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Belturbet Business Park,
Creeny,
Belturbet,
Co. Cavan.

Brian Dunne
c/o McCrae Consulting Engineers
Rear 6B Arbourfield Terrace,
Dundrum Business Park,
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**Re: Soakaway design as per BRE 365 for 263m² impermeable area for Brian Dunne, Lynbrook
Whitechurch Rd, Rathfarnham, Dublin 16, (Existing House).**

We have designed per BRE Digest 365 based on the total impermeable area as supplied and Met Eireann's Extreme Rainfall Return Periods for Lynbrook, Whitechurch Rd, Rathfarnham, Dublin 16.

**Site Information Supplied as part of the layout provided By McCrae Consulting Engineers
House Area -210 m²**

Rainfall Information as Per Met Eireann (30 Year Rainfall Returns)

Storm dur.	Area	Rainfall	20% Allowance for Climate Change
mins.	m ²	mm.	mm.
5	210	13.0	15.6
10	210	18.1	21.72
30	210	27.1	32.52
60	210	34.6	41.52

Void Ratio

The void ratio for the trench fill was set at 95% (0.95) to accommodate the use of Cellular Storage.
The safety factor was taken as 1.

Soil infiltration rate

Tests carried out at 1.00m below ground level.
Calculated as per BRE365 = $3.06 * 10^{-5}$ m/sec

The total impermeable area is c. 210m² and the runoff co-efficient is set at 1.0 as per BRE365.

Inflow From	
Total Impermeable Area: 210sq m @ runoff coefficient 1.0	= 8.719cu m
Total Inflow 210sq m	= 8.719cu m

Outflow from Soakaway in model storm	
Internal Surface area to 50% effective depth of Cellular Storage	5.40 sq m
Soil Infiltration Rate	0.0000306m/s
Storm duration in seconds	= 3600s
Total Outflow (7.56 x 0.0000162 x 3600)	0.441 cu. m

Storage Required in Cellular Storage (Inflow – Outflow)	= 8.154 m ³
Capacity of Pit Required	= 8.58m ³
Capacity of Pit	= 10.80m ³

The Cellular Storage will have the following dimensions
6.00m long, 0.6m deep x 3.00m wide (10.80m³)

Traynor Environmental Ltd – BRE Digest 365 Calculations

Infiltration Rate	
Test Hole Dimension	
Length (l)	1.20m
Width (m)	0.60m
Depth (m)	1.00m
Drop Time (mins)	109

Soil Infiltration Rate, $f = V_{p75-25} / \alpha_{p50} \times t_{p75-25}$

Where

V_{p75-25} = the effective storage volume of water in the trial pit between 75% and 25% effective depth;

α_{p50} = the internal surface area of the trial pit up to 50% effective depth and including the base area;

t_{p75-25} = the time for the water level to fall from 75% to 25% effective depth

$$V_{p75-25} = 1.20 \times 0.60 \times (0.75 - 0.25) = 0.36\text{m}^3$$

$$n\alpha_{p50} = (1.20 \times 0.50 \times 2) + (0.6 \times 0.5 \times 2) = 1.80\text{m}^2$$

$$f = \frac{0.36}{1.80 \times 109 \times 60} = 3.06^{-5}\text{m/s}$$

$$1.80 \times 109 \times 60 = 3.06^{-5}\text{m/s}$$

Inflow and Outflow	
Impermeable Area	210m ²
Rainfall (Depth)	41.52
Cellular Storage (Length)	6.00
Cellular Storage (Width)	3.00
Cellular Storage (depth)	0.60
Storm Duration (mm)	60

Inflow to Soakaway Area I:

$$I = A \times R$$

= impermeable surface area x M60-D min rainfall

M60 – 60min Storm Duration, M60-D = 41.52mm = 0.04152m

$$\text{Inflow} = 210\text{m}^2 \times 0.04152 = 8.719\text{m}^2$$

$$A_{50} = (6.00 \times 0.30 \times 2) + (3.00 \times 0.30 \times 2) = 5.4\text{m}^2$$

Outflow From Soakaway O:

$O = a_{50} \times f \times D$ = Internal surface area of soakaway pit to 50% storage depth (excluding base area) x soil percolation rate x storm duration.

$$\text{Outflow} = 5.4 \times 0.0000306 \times 3600 = 0.565\text{m}^3$$

Volume Required	
Void (Ratio)	0.95

Soakaway Storage Volume S

= effective storage volume of soakaway with 95% free volume

$$\text{Storage} = 8.719\text{m}^2 - 0.565 = 8.154 \text{ m}^3$$

$$\text{Volume} = \frac{8.154}{0.95} = 8.58\text{m}^3$$

0.95

NB:

During the design process, a Silt Trap **must** be incorporated into any drains discharging into the soakaway system.

