

Tel: 0419842378 Mob: 0877905155 / 0872208633 Email: info@hydrocare.ie

Job Ref: 21-651

Date: 17 February 2022

FAO: SCEG Ltd.

RE: Soakaway Design per BRE 365

Client: Clondalkin Rugby Club

Location: Clondalkin, Co. Dublin

Dear Paul,

We have designed the soakaway per BRE 365 & C697 based on the total impermeable area outlined below, as provided by yourself, and Met Eireann's Extreme Rainfall Return Periods.

Site information supplied by:

SCEG Ltd. 'The Five Roads', Jordanstown, Lusk, Co. Dublin

Total Impermeable Area: 3808.00 m²

Rainfall Information as per Met Eireann:

Data for Lucan, Dublin
30 year return period
Duration = 60 mins
Rainfall Depth = 29.50 mm
Plus 10% climate change = 32.45 mm

The void ratio for the trench fill was set at 30% (0.3) to accommodate the use of granular fill material, i.e. Rounded gravel. The safety factor was taken as 1.

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Soil Infiltration Rate:

Tests carried out on: 20/11/2021 Base of test: 1.1m BGL
WTL: 1.1m BGL

Calculated as per BRE 365: **3.37E-06 m/sec**
(see calculation sheet for details)

The total impermeable area is ca. 3808 square metres and the runoff coefficient is to be set at 1.0 as per BRE 365.

Inflow from:

	Proposed impermeable areas:	Area (m²)	Runoff Volume (m³)
1	Remaining Structures, Access Lane and Impermeable Areas	3808	123.5696
2	-	0	0
3	-	0	0
	Total inflow from:	3808.00	123.5696

The depth of the soakaway pit is set at 0.7m below the invert level of the drain. According to BRE 365 method, the pit was calculated as.

290 m L x 2 m W x 0.7 m D

Storage required in soakaway (Inflow - Outflow):	120.92 m ³
Capacity of pit required to accommodate fill material 30% void:	403.06 m ³
Actual capacity of calculated soakaway:	406.00 m ³

The soakaway shall be constructed in trenches as outlined below:

11 no. trenches:

Trench No. 1	22 m L x 2 m W x 0.7 m D	Volume: 30.8 m ³
Trench No. 2	26 m L x 2 m W x 0.7 m D	Volume: 36.4 m ³
Trench No. 3	28 m L x 2 m W x 0.7 m D	Volume: 39.2 m ³
Trench No. 4	34 m L x 2 m W x 0.7 m D	Volume: 47.6 m ³
Trench No. 5	35 m L x 2 m W x 0.7 m D	Volume: 49 m ³
Trench No. 6	35 m L x 2 m W x 0.7 m D	Volume: 49 m ³
Trench No. 7	30 m L x 2 m W x 0.7 m D	Volume: 42 m ³
Trench No. 8	20 m L x 2 m W x 0.7 m D	Volume: 28 m ³
Trench No. 9	10 m L x 2 m W x 0.7 m D	Volume: 14 m ³
Trench No. 10	30 m L x 2 m W x 0.7 m D	Volume: 42 m ³
Trench No. 11	20 m L x 2 m W x 0.7 m D	Volume: 28 m ³
		Total Volume of 406 m³

NB

During the design process, a Silt Trap **must** be incorporated into any drains discharging into the soakaway system. All inflow from permeable paved areas must pass through a suitable geotextile to ensure filtration of fines.

NB

Any paved surface runoff or runoff from a Car parking area **must** pass through an oil interceptor \ hydrocarbon retention geotextile before discharge to the soakaway.

NB

Please note that for the purpose of this design, the fill material used must have no less free volume than 30%.

NB

This design will comply with BRE 365's 24-hour maximum limit for Half-Empty time, with a half empty time of 22 hrs 49 mins

NB

The base of the soakaway has **not** been included in the design calculations.

NB

All elements of the soakaway **must** be well maintained by suitable professionals, *i.e. Silt Traps must be regularly cleaned.*

NB

Please note that all relevant aspects of BRE365 **must** be taken into account in the design and installation of this Soakaway system, eg. Min. 5m separation distance from building foundations.

