Job Ref: 22-425

27/10/2022

Planning/Environmental Dept,
South Dublin County Council,
County Hall,
Tallaght,
Dublin

Re: Surface Water Drainage Design for a Proposed Extension

Applicant: Kevin & Aishling Doherty

Site Address: 46 Glendoher Drive, Rathfarnham, Dublin 16

To Whom it Concerns,

This is to state that Hydrocare Environmental Ltd. has been retained by the applicant to prepare a surface water drainage design for a proposed extension to an existing dwelling at 46 Glendoher Drive, Rathfarnham, Dublin 16. It is proposed to install a soakaway at the rear of the dwelling.

Due to lack of access at current it was not possible to carry out an infiltration test. The infiltration rate required for calculating the size and half-empty time for the soakaways was assumed based on past tests and experience in the area. However, it is proposed that an infiltration test be carried out prior to final construction in order to confirm and amend the size of the proposed soakaway as required.

Please see BRE 365 soakaway reports attached herewith.

We hope the above is to your satisfaction.

Yours sincerely,

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

HYDROCARE
ENVIRONMENTAL LTD

Environmental Consultants
Cooperhill Rd.,
Beamore, Drogheda,
Co. Meath

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

Job Ref: *22-425*

Date: 27 October 2022

FAO: McKevitt King Architects

RE: Soakaway Design per BRE 365

Client: Kevin & Aishling Doherty

Location: 46 Glendoher Drive, Rathfarnham, Dublin 16

Dear Emma Kennedy,

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:
McKevitt King Architects 50 North Road, Drogheda, Co. Louth

Total Impermeable Area: 49.00 m^2

Rainfall Information as per Met Eireann:

Data for Kilmashogue, Dublin
30 year return period
Duration =   60 min
Rainfall Depth =   33.90 mm
Plus 20% climate change =   40.68 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.

The total impermeble area is ca. 49 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 (m3)
1	Proposed Extension Roof	49	1.99332
2	-	0	0
3	-	0	0
4	-	0	0
	Total inflow from:	49.00	1.99332

The depth of the soakaway pit is set at 1.1m below the invert level of the drain. According to BRE 365 method, the pit was calculated as.

8.6 m L x 0.7 m W x 1.1 m D

Storage required in soakaway (Inflow - Outflow):	1.93 m^3
Capacity of pit required to accommodate fill material 30% void:	6.45 m^3
Actual capacity of calculated soakaway:	6.62 m^3

The soakaway shall be constructed in trenches as outlined below:

2 no. trenches:

Trench No. 1	4.3 m L x 0.7 m W x 1.1 m D	Volume: 3.311 m^3
Trench No. 2	4.3 m L x 0.7 m W x 1.1 m D	Volume: 3.311 m^3
		Total Volume of 6.622 m^3

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 28 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: **Kevin & Aishling Doherty**

LOCATION: **46 Glendoher Drive, Rathfarnham, Dublin 16**

Inflow and Outflow

Impermeable Area [m^2]	49.00	Inflow =	49 x 0.04068	=	1.99332 m^3
Rainfall Depth [mm]	40.68				

Soakaway No. 1 Length [m]	4.30	$A_{s50\,(1)}$ =	(4.3 x 0.55 x 2) + (0.7 x 0.55 x 2)	=	5.5 m^2
Soakaway Width [m]	0.70				
Soakaway Depth [m]	1.10	Outflow (1) =	5.5 x 0.0000015 x 3600	=	0.029333 m^3
Storm Duration [min]	60				

Soakaway No. 2 Length [m]	4.30	$A_{s50\,(2)}$ =	(4.3 x 0.55 x 2) + (0.7 x 0.55 x 2)	=	5.5 m^2
Soakaway Width [m]	0.70				
Soakaway Depth [m]	1.10	Outflow (2) =	5.5 x 0.0000015 x 3600	=	0.029333 m^3
Storm Duration [min]	60				

A_{s50} =	As50 (1) + As50 (2)	=	11 m^2
Outflow =	11 x 0.0000015 x 3600	=	0.058667 m^3