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 if applicable.

NB:

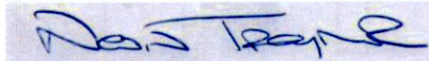
All elements of the soakaway **must** be maintained by suitably qualified professionals *i.e. Silt traps must be regularly cleaned.*

NB:

Please note that all relevant aspects of BRE365 **must** be taken into account in the design and installation of this soakaway system e.g. minimum separation distance of 5m from building foundations and from soil polishing filter for domestic wastewater.

Should you have any queries on this, do not hesitate to contact me.

Yours sincerely




Nevin Traynor

BSc. Env, H.Dip I.T, Cert SHWW, EPA/FAS Cert.

For **Traynor Environmental Ltd**

Encl – Appendices A - D

SOAKAWAY TESTING TO BRE DIGEST 365
COMPLETED BY
TRAYNOR ENVIRONMENTAL LTD
APPENDIX A – TRIAL PIT LOG

Trial Pit Number TP Existing House		Traynor Environmental Ltd Unit 6, Belturbet Business Park Creeny Belturbet Co. Cavan			Sheet 1 of 1		
Project <i>Proposed Development Site at Lynbrook, Whitechurch Rd, Rathfarnham, Dublin 16</i>				Client <i>Brian Dunne</i>			
Method 3 ton digger		Ground Level			Start Date 23.03.22		
Description	Legend	Reduced Level	Depth	Installation Backfill	Sample Test		Notes
<i>Silt/Clay, Crumb Nature, Low Density Brown Colour</i>			<i>0.00m - 0.50m</i>				
<i>Clay intermixed with stone Blocky Nature, Medium Density Broen Colour</i>			<i>0.50- 1.80m</i>				
<i>Groundwater Table & Winter Water Table</i>			<i>1.80m- 2.10m</i>				
Trial Pit Completed at 2.3m BGL.							
Remarks: <i>Bedrock None Encountered Winter Water Table: 1.80mBGL Groundwater Table:1.80m BGL Average soakage characteristics of the subsoil.</i>		Pit Dimensions Depth: 2.80m Length: 3.2m Width: 1.60m Orientation of Long Side: 000 Degrees			Photo 		