Hoping this is to your Satisfaction

Yours sincerely,



Daniel Nolan, BA BAI, Msc Environmental Engineering, FETAC Site Assesor

Hydrocare Environmental Ltd. - BRE365 Design Calculations

CLIENT: Clondalkin Rugby Club
 LOCATION: Clondalkin, Co. Dublin

Infiltration Rate				
Test Hole Dimensions:		$V_{p75-25} =$	$2 \times 1 \times (1.125 - 0.375)$	$= 1.5 \text{ m}^3$
Length [m]	2.00	$A_{50} =$	$(2 \times 0.75 \times 2) + (1 \times 0.75 \times 2) + (2 \times 1)$	$= 6.5 \text{ m}^2$
Width [m]	1.00	$f =$	$\frac{1.5}{6.5 \times 1140 \times 60}$	$= 3.37E-06 \text{ m/s}$
Depth [m]	1.50			
Drop Time [min]	1140			
Inflow and Outflow				
Impermeable Area [m ²]	3808.40	Inflow =	3808×0.03245	$= 123.5696 \text{ m}^3$
Rainfall Depth [mm]	32.45	$A_{50(1)} =$	$(22 \times 0.35 \times 2) + (2 \times 0.35 \times 2)$	$= 16.8 \text{ m}^2$
Soakaway No. 1 Length [m]	22.00	Outflow (1) =	$16.8 \times 0.0000034 \times 3600$	$= 0.204049 \text{ m}^3$
Soakaway Width [m]	2.00	$A_{50(2)} =$	$(26 \times 0.35 \times 2) + (2 \times 0.35 \times 2)$	$= 19.6 \text{ m}^2$
Soakaway Depth [m]	0.70	Outflow (2) =	$19.6 \times 0.0000034 \times 3600$	$= 0.238057 \text{ m}^3$
Storm Duration [min]	60	$A_{50(3)} =$	$(28 \times 0.35 \times 2) + (2 \times 0.35 \times 2)$	$= 21 \text{ m}^2$
Soakaway No. 2 Length [m]	26.00	Outflow (3) =	$21 \times 123.5696 \times 3600$	$= 0.255061 \text{ m}^3$
Soakaway Width [m]	2.00	$A_{50(4)} =$	$(34 \times 0.35 \times 2) + (2 \times 0.35 \times 2)$	$= 25.2 \text{ m}^2$
Soakaway Depth [m]	0.70	Outflow (4) =	$25.2 \times 0.2040486 \times 3600$	$= 0.306073 \text{ m}^3$
Storm Duration [min]	60	$A_{50(5)} =$	$(35 \times 0.35 \times 2) + (2 \times 0.35 \times 2)$	$= 25.9 \text{ m}^2$
Soakaway No. 3 Length [m]	28.00	Outflow (5) =	$25.9 \times 0.2380567 \times 3600$	$= 0.314575 \text{ m}^3$
Soakaway Width [m]	2.00	$A_{50(6)} =$	$(35 \times 0.35 \times 2) + (2 \times 0.35 \times 2)$	$= 25.9 \text{ m}^2$
Soakaway Depth [m]	0.70	Outflow (6) =	$25.9 \times 0.2550607 \times 3600$	$= 0.314575 \text{ m}^3$
Storm Duration [min]	60	$A_{50(7)} =$	$(30 \times 0.35 \times 2) + (2 \times 0.35 \times 2)$	$= 22.4 \text{ m}^2$
Soakaway No. 4 Length [m]	34.00	Outflow (7) =	$22.4 \times 0.3060729 \times 3600$	$= 0.272065 \text{ m}^3$
Soakaway Width [m]	2.00	$A_{50(8)} =$	$(20 \times 0.35 \times 2) + (2 \times 0.35 \times 2)$	$= 15.4 \text{ m}^2$
Soakaway Depth [m]	0.70	Outflow (8) =	$15.4 \times 0.3145749 \times 3600$	$= 0.187045 \text{ m}^3$
Storm Duration [min]	60	$A_{50(9)} =$	$(10 \times 0.35 \times 2) + (2 \times 0.35 \times 2)$	$= 8.4 \text{ m}^2$
Soakaway No. 5 Length [m]	35.00	Outflow (9) =	$8.4 \times 0.3145749 \times 3600$	$= 0.102024 \text{ m}^3$
Soakaway Width [m]	2.00	$A_{50(10)} =$	$(30 \times 0.35 \times 2) + (2 \times 0.35 \times 2)$	$= 22.4 \text{ m}^2$
Soakaway Depth [m]	0.70	Outflow (10) =	$22.4 \times 0.2720648 \times 3600$	$= 0.272065 \text{ m}^3$
Storm Duration [min]	60	$A_{50(11)} =$	$(20 \times 0.35 \times 2) + (2 \times 0.35 \times 2)$	$= 15.4 \text{ m}^2$
Soakaway No. 6 Length [m]	35.00	Outflow (11) =	$15.4 \times 0.1870445 \times 3600$	$= 0.187045 \text{ m}^3$
Soakaway Width [m]	2.00	$A_{50} =$	$A_{50(1)} + A_{50(2)}$	$= 218.4 \text{ m}^2$
Soakaway Depth [m]	0.70	Outflow =	$218.4 \times 0.0000034 \times 3600$	$= 2.652632 \text{ m}^3$
Storm Duration [min]	60			
Soakaway No. 7 Length [m]	30.00			
Soakaway Width [m]	2.00			
Soakaway Depth [m]	0.70			
Storm Duration [min]	60			
Soakaway No. 8 Length [m]	20.00			
Soakaway Width [m]	2.00			
Soakaway Depth [m]	0.70			
Storm Duration [min]	60			
Soakaway No. 9 Length [m]	10.00			
Soakaway Width [m]	2.00			
Soakaway Depth [m]	0.70			
Storm Duration [min]	60			
Soakaway No. 10 Length [m]	30.00			
Soakaway Width [m]	2.00			
Soakaway Depth [m]	0.70			
Storm Duration [min]	60			
Soakaway No. 11 Length [m]	20.00			
Soakaway Width [m]	2.00			
Soakaway Depth [m]	0.70			
Storm Duration [min]	60			
Volume Required				
Void Ratio (%)	30%	Storage =	$123.5696 - 2.652632$	$= 120.92 \text{ m}^3$
		Volume =	$\frac{120.9170}{0.3}$	$= 403.06 \text{ m}^3$
Half Empty Time				
$T_{50} =$	$\frac{5 \times 0.5}{A_{50} \times f}$	$=$	$\frac{120.917 \times 0.5}{218.4 \times 0.00000337 \times 3600}$	$= 22.82 \text{ hrs}$
				$= 22 \text{ hrs } 49 \text{ mins}$



BRE 365 TEST HOLE

Dims: 2 m L x 1 m W x 1.5 m D
Date: 20/11/2021
Client: Clondalkin Rugby Club
Location: Clondalkin, Co. Dublin