Volume Required

Void Ratio [%]	30%	Storage =	1.99332 - 0.058667	=	1.93 m^3

$$Volume = \frac{1.9347}{0.3} = 6.45 \ m^3$$

Half Empty Time

$$T_{s50} = \frac{S \times 0.5}{A_{s50} \times f} = \frac{1.9347 \times 0.5}{11 \times 0.00000148 \times 3600} = 16.47 \ hrs$$

$$= 16 \ hrs \ 28 \ mins$$

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 313727, Northing: 225509,

	Interval		Years													
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.7,	4.0,	4.6,	5.7,	6.4,	7.0,	8.9,	11.1,	12.5,	14.6,	16.5,	18.0,	20.3,	22.1,	23.6,	N/A ,
10 mins	3.8,	5.5,	6.5,	7.9,	8.9,	9.7,	12.4,	15.4,	17.5,	20.4,	23.0,	25.1,	28.3,	30.8,	32.9,	N/A ,
15 mins	4.4,	6.5,	7.6,	9.3,	10.5,	11.5,	14.5,	18.1,	20.5,	24.0,	27.1,	29.5,	33.3,	36.2,	38.7,	N/A ,
30 mins	5.9,	8.5,	10.0,	12.2,	13.7,	14.9,	18.8,	23.3,	26.4,	30.7,	34.6,	37.6,	42.3,	46.0,	49.1,	N/A ,
1 hours	7.7,	11.2,	13.0,	15.9,	17.8,	19.3,	24.3,	30.0,	33.9,	39.3,	44.2,	48.0,	53.9,	58.5,	62.3,	N/A ,
2 hours	10.2,	14.6,	17.0,	20.7,	23.1,	25.1,	31.4,	38.7,	43.5,	50.3,	56.5,	61.2,	68.6,	74.4,	79.1,	N/A ,
3 hours	12.0,	17.2,	19.9,	24.1,	27.0,	29.2,	36.5,	44.8,	50.4,	58.2,	65.2,	70.6,	79.0,	85.6,	91.0,	N/A ,
4 hours	13.5,	19.2,	22.3,	26.9,	30.1,	32.5,	40.6,	49.8,	55.9,	64.5,	72.2,	78.1,	87.4,	94.6,	100.5,	N/A ,
6 hours	15.9,	22.5,	26.1,	31.4,	35.1,	37.9,	47.2,	57.7,	64.7,	74.6,	83.3,	90.1,	100.7,	108.8,	115.6,	N/A ,
9 hours	18.7,	26.4,	30.5,	36.7,	40.9,	44.2,	54.9,	67.0,	74.9,	86.2,	96.2,	104.0,	116.0,	125.3,	133.0,	N/A ,
12 hours	21.0,	29.5,	34.1,	41.0,	45.6,	49.2,	61.0,	74.4,	83.2,	95.6,	106.6,	115.1,	128.3,	138.5,	146.9,	N/A ,
18 hours	24.7,	34.6,	40.0,	47.9,	53.2,	57.4,	71.0,	86.3,	96.4,	110.5,	123.1,	132.8,	147.8,	159.4,	169.0,	N/A ,
24 hours	27.8,	38.8,	44.7,	53.5,	59.4,	64.0,	79.0,	95.8,	107.0,	122.5,	136.3,	147.0,	163.5,	176.2,	186.7,	223.6,
2 days	35.1,	47.7,	54.4,	64.2,	70.7,	75.8,	92.0,	110.1,	121.8,	138.1,	152.4,	163.4,	180.2,	193.1,	203.8,	240.7,
3 days	41.0,	55.0,	62.2,	72.9,	79.9,	85.3,	102.6,	121.7,	134.0,	151.0,	165.9,	177.3,	194.6,	207.8,	218.7,	256.2,
4 days	46.2,	61.3,	69.0,	80.4,	87.9,	93.6,	111.9,	131.8,	144.7,	162.3,	177.7,	189.4,	207.2,	220.8,	232.0,	270.2,
6 days	55.3,	72.3,	81.0,	93.5,	101.8,	108.0,	127.9,	149.4,	163.1,	182.0,	198.3,	210.6,	229.3,	243.6,	255.2,	294.9,
8 days	63.4,	82.0,	91.4,	105.0,	113.9,	120.6,	141.9,	164.7,	179.2,	199.1,	216.1,	229.1,	248.6,	263.4,	275.5,	316.5,
10 days	70.9,	90.9,	101.0,	115.5,	124.9,	132.1,	154.5,	178.6,	193.8,	214.5,	232.3,	245.7,	266.0,	281.3,	293.8,	336.0,
12 days	77.8,	99.2,	109.9,	125.2,	135.2,	142.7,	166.2,	191.3,	207.2,	228.7,	247.2,	261.1,	282.0,	297.8,	310.6,	354.0,
16 days	90.8,	114.5,	126.3,	143.1,	154.0,	162.2,	187.7,	214.7,	231.7,	254.6,	274.2,	289.0,	311.1,	327.7,	341.2,	386.7,
20 days	102.9,	128.7,	141.5,	159.6,	171.2,	180.0,	207.2,	235.9,	253.9,	278.1,	298.8,	314.2,	337.4,	354.8,	368.8,	416.2,
25 days	117.1,	145.2,	159.1,	178.6,	191.2,	200.6,	229.8,	260.4,	279.5,	305.1,	326.9,	343.2,	367.5,	385.7,	400.5,	449.9,