SOAKAWAY TESTING TO BRE DIGEST 365

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APPENDIX B – MET EIREANN RAINFALL RETURN PERIODS

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 314707, Northing: 225697,

DURATION	Interval		Years															
	6months	1year	2	3	4	5	10	20	30	50	75	100	150	200	250	500		
5 mins	2.7	4.0	4.7	5.8	6.6	7.2	9.1	11.4	13.0	15.2	17.2	18.7	21.2	23.1	24.7	N/A		
10 mins	3.8	5.6	6.6	8.1	9.2	10.0	12.7	15.9	18.1	21.2	23.9	26.1	29.5	32.2	34.4	N/A		
15 mins	4.5	6.6	7.8	9.5	10.8	11.8	15.0	18.7	21.3	24.9	28.2	30.7	34.7	37.9	40.5	N/A		
30 mins	5.9	8.6	10.1	12.4	13.9	15.2	19.2	24.0	27.1	31.6	35.7	38.9	43.8	47.7	51.0	N/A		
1 hours	7.8	11.2	13.1	16.0	18.0	19.6	24.7	30.6	34.6	40.2	45.2	49.2	55.3	60.1	64.1	N/A		
2 hours	10.2	14.7	17.1	20.8	23.3	25.3	31.7	39.1	44.1	51.1	57.4	62.2	69.8	75.7	80.7	N/A		
3 hours	12.0	17.2	20.0	24.2	27.1	29.3	36.7	45.2	50.8	58.8	65.9	71.4	80.0	86.7	92.3	N/A		
4 hours	13.5	19.2	22.3	27.0	30.1	32.6	40.8	50.0	56.2	64.9	72.7	78.8	88.1	95.4	101.5	N/A		
6 hours	15.8	22.4	26.0	31.4	35.0	37.9	47.2	57.8	64.8	74.7	83.5	90.4	101.0	109.3	116.1	N/A		
9 hours	18.6	26.2	30.3	36.5	40.7	44.0	54.6	66.7	74.7	86.0	96.0	103.8	115.8	125.1	132.8	N/A		
12 hours	20.8	29.3	33.9	40.7	45.3	48.9	60.6	73.9	82.7	95.0	105.9	114.4	127.5	137.7	146.1	N/A		
18 hours	24.5	34.3	39.5	47.4	52.7	56.8	70.2	85.3	95.3	109.3	121.7	131.4	146.2	157.7	167.2	N/A		
24 hours	27.4	38.3	44.1	52.8	58.6	63.1	77.9	94.5	105.4	120.8	134.4	144.9	161.0	173.6	183.9	220.2		
2 days	34.6	47.1	53.6	63.3	69.7	74.7	90.7	108.5	120.1	136.1	150.2	161.1	177.6	190.4	200.9	237.3		
3 days	40.4	54.1	61.3	71.8	78.8	84.1	101.2	120.0	132.1	148.9	163.6	174.8	191.9	205.0	215.7	252.8		
4 days	45.4	60.3	68.0	79.2	86.6	92.3	110.3	130.0	142.6	160.1	175.3	186.9	204.5	217.9	228.9	266.7		
6 days	54.4	71.2	79.7	92.1	100.3	106.5	126.1	147.3	160.9	179.5	195.7	207.9	226.4	240.5	252.0	291.4		
8 days	62.3	80.7	90.0	103.4	112.2	118.9	139.9	162.5	176.9	196.5	213.4	226.2	245.6	260.3	272.2	313.0		
10 days	69.6	89.4	99.4	113.8	123.1	130.2	152.4	176.2	191.3	211.8	229.4	242.8	262.9	278.1	290.5	332.5		
12 days	76.5	97.6	108.2	123.3	133.2	140.6	163.9	188.8	204.6	225.9	244.2	258.1	278.8	294.5	307.3	350.5		
16 days	89.2	112.6	124.3	141.0	151.7	159.8	185.1	211.9	228.8	251.6	271.1	285.8	307.8	324.4	337.8	383.1		
20 days	101.0	126.6	139.2	157.1	168.7	177.4	204.4	233.0	250.9	275.0	295.5	311.0	334.0	351.3	365.4	412.6		
25 days	114.9	142.8	156.5	176.0	188.4	197.8	226.8	257.2	276.2	301.8	323.5	339.8	364.1	382.3	397.0	446.4		

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

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APPENDIX C – MAPS USED AS PART OF THE DESK STUDY

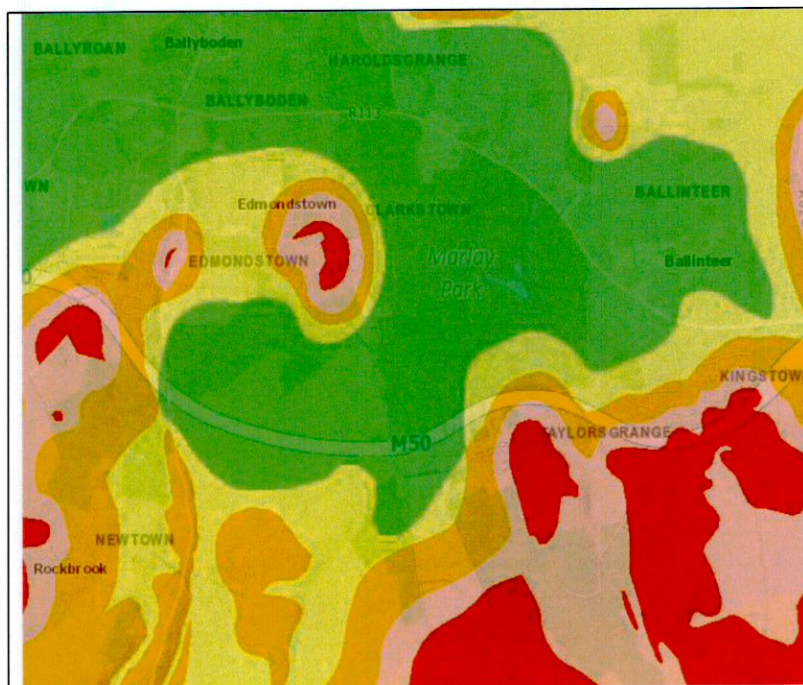
Maps Used As Part of the EPA Site Suitability Assessment