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 303650, Northing: 234671,

DURATION	Interval	Years														
		2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,	
5 mins	2.3, 3.4,	4.1,	5.0,	5.7,	6.2,	8.0,	10.1,	11.5,	13.5,	15.3,	16.7,	19.0,	20.8,	22.2,	N/A,	
10 mins	3.2, 4.8,	5.7,	7.0,	8.0,	8.7,	11.2,	14.0,	16.0,	18.8,	21.3,	23.3,	26.5,	28.9,	31.0,	N/A,	
15 mins	3.8, 5.7,	6.7,	8.3,	9.4,	10.2,	13.1,	16.5,	18.8,	22.1,	25.1,	27.4,	31.1,	34.0,	36.4,	N/A,	
30 mins	5.0, 7.4,	8.7,	10.6,	12.0,	13.1,	16.6,	20.8,	23.6,	27.5,	31.1,	33.9,	38.3,	41.8,	44.6,	N/A,	
1 hours	6.6, 9.6,	11.2,	13.7,	15.4,	16.7,	21.1,	26.1,	29.5,	34.3,	38.6,	42.0,	47.2,	51.3,	54.7,	N/A,	
2 hours	8.8, 12.5,	14.6,	17.6,	19.7,	21.4,	26.7,	32.9,	36.9,	42.7,	47.9,	51.9,	58.1,	62.9,	66.9,	N/A,	
3 hours	10.3, 14.6,	17.0,	20.5,	22.8,	24.7,	30.7,	37.6,	42.1,	48.6,	54.3,	58.7,	65.6,	70.9,	75.3,	N/A,	
4 hours	11.6, 16.3,	18.9,	22.7,	25.3,	27.3,	33.9,	41.3,	46.3,	53.2,	59.4,	64.1,	71.5,	77.2,	82.0,	N/A,	
6 hours	13.7, 19.1,	22.0,	26.3,	29.3,	31.5,	38.9,	47.3,	52.8,	60.5,	67.3,	72.6,	80.7,	87.0,	92.3,	N/A,	
9 hours	16.1, 22.3,	25.6,	30.5,	33.8,	36.4,	44.7,	54.1,	60.2,	68.8,	76.3,	82.2,	91.2,	98.1,	103.9,	N/A,	
12 hours	18.1, 24.9,	28.5,	33.9,	37.5,	40.3,	49.4,	59.5,	66.1,	75.3,	83.5,	89.8,	99.4,	106.8,	113.0,	N/A,	
18 hours	21.3, 29.1,	33.2,	39.3,	43.4,	46.5,	56.7,	68.0,	75.4,	85.6,	94.7,	101.6,	112.3,	120.4,	127.2,	N/A,	
24 hours	23.9, 32.5,	37.0,	43.7,	48.1,	51.5,	62.6,	74.8,	82.7,	93.8,	103.5,	111.0,	122.4,	131.1,	138.3,	163.4,	
2 days	29.9, 39.6,	44.6,	51.9,	56.8,	60.4,	72.1,	84.9,	93.2,	104.5,	114.3,	121.8,	133.2,	141.9,	149.0,	173.4,	
3 days	34.8, 45.4,	50.8,	58.6,	63.7,	67.6,	80.0,	93.3,	101.8,	113.4,	123.5,	131.2,	142.7,	151.5,	158.7,	183.1,	
4 days	39.1, 50.5,	56.2,	64.5,	69.8,	73.9,	86.8,	100.6,	109.4,	121.3,	131.7,	139.5,	151.2,	160.1,	167.4,	192.0,	
6 days	46.6, 59.3,	65.6,	74.6,	80.4,	84.8,	98.6,	113.3,	122.5,	135.1,	145.8,	153.9,	166.1,	175.3,	182.7,	207.9,	
8 days	53.3, 67.0,	73.8,	83.4,	89.6,	94.3,	108.9,	124.3,	134.0,	147.1,	158.2,	166.6,	179.1,	188.5,	196.1,	221.9,	
10 days	59.5, 74.1,	81.3,	91.5,	98.0,	103.0,	118.2,	134.3,	144.3,	157.8,	169.3,	178.0,	190.8,	200.5,	208.3,	234.5,	
12 days	65.2, 80.7,	88.2,	98.9,	105.8,	110.9,	126.8,	143.5,	153.9,	167.8,	179.6,	188.5,	201.6,	211.5,	219.5,	246.2,	
16 days	75.9, 92.8,	101.1,	112.7,	120.0,	125.6,	142.6,	160.3,	171.2,	185.9,	198.3,	207.5,	221.3,	231.5,	239.8,	267.4,	
20 days	85.7, 104.0,	112.9,	125.2,	133.1,	138.9,	156.9,	175.5,	187.0,	202.3,	215.2,	224.8,	239.0,	249.6,	258.1,	286.5,	
25 days	97.3, 117.1,	126.6,	139.8,	148.1,	154.4,	173.4,	193.0,	205.1,	221.1,	234.5,	244.5,	259.3,	270.3,	279.1,	308.3,	

NOTES:

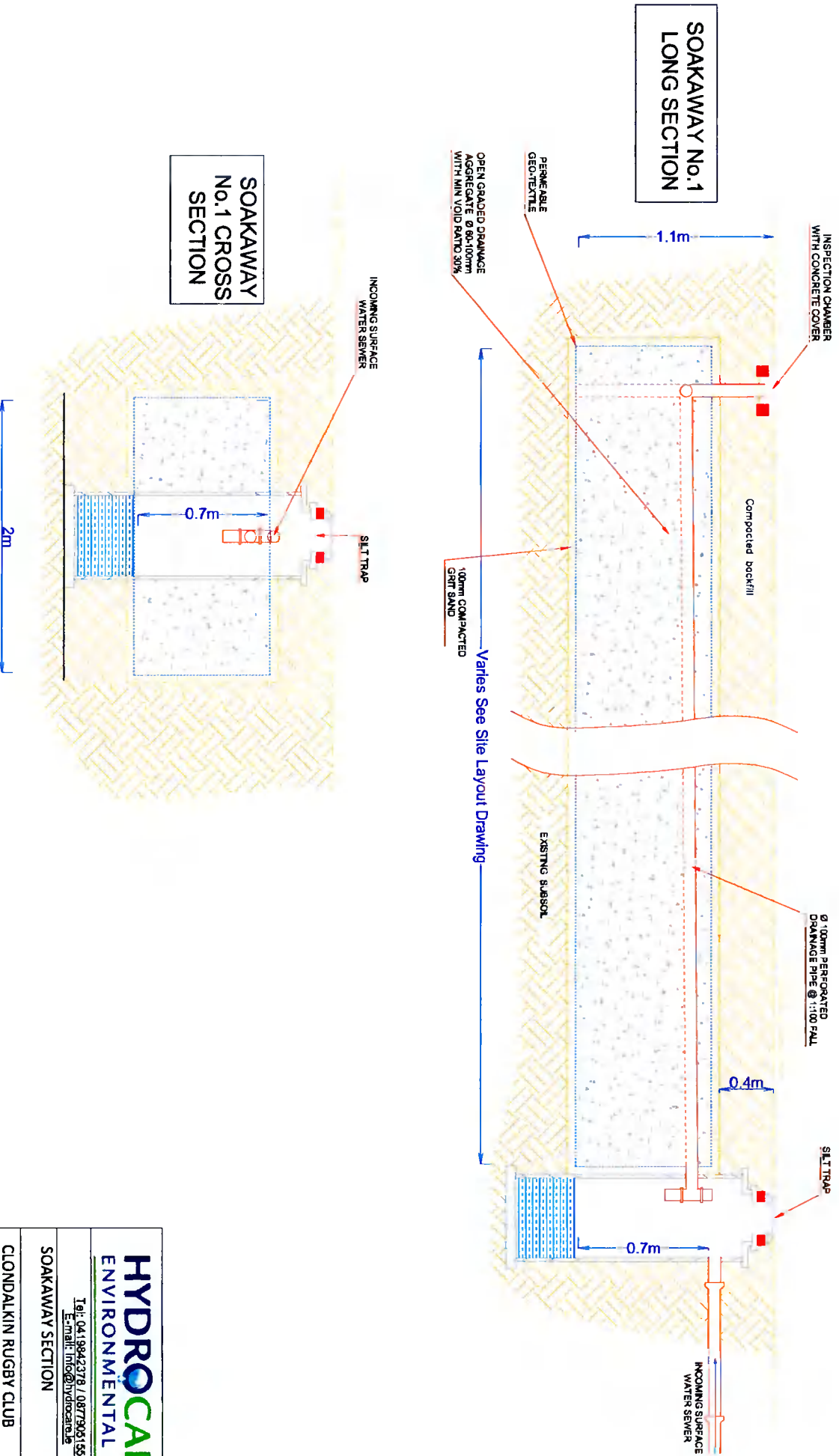
N/A Data not available

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



Tel: 041 9842378 / 0877906155 E-mail: info@hydrocare.ie	
SOAKAWAY SECTION	
CLONDALKIN RUGBY CLUB	
CLONDALKIN, CO. DUBLIN	
SCALE n15	DATE: 17/02/2022

Job Ref: 21-651

Date: 17 February 2022

FAO: SCEG Ltd.

RE: Soakaway Design per BRE 365

Client: Clondalkin Rugby Club

Location: Clondalkin, Co. Dublin

Dear Paul,

We have designed the soakaway per BRE 365 & C697 based on the total impermeable area outlined below, as provided by yourself, and Met Eireann's Extreme Rainfall Return Periods.

Site information supplied by:

SCEG Ltd. 'The Five Roads', Jordanstown, Lusk, Co. Dublin

Total Impermeable Area: 2295.00 m²

Rainfall Information as per Met Eireann:

Data for Lucan, Dublin
30 year return period
Duration = 60 mins
Rainfall Depth = 29.50 mm
Plus 10% climate change = 32.45 mm

The void ratio for the trench fill was set at 30% (0.3) to accommodate the use of granular fill material, i.e. Rounded gravel. The safety factor was taken as 1.

Soil Infiltration Rate:			
Tests carried out on:	20/11/2021	Base of test:	1.7m BGL
		WTL:	NA
Calculated as per BRE 365:	7.30E-06 m/sec (see calculation sheet for details)		

The total impermeable area is ca. 2295 square metres and the runoff coefficient is to be set at 1.0 as per BRE 365.

Inflow from:			
	Proposed impermeable areas:	Area (m²)	Runoff Volume (m³)
1	South East Car Park and Access Lane	2295	74.47275
2	-	0	0
3	-	0	0
4	-	0	0
	Total inflow from:	2295.00	74.47275

The depth of the soakaway pit is set at 1.3m below the invert level of the drain. According to BRE 365 method, the pit was calculated as.

$$62 \text{ m L} \times 3 \text{ m W} \times 1.3 \text{ m D}$$

Storage required in soakaway (Inflow - Outflow):	72.25 m ³
Capacity of pit required to accommodate fill material 30% void:	240.84 m ³
Actual capacity of calculated soakaway:	241.80 m ³

The soakaway shall be constructed in trenches as outlined below:

1 no. trenches:

Trench No. 1

62 m L x 3 m W x 1.3 m D

Volume: 241.8 m³

Total Volume of 241.8 m³

NB

During the design process, a Silt Trap **must** be incorporated into any drains discharging into the soakaway system. All inflow from permeable paved areas must pass through a suitable geotextile to ensure filtration of fines.

NB

Any paved surface runoff or runoff from a Car parking area **must** pass through an oil interceptor \ hydrocarbon retention geotextile before discharge to the soakaway.

NB

Please note that for the purpose of this design, the fill material used must have no less free volume than 30%.

NB

This design will comply with BRE 365's 24-hour maximum limit for Half-Empty time, with a half empty time of 16 hrs 16 mins

NB

The base of the soakaway has **not** been included in the design calculations.

NB

All elements of the soakaway **must** be well maintained by suitable professionals, *i.e. Silt Traps must be regularly cleaned.*

NB

Please note that all relevant aspects of BRE365 **must** be taken into account in the design and installation of this Soakaway system, eg. Min. 5m separation distance from building foundations.