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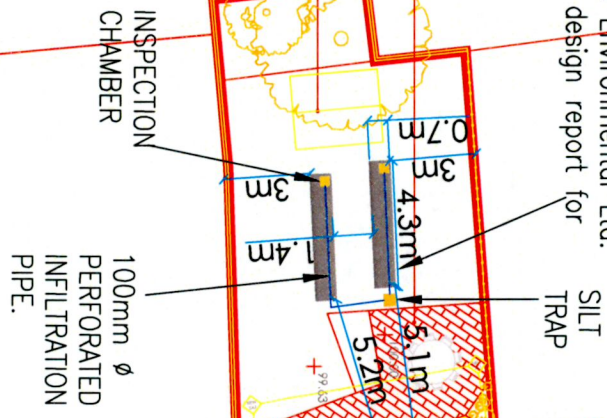For details refer to:
'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',
 Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

GLENDOHER PARK

PROPOSED PATIO AREA

EXISTING GREENHOUSE
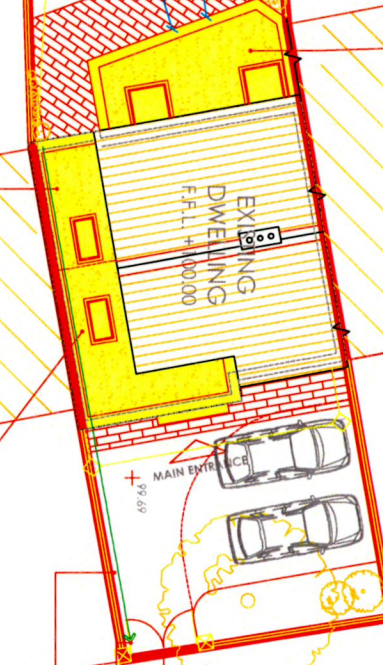
2 No. SOAKAWAY 0.7m(W) x
4.3m(L) x 1.1m(D) - Refer to
Hydrocare Environmental Ltd.
BRE 365 design report for
details.

INSPECTION
CHAMBER

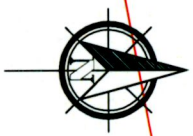100mm ∅
PERFORATED
INFILTRATION
PIPE.