Groundwater/Aquifer Map



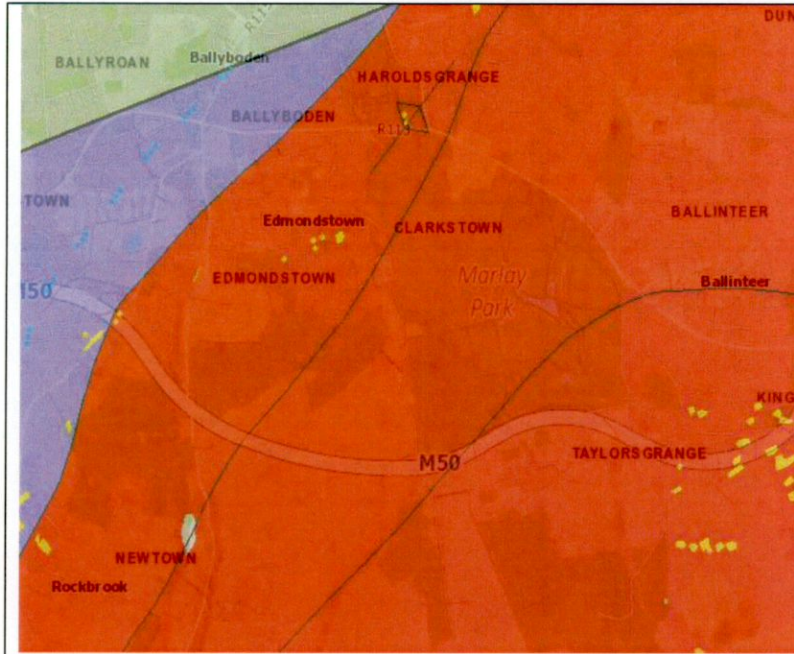
*From the GSI Groundwater
Aquifer Map Site is
classified as PI- Poor
Aquifer - Bedrock which is
Generally Unproductive
except for Local Zones*

Vulnerability Map



*From the GSI Vulnerability
Map Site is classified as
Low*

Bedrock Map



*From the GSI Bedrock Map
the Site is classified as GII-
Granites & other Igneous
Intrusive rocks*

Teagasc Subsoil Map



*From the GSI Teagasc
Subsoil Map Site is
classified as Fine loamy
drift with siliceous stones*

**SOAKAWAY TESTING TO BRE DIGEST 365
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APPENDIX D – INSURANCE

Griffiths & Armour Europe DAC

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The Sweepstakes +353 (0)1 834 9001
Ballsbridge info@griffithsandarmour.com
Dublin 4 griffithsandarmour.com

Griffiths &
Armour

PROFESSIONAL INDEMNITY INSURANCE

We confirm the following details relating to our client's Professional Indemnity Insurance:

Insured: Traynor Environmental Ltd

Address: Belturbet Business Park
Creeny
Belturbet
Co. Cavan
H14AY94

Lead Insurer(s): Axis Specialty Europe SE

Period of Insurance: 12 July 2021 to 11 July 2022

Policy Number: 20/1/04786

Limit of Indemnity: €1,500,000 any one claim and unlimited in the period of insurance

Signed:



Graeme Tinney
Chief Executive Officer
Griffiths & Armour Europe DAC

Date: 22 June 2021

The policy is subject to the insuring agreements, exceptions, exclusions, limitations, conditions and declarations contained therein. The above is accurate at the date of signature. No obligation is imposed herein on the signatory to advise of any alteration.