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit Design Rainfall - 4hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **4** hr
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **1.77**
Rainfall for 4hr storm with 5 year return period	$M5\_4hr_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **40.1** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.89**
Rainfall for 4hr storm with 100 year return period	$M100\_4hr = Z2 \times M5\_4hr_i$ = **75.8** mm
Design rainfall intensity	I_{max} = M100_4hr / D = **19.0** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.6** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit Design Rainfall - 6hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **6** hr
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **2.21**
Rainfall for 6hr storm with 5 year return period	$M5\_6hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **50.1** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.81**
Rainfall for 6hr storm with 100 year return period	$M100\_6hr = Z2 \times M5\_6hr_1$ = **90.7** mm
Design rainfall intensity	I_{max} = M100_6hr / D = **15.1** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.5** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit Design Rainfall - 10hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **10** hr
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **2.62**
Rainfall for 10hr storm with 5 year return period	$M5\_10hr_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **59.4** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.75**
Rainfall for 10hr storm with 100 year return period	$M100\_10hr = Z2 \times M5\_10hr_i$ = **103.7** mm
Design rainfall intensity	I_{max} = M100_10hr / D = **10.4** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.3** l/s

Tekla Tedds	Project				Job no.	
Teicniuil-Priory Consulting Engineers Ltd The Courtyard Killarney	Housing Development at Ardshanavooly				91-24	
	Calcs for				Start page no./Revision	
	Tree Pit Design Rainfall - 10hr				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	MC	17/12/2025				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **24** hr
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.210**
5-year return period rainfall of 60 minutes duration	M5_60min = **18.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %
Factor Z1 (Wallingford procedure)	Z1 = **3.60**
Rainfall for 24hr storm with 5 year return period	$M5\_24hr_1 = Z1 \times M5\_60min \times (1 + p_{climate})$ = **81.6** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.61**
Rainfall for 24hr storm with 100 year return period	$M100\_24hr = Z2 \times M5\_24hr_1$ = **131.7** mm
Design rainfall intensity	I_{max} = M100_24hr / D = **5.5** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **110** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **0.2** l/s