SILT
TRAP

0.7m

3m

3m

4.3m

1.4m

5.1m

5.2m

42

44

48

EXISTING
DWELLING
F.F.L. +100.00

MAIN ENTRANCE

PROPOSED EXTENSION
SHOWN IN YELLOW

PROPOSED EXTENSION
SHOWN IN YELLOW

EXISTING GABLE ROOF TO BE
REMOVED AND REPLACED
WITH NEW PARAPET ROOF
WITH FLAT ROOFLIGHTS

EXISTING FOUL DRAINAGE CONNECTING
TO EXISTING PUBLIC DRAINAGE

EXISTING PAVED DRIVEWAY
TO BE EXTENDED OVER
EXISTING GRASS AREA

EXISTING ENTRANCE GATES & PIERS

ER DRIVE

SOAKAWAY No.1 LONG SECTION

INSPECTION CHAMBER WITH CONCRETE COVER

PERMEABLE GEO-TEXTILE

OPEN GRADED DRAINAGE AGGREGATE Ø 60-100mm WITH MIN VOID RATIO 30%

Compacted backfill

EXISTING SUBSOIL

Ø 100mm PERFORATED DRAINAGE PIPE @ 1:100 FALL

Finished ground level

1.4m

4.3m
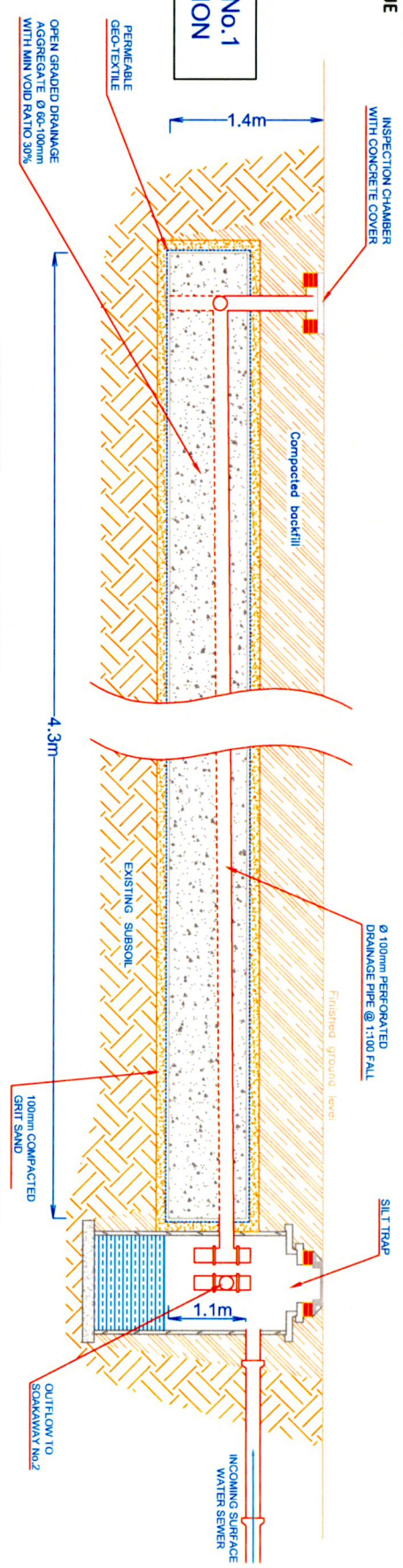
SOAKAWAY No.2 LONG SECTION

PERMEABLE GEO-TEXTILE

OPEN GRADED DRAINAGE AGGREGATE Ø 60-100mm WITH MIN VOID RATIO 30%

INFLOW FROM SILT TRAP

INSPECTION CHAMBER WITH CONCRETE COVER