Hoping this is to your Satisfaction

Yours sincerely,



Daniel Nolan, BA BAI, Msc Environmental Engineering, FETAC Site Assesor

Hydrocare Environmental Ltd. - BRE365 Design Calculations

CLIENT: Clonsalkin Rugby Club
 LOCATION: Clonsalkin, Co. Dublin

Infiltration Rate

Test Hole Dimensions:

Length [m]	2.50
Width [m]	0.90
Depth [m]	1.70
Drop Time [min]	544

$$V_{p75-25} = 2.5 \times 0.9 \times (1.275 - 0.425) = 1.9125 \text{ m}^3$$

$$A_{p50} = (2.5 \times 0.85 \times 2) + (0.9 \times 0.85 \times 2) + (2.5 \times 0.9) = 8.03 \text{ m}^2$$

$$f = \frac{1.9125}{8.03 \times 544 \times 60} = 7.30\text{E-}06 \text{ m/s}$$

Inflow and Outflow

Impermeable Area [m ²]	2295.00
Rainfall Depth [mm]	32.45

$$\text{Inflow} = 2295 \times 0.03245 = 74.47275 \text{ m}^3$$

Soakaway Length [m]	62.00
Soakaway Width [m]	3.00
Soakaway Depth [m]	1.30
Storm Duration [min]	60

$$A_{s50} = (62 \times 0.65 \times 2) + (3 \times 0.65 \times 2) = 84.5 \text{ m}^2$$

$$\text{Outflow} = 84.5 \times 0.0000073 \times 3600 = 2.219703 \text{ m}^3$$

Volume Required

Void Ratio [%]	30%
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$$\text{Storage} = 74.47275 - 2.219703 = 72.25 \text{ m}^3$$

$$\text{Volume} = \frac{72.2530}{0.3} = 240.84 \text{ m}^3$$

Half Empty Time

$$T_{s50} = \frac{S \times 0.5}{A_{s50} \times f} = \frac{72.253 \times 0.5}{84.5 \times 0.0000073 \times 3600} = 16.27 \text{ hrs}$$

$$= 16 \text{ hrs } 16 \text{ mins}$$



BRE 365 TEST HOLE

Dims: 2.5 m L x 0.9 m W x 1.7 m D
Date: 20/11/2021
Client: Clondalkin Rugby Club
Location: Clondalkin, Co. Dublin

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 303650, Northing: 234671,

DURATION	Interval 6months, 1year,	Years													
		2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.3, 3.4,	4.1,	5.0,	5.7,	6.2,	8.0,	10.1,	11.5,	13.5,	15.3,	16.7,	19.0,	20.8,	22.2,	N/A,
10 mins	3.2, 4.8,	5.7,	7.0,	8.0,	8.7,	11.2,	14.0,	16.0,	18.8,	21.3,	23.3,	26.5,	28.9,	31.0,	N/A,
15 mins	3.8, 5.7,	6.7,	8.3,	9.4,	10.2,	13.1,	16.5,	18.8,	22.1,	25.1,	27.4,	31.1,	34.0,	36.4,	N/A,
30 mins	5.0, 7.4,	8.7,	10.6,	12.0,	13.1,	16.6,	20.8,	23.6,	27.5,	31.1,	33.9,	38.3,	41.8,	44.6,	N/A,
1 hours	6.6, 9.6,	11.2,	13.7,	15.4,	16.7,	21.1,	26.1,	29.5,	34.3,	38.6,	42.0,	47.2,	51.3,	54.7,	N/A,
2 hours	8.8, 12.5,	14.6,	17.6,	19.7,	21.4,	26.7,	32.9,	36.9,	42.7,	47.9,	51.9,	58.1,	62.9,	66.9,	N/A,
3 hours	10.3, 14.6,	17.0,	20.5,	22.8,	24.7,	30.7,	37.6,	42.1,	48.6,	54.3,	58.7,	65.6,	70.9,	75.3,	N/A,
4 hours	11.6, 16.3,	18.9,	22.7,	25.3,	27.3,	33.9,	41.3,	46.3,	53.2,	59.4,	64.1,	71.5,	77.2,	82.0,	N/A,
6 hours	13.7, 19.1,	22.0,	26.3,	29.3,	31.5,	38.9,	47.3,	52.8,	60.5,	67.3,	72.6,	80.7,	87.0,	92.3,	N/A,
9 hours	16.1, 22.3,	25.6,	30.5,	33.8,	36.4,	44.7,	54.1,	60.2,	68.8,	76.3,	82.2,	91.2,	98.1,	103.9,	N/A,
12 hours	18.1, 24.9,	28.5,	33.9,	37.5,	40.3,	49.4,	59.5,	66.1,	75.3,	83.5,	89.8,	99.4,	106.8,	113.0,	N/A,
18 hours	21.3, 29.1,	33.2,	39.3,	43.4,	46.5,	56.7,	68.0,	75.4,	85.6,	94.7,	101.6,	112.3,	120.4,	127.2,	N/A,
24 hours	23.9, 32.5,	37.0,	43.7,	48.1,	51.5,	62.6,	74.8,	82.7,	93.8,	103.5,	111.0,	122.4,	131.1,	138.3,	163.4,
2 days	29.9, 39.6,	44.6,	51.9,	56.8,	60.4,	72.1,	84.9,	93.2,	104.5,	114.3,	121.8,	133.2,	141.9,	149.0,	173.4,
3 days	34.8, 45.4,	50.8,	58.6,	63.7,	67.6,	80.0,	93.3,	101.8,	113.4,	123.5,	131.2,	142.7,	151.5,	158.7,	183.1,
4 days	39.1, 50.5,	56.2,	64.5,	69.8,	73.9,	86.8,	100.6,	109.4,	121.3,	131.7,	139.5,	151.2,	160.1,	167.4,	192.0,
6 days	46.6, 59.3,	65.6,	74.6,	80.4,	84.8,	98.6,	113.3,	122.5,	135.1,	145.8,	153.9,	166.1,	175.3,	182.7,	207.9,
8 days	53.3, 67.0,	73.8,	83.4,	89.6,	94.3,	108.9,	124.3,	134.0,	147.1,	158.2,	166.6,	179.1,	188.5,	196.1,	221.9,
10 days	59.5, 74.1,	81.3,	91.5,	98.0,	103.0,	118.2,	134.3,	144.3,	157.8,	169.3,	178.0,	190.8,	200.5,	208.3,	234.5,
12 days	65.2, 80.7,	88.2,	98.9,	105.8,	110.9,	126.8,	143.5,	153.9,	167.8,	179.6,	188.5,	201.6,	211.5,	219.5,	246.2,
16 days	75.9, 92.8,	101.1,	112.7,	120.0,	125.6,	142.6,	160.3,	171.2,	185.9,	198.3,	207.5,	221.3,	231.5,	239.8,	267.4,
20 days	85.7, 104.0,	112.9,	125.2,	133.1,	138.9,	156.9,	175.5,	187.0,	202.3,	215.2,	224.8,	239.0,	249.6,	258.1,	286.5,
25 days	97.3, 117.1,	126.6,	139.8,	148.1,	154.4,	173.4,	193.0,	205.1,	221.1,	234.5,	244.5,	259.3,	270.3,	279.1,	308.3,

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

Job Ref: 20-629

21/02/2022

Planning & Environmental Dept,
South Dublin County Council,
County Hall,
Tallaght,
Dublin 24.

Re: Surface Water Drainage Proposal

Applicant: Clondalkin Rugby Club
Site Address: Clondalkin, Co. Dublin

To Whom it Concerns,

Hydrocare Environmental Ltd have been retained by the applicant to carry out Infiltration Rate Tests per BRE Digest 365 and design a surface water drainage proposal for the proposed new Clondalkin Rugby Club development located in Clondalkin, Co. Dublin.

The infiltration rate tests have yielded very good drainage across the entire site area. It is proposed to install soakaways to cater for the surface water runoff from the impermeable surfaces at this proposed development. The soakaways have been designed to achieve the storage volume and half empty time less than 24-hours per BRE Digest 365 requirements.

The site area has been broken down into three sections with a separate soakaway design and BRE report for each section. All soakaways are connected with high-level overflows for balancing in exceedance storm events. A high-level overflow is also proposed to discharge from the soakaway network to the Camac River northwest of the proposed development.

The runoff water from the high-level overflow to the Camac River will only discharge in exceedance storm events. The surface water runoff to the Camac River via the high-level overflow will be clean as the soakaways will provide a level of pre-treatment and filtration. Additionally it is proposed to install a filter drain that is 69m(L) x 0.6m(W) x 0.6m(D) to act as a conveyance channel for the high level overflows down to the Camac River. Silt traps have also been included at the inlet into the soakaways.

Please BRE Reports appended herewith.

We hope the above is to your satisfaction,

Yours sincerely,



Daniel Nolan, BA BAI, Msc Environmental Engineering, FETAC Site Assessor

Tel: 0419842378 Mob: 0877905155 / 0872208633 Email: info@hydrocare.ie

Job Ref: 21-651

Date: 21 February 2022

FAO: SCEG Ltd.

RE: Soakaway Design per BRE 365

Client: Clondalkin Rugby Club

Location: Clondalkin, Co. Dublin

Dear Paul,

We have designed the soakaway per BRE 365 & C697 based on the total impermeable area outlined below, as provided by yourself, and Met Eireann's Extreme Rainfall Return Periods.

Site information supplied by:

SCEG Ltd. 'The Five Roads', Jordanstown, Lusk, Co. Dublin

Total Impermeable Area: 1929.50 m²

Rainfall Information as per Met Eireann:

Data for Lucan, Dublin

30 year return period

Duration = 60 min

Rainfall Depth = 29.50 mm

Plus 10% climate change = 32.45 mm

The void ratio for the trench fill was set at 30% (0.3) to accommodate the use of granular fill material, i.e. Rounded gravel. The safety factor was taken as 1.

Soil Infiltration Rate:

Tests carried out on: 20/11/2021 Base of test: 1.7m BGL
WTL: NA

Calculated as per BRE 365: 1.06E-05 m/sec
(see calculation sheet for details)

The total impermeable area is ca. 1929.5 square metres and the runoff coefficient is to be set at 1.0 as per BRE 365.

Inflow from:

	Proposed impermeable areas:	Area (m ²)	Runoff Volume (m ³)
1	Main Entrance, Central Car Park and Main	1929.5	62.612275
2	-	0	0
3	-	0	0
4	-	0	0
	Total inflow from:	1929.50	62.612275

The depth of the soakaway pit is set at 1.3m below the invert level of the drain. According to BRE 365 method, the pit was calculated as.

55 m L x 3 m W x 1.3 m D

Storage required in soakaway (Inflow - Outflow):	59.58 m ³
Capacity of pit required to accommodate fill material 30% void:	198.61 m ³
Actual capacity of calculated soakaway:	214.50 m ³

The soakaway shall be constructed in trenches as outlined below:

2 no. trenches:

Trench No. 1 45 m L x 3 m W x 1.3 m D Volume: 175.5 m³
Trench No. 2 10 m L x 3 m W x 1.3 m D Volume: 39 m³
Total Volume of 214.5 m³

NB

During the design process, a Silt Trap **must** be incorporated into any drains discharging into the soakaway system. All inflow from permeable paved areas must pass through a suitable geotextile to ensure filtration of fines.

NB

Any paved surface runoff or runoff from a Car parking area **must** pass through an oil interceptor \ hydrocarbon retention geotextile before discharge to the soakaway.

NB

Please note that for the purpose of this design, the fill material used must have no less free volume than 30%.

NB

This design will comply with BRE 365's 24-hour maximum limit for Half-Empty time, with a half empty time of 9 hrs 50 mins

NB

The base of the soakaway has **not** been included in the design calculations.

NB

All elements of the soakaway **must** be well maintained by suitable professionals, *i.e. Silt Traps must be regularly cleaned.*

NB

Please note that all relevant aspects of BRE365 **must** be taken into account in the design and installation of this Soakaway system, eg. Min. 5m separation distance from building foundations.