Ø 100mm PERFORATED DRAINAGE PIPE @ 1:100 FALL

Compacted backfill

EXISTING SUBSOIL

100mm COMPACTED GRIT SAND

Finished ground level

INSPECTION CHAMBER WITH CONCRETE COVER

INFLOW FROM SILT TRAP

1.4m

4.3m

1.1m

SOAKAWAY No.1 CROSS SECTION

Finished ground level

PERMEABLE GEO-TEXTILE

INCOMING SURFACE WATER SEWER

SILT TRAP

1.1m

0.7m

100mm COMPACTED GRIT SAND

Ø 100mm PERFORATED DRAINAGE PIPE @ 1:100 FALL

Compacted backfill

0.7m
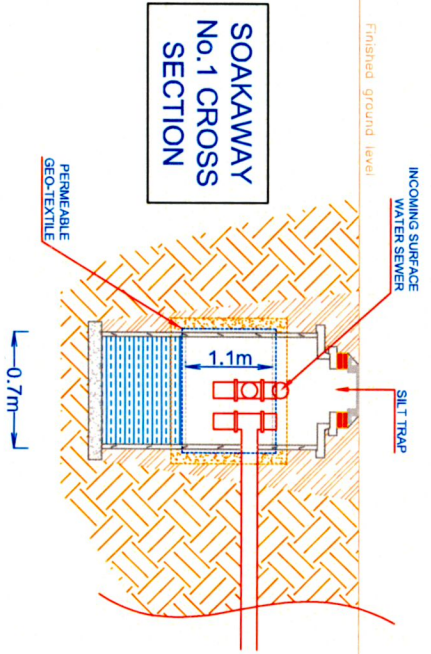
SOAKAWAY No.2 CROSS SECTION

Ø 100mm PERFORATED DRAINAGE PIPE @ 1:100 FALL

100mm COMPACTED GRIT SAND

SILT TRAP

OUTFLOW TO SOAKAWAY No.2

INCOMING SURFACE WATER SEWER

1.1m
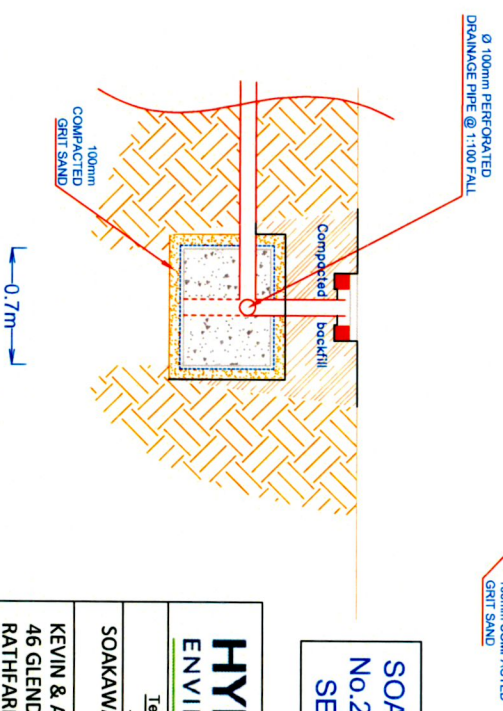
HYDROCARE
ENVIRONMENTAL LTD

Tel: 041 9842378 / 087 7905155
E-mail: info@hydrocare.ie

SOAKAWAY SECTION

KEVIN & AISHLING DOHERTY
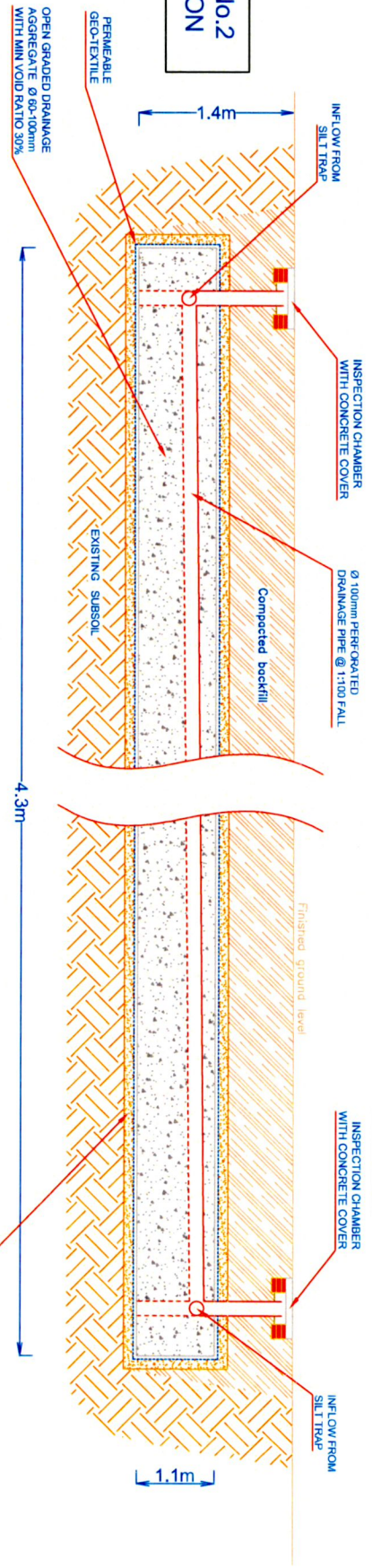46 GLENDOHER DRIVE
RATHFARNHAM, DUBLIN 16

SCALE nts   DATE: 27/10/2022