Hoping this is to your Satisfaction

Yours sincerely,



Daniel Nolan, BA BAI, Msc Environmental Engineering, FETAC Site Assesor

Hydrocare Environmental Ltd. - BRE365 Design Calculations

CLIENT: Clonsilla Rugby Club
 LOCATION: Clonsilla, Co. Dublin

<u>Infiltration Rate</u>				
Test Hole Dimensions:		$V_{p75-25} =$	$2.5 \times 0.9 \times (1.275 - 0.425)$	$= 1.9125 \text{ m}^3$
Length [m]	2.50	$A_{p50} =$	$(2.5 \times 0.85 \times 2) + (0.9 \times 0.85 \times 2) + (2.5 \times 0.9)$	$= 8.03 \text{ m}^2$
Width [m]	0.90	$f =$	$\frac{1.9125}{8.03 \times 374 \times 60}$	$= 1.06\text{E-}05 \text{ m/s}$
Depth [m]	1.70			
Drop Time [min]	374			
<u>Inflow and Outflow</u>				
Impermeable Area [m ²]	1929.50	Inflow =	1929.5×0.03245	$= 62.612275 \text{ m}^3$
Rainfall Depth [mm]	32.45			
Soakaway No. 1 Length [m]	45.00	$A_{s50(1)} =$	$(45 \times 0.65 \times 2) + (3 \times 0.65 \times 2)$	$= 62.4 \text{ m}^2$
Soakaway Width [m]	3.00	Outflow (1) =	$62.4 \times 0.0000106 \times 3600$	$= 2.384241 \text{ m}^3$
Soakaway Depth [m]	1.30			
Storm Duration [min]	60			
Soakaway No. 2 Length [m]	10.00	$A_{s50(2)} =$	$(10 \times 0.65 \times 2) + (3 \times 0.65 \times 2)$	$= 16.9 \text{ m}^2$
Soakaway Width [m]	3.00	Outflow (2) =	$16.9 \times 0.0000106 \times 3600$	$= 0.645732 \text{ m}^3$
Soakaway Depth [m]	1.30			
Storm Duration [min]	60			
		$A_{s50} =$	$A_{s50(1)} + A_{s50(2)}$	$= 79.3 \text{ m}^2$
		Outflow =	$79.3 \times 0.0000106 \times 3600$	$= 3.029973 \text{ m}^3$
<u>Volume Required</u>				
Void Ratio [%]	30%	Storage =	$62.612275 - 3.029973$	$= 59.58 \text{ m}^3$
		Volume =	$\frac{59.5823}{0.3}$	$= 198.61 \text{ m}^3$
<u>Half Empty Time</u>				
		$T_{s50} =$	$\frac{S \times 0.5}{A_{s50} \times f}$	$= \frac{59.5823 \times 0.5}{79.3 \times 0.00001061 \times 3600}$
				$= 9.84 \text{ hrs}$
				$= 9 \text{ hrs } 50 \text{ mins}$



BRE 365 TEST HOLE

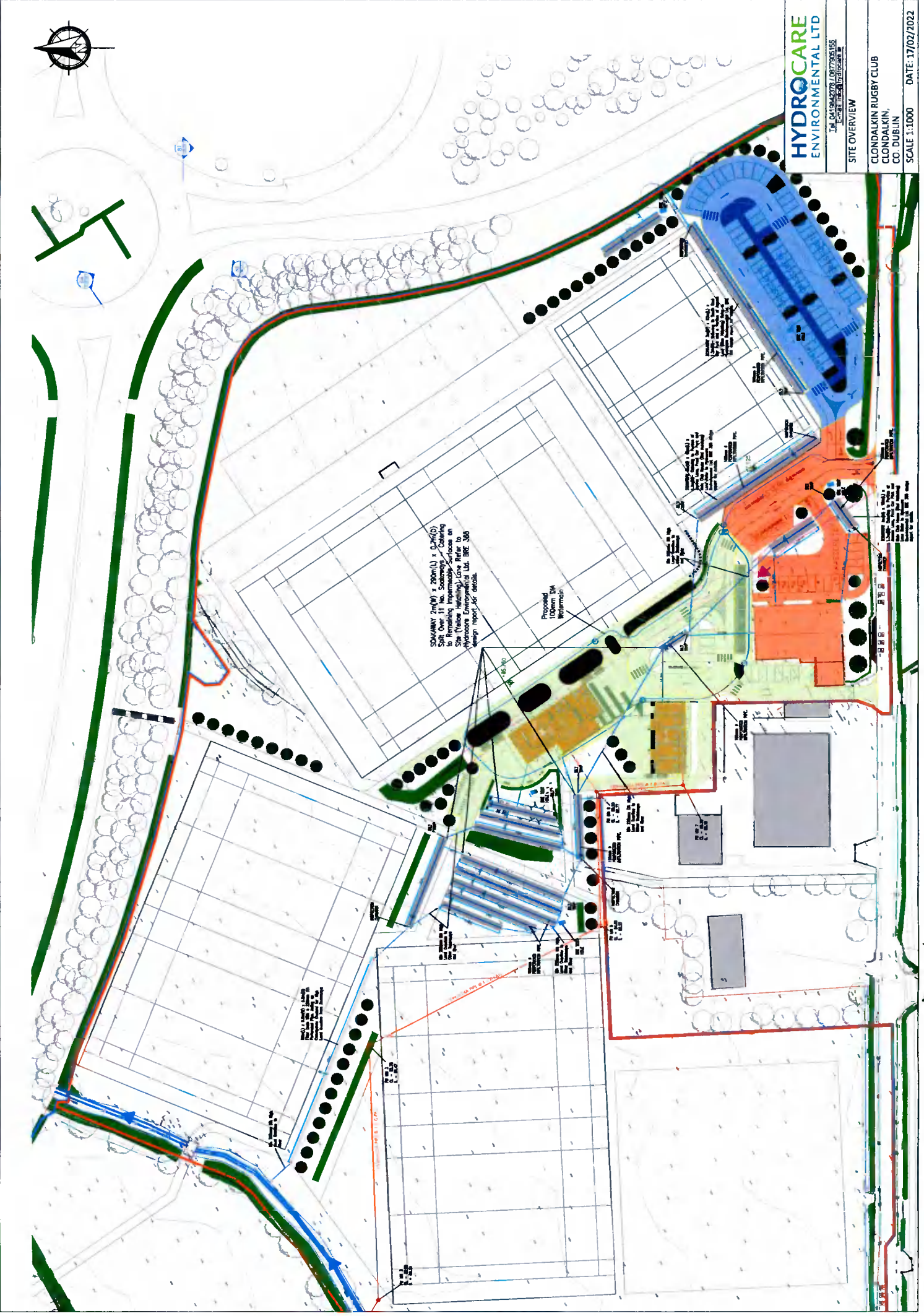
Dims: 2.5 m L x 0.9 m W x 1.7 m D
Date: 20/11/2021
Client: Clondalkin Rugby Club
Location: Clondalkin, Co. Dublin

Met Eireann
 Return Period Rainfall Depths for sliding Durations
 Irish Grid: Easting: 303650, Northing: 234671,

DURATION	Interval	Years														
		2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,	
5 mins	2.3, 3.4,	4.1,	5.0,	5.7,	6.2,	8.0,	10.1,	11.5,	13.5,	15.3,	16.7,	19.0,	20.8,	22.2,	N/A,	
10 mins	3.2, 4.8,	5.7,	7.0,	8.0,	8.7,	11.2,	14.0,	16.0,	18.8,	21.3,	23.3,	26.5,	28.9,	31.0,	N/A,	
15 mins	3.8, 5.7,	6.7,	8.3,	9.4,	10.2,	13.1,	16.5,	18.8,	22.1,	25.1,	27.4,	31.1,	34.0,	36.4,	N/A,	
30 mins	5.0, 7.4,	8.7,	10.6,	12.0,	13.1,	16.6,	20.8,	23.6,	27.5,	31.1,	33.9,	38.3,	41.8,	44.6,	N/A,	
1 hours	6.6, 9.6,	11.2,	13.7,	15.4,	16.7,	21.1,	26.1,	29.5,	34.3,	38.6,	42.0,	47.2,	51.3,	54.7,	N/A,	
2 hours	8.8, 12.5,	14.6,	17.6,	19.7,	21.4,	26.7,	32.9,	36.9,	42.7,	47.9,	51.9,	58.1,	62.9,	66.9,	N/A,	
3 hours	10.3, 14.6,	17.0,	20.5,	22.8,	24.7,	30.7,	37.6,	42.1,	48.6,	54.3,	58.7,	65.6,	70.9,	75.3,	N/A,	
4 hours	11.6, 16.3,	18.9,	22.7,	25.3,	27.3,	33.9,	41.3,	46.3,	53.2,	59.4,	64.1,	71.5,	77.2,	82.0,	N/A,	
6 hours	13.7, 19.1,	22.0,	26.3,	29.3,	31.5,	38.9,	47.3,	52.8,	60.5,	67.3,	72.6,	80.7,	87.0,	92.3,	N/A,	
9 hours	16.1, 22.3,	25.6,	30.5,	33.8,	36.4,	44.7,	54.1,	60.2,	68.8,	76.3,	82.2,	91.2,	98.1,	103.9,	N/A,	
12 hours	18.1, 24.9,	28.5,	33.9,	37.5,	40.3,	49.4,	59.5,	66.1,	75.3,	83.5,	89.8,	99.4,	106.8,	113.0,	N/A,	
18 hours	21.3, 29.1,	33.2,	39.3,	43.4,	46.5,	56.7,	68.0,	75.4,	85.6,	94.7,	101.6,	112.3,	120.4,	127.2,	N/A,	
24 hours	23.9, 32.5,	37.0,	43.7,	48.1,	51.5,	62.6,	74.8,	82.7,	93.8,	103.5,	111.0,	122.4,	131.1,	138.3,	163.4,	
2 days	29.9, 39.6,	44.6,	51.9,	56.8,	60.4,	72.1,	84.9,	93.2,	104.5,	114.3,	121.8,	133.2,	141.9,	149.0,	173.4,	
3 days	34.8, 45.4,	50.8,	58.6,	63.7,	67.6,	80.0,	93.3,	101.8,	113.4,	123.5,	131.2,	142.7,	151.5,	158.7,	183.1,	
4 days	39.1, 50.5,	56.2,	64.5,	69.8,	73.9,	86.8,	100.6,	109.4,	121.3,	131.7,	139.5,	151.2,	160.1,	167.4,	192.0,	
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8 days	53.3, 67.0,	73.8,	83.4,	89.6,	94.3,	108.9,	124.3,	134.0,	147.1,	158.2,	166.6,	179.1,	188.5,	196.1,	221.9,	
10 days	59.5, 74.1,	81.3,	91.5,	98.0,	103.0,	118.2,	134.3,	144.3,	157.8,	169.3,	178.0,	190.8,	200.5,	208.3,	234.5,	
12 days	65.2, 80.7,	88.2,	98.9,	105.8,	110.9,	126.8,	143.5,	153.9,	167.8,	179.6,	188.5,	201.6,	211.5,	219.5,	246.2,	
16 days	75.9, 92.8,	101.1,	112.7,	120.0,	125.6,	142.6,	160.3,	171.2,	185.9,	198.3,	207.5,	221.3,	231.5,	239.8,	267.4,	
20 days	85.7, 104.0,	112.9,	125.2,	133.1,	138.9,	156.9,	175.5,	187.0,	202.3,	215.2,	224.8,	239.0,	249.6,	258.1,	286.5,	
25 days	97.3, 117.1,	126.6,	139.8,	148.1,	154.4,	173.4,	193.0,	205.1,	221.1,	234.5,	244.5,	259.3,	270.3,	279.1,	308.3,	

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/products/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf



SOAKAWAY 270M x 200M (L) x 0.2M (D)
Soil Over 11 No. Soakaway. Confined to
Remaining Impervious Surfaces on
Site (Under existing) Using 100mm Dia
Wetmain. (See Appendix 11.1 for
design report) 3/5/ detail

Proposed 100mm DIA
Wetmain

HYDROCARE
ENVIRONMENTAL LTD
TEL: 045 454 5271 | 087 779 8555
E: SALES@HYDROCARE.COM
WWW.HYDROCARE.COM

SITE OVERVIEW
CLONDALKIN RUGBY CLUB
CLONDALKIN,
CO. DUBLIN
SCALE 1:1000 DATE: 17/02/2022