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Site Characterisation Report

By

Dr. Eugene Bolton

Applicant: Lynne McKeon & Seamus Foley

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APPENDIX A: SITE CHARACTERISATION FORM

File Reference:

1.0 GENERAL DETAILS (From planning application)

Prefix: First Name: Lynne McKeon & Seamus Foley Surname:

Address:

Site Location and Townland: Cnoc Mhuire, Friarstown, Bohernabreena Co. Dublin. D24 W732

Number of Bedrooms: 4 Maximum Number of Residents: 6

Comments on population equivalent

Number of bedrooms plus 2

Proposed Water Supply:

Mains ☑ Private Well/Borehole ☐ Group Well/Borehole ☐

2.0 GENERAL DETAILS (From planning application)

Soil Type, (Specify Type): Sandstone & Shale Till

Subsoil, (Specify Type): Till derived from Lower Palaeozoic sandstones and shales

Bedrock Type: Ordovician Metasediments

Aquifer Category: Regionally Important Locally Important Poor PI

Vulnerability: Extreme ✓ High ☐ Moderate ☐ Low ☐

Groundwater Body: Kilcullen Status Good

Name of Public/Group Scheme Water Supply within 1 km:

Source Protection Area: ZOC ☐ SI ☐ SO ☐ Groundwater Protection Response: R2,

Presence of Significant Sites (Archaeological. Natural & Historical): Not within 250m

Past experience in the area: Good soakage

Comments:

(Integrate the information above in order to comment on: the potential suitability of the site, potential targets at risk and/or any potential site restrictions).

Bedrock Aquifer is PI - Vulnerability is Extreme - Groundwater will be a target at risk.

Note: Only information available at the desk study stage should be used in this section.

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment

Landscape Position: At top of gentle slope

Slope: Steep (>1:5) ☐ Shallow (1:5-1:20) ☐ Relatively Flat (<1:20) ☑

Slope Comment

Surface Features within a minimum of 250m (Distance To Features Should Be Noted In Metres)

Houses:

House borders site to North and likewise to south.
House to Northeast and one to Southeast on opposite side of road.
There are 5 houses within a radius of 100m of this site

Existing Land Use:

Residential

Vegetation Indicators:

Nothing to suggest poor soakage - this house and the adjoining houses are all mature sites

Groundwater Flow Direction: Northwest

Ground Condition:

Dry

Site Boundaries:

Hedgerow

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment (contd.)

Roads:

Road to East

Outcrops (Bedrock And/Or Subsoil):

None

Surface Water Ponding:

None

Lakes:

Glenasmole Reservoirs 2Km Southwest

Beaches/Shellfish Areas:

None

Wetlands:

None

Karst Features:

None

Watercourses/Streams:*

Stream 600m South

*Note and record water level

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment (contd.)

Drainage Ditches:*

No ditches bordering site

Springs:*

None

Wells:*

area on mains.
There is a well in use in the house bordering the site to south. This well is close to the border with this site and is up-gradient so percolation area must be at least 15m from this well

Comments:
(Integrate the information above in order to comment on: the potential suitability of the site, potential targets at risk, the suitability of the site to treat the wastewater and the location of the proposed system within the site).

Site is in good dry land with no vegetation to suggest reduced drainage. There are no surface water drains or streams near the site suggesting there will be good soakage.
The existing septic tank has a percolation area that is very limited in scale but no evidence oOf hydraulic failure again suggesting good soakage

This site should be suitable for an on-site wastewater treatment system

*Note and record water level

3.2 Trial Hole (should be a minimum of 2.1m deep (3m for regionally important aquifers))

To avoid any accidental damage, a trial hole assessment or percolation tests should not be undertaken in areas which are at or adjacent to significant sites, (e.g. NHAs, SACs, SPAs, and/or Archaeological etc.), without prior advice from National Parks and Wildlife Service or the Heritage Service.

Depth of trial hole (m): 2.7

Depth from ground surface to bedrock (m) (if present):

Depth from ground surface to water table (m) (if present): 2.1

Depth of water ingress:

Rock type (if present):

Date and time of excavation: 17-Jan-2022

Date and time of examination: 20-Jan-2022

Depth of Surface and Subsurface Percolation Tests	Soil/Subsoil Texture & Classification**	Plasticity and dilatancy***	Soil Structure	Density/ Compactness	Colour****	Preferential flowpaths
0.1 m	Loam	Dilatant	Crumb	Firm	Dark Brown	Rootlets
0.2 m						
0.3 m	CLAY	Slowly Dilatant Trds = 9,10,10 Ribs 110,110,120	Blocky	Firm	Orange/Brown	
0.4 m						
0.5 m						
0.6 m						None
0.7 m						
0.8 m	SILT High content of Shale-like cobbles mostly angular Concentration of cobbles increases with depth	No trds or Ribs	Structureless	Stiff- becoming Hard towards base of pit	Light Brown	
0.9 m						
1.0 m						
1.1 m						
1.2 m						
1.3 m						
1.4 m						
1.5 m						
1.6 m						
1.7 m						
1.8 m						
1.9 m						
2.0 m						
2.1 m						
2.2 m						
2.3 m						
2.4 m						
2.5 m						
2.6 m						
2.7 m	Base of Pit					
2.8 m						
2.9 m						
3.0 m						
3.1 m						
3.2 m						
3.3 m						
3.4 m						
3.5 m						

Likely Subsurface Percolation Value: 25

Likely Surface Percolation Value: 20

Note: *Depth of percolation test holes should be indicated on log above. (*Enter Surface or Subsurface at depths as appropriate).

** See Appendix E for BS 5930 classification.

*** 3 samples to be tested for each horizon and results should be entered above for each horizon.

**** All signs of mottling should be recorded.

3.2 Trial Hole (contd.) Evaluation:

Soil is free draining . No mottling evident.
At lower levels the silt is compacted which will slow soakage sufficient to ensure good treatment

3.3(a) Subsurface Percolation Test for Subsoil

Step 1: Test Hole Preparation

Percolation Test Hole	1	2	3
Depth from ground surface to top of hole (mm) (A)	500	500	500
Depth from ground surface to base of hole (mm) (B)	900	900	900
Depth of hole (mm) [B - A]	400	400	400
Dimensions of hole [length x breadth (mm)]	300 x 300	300 x 300	300 x 300

Step 2: Pre-Soaking Test Holes

Pre-soak start	Date	20-Jan-2022	20-Jan-2022	20-Jan-2022
	Time			
2nd pre-soak start	Date	20-Jan-2022	20-Jan-2022	20-Jan-2022
	Time			

Each hole should be pre-soaked twice before the test is carried out.

Step 3: Measuring T_{100}

Percolation Test Hole No.	1	2	3
Date of test	21-01-2022	21-01-2022	21-01-2022
Time filled to 400 mm	08:42	08:43	08:44
Time water level at 300 mm	09:55	09:57	09:45
Time (min.) to drop 100 mm (T_{100})	73.00	74.00	61.00
Average T_{100}			69.33

If T_{100} > 480 minutes then Subsurface Percolation value >120 – site unsuitable for discharge to ground
If $T_{100} \leq 210$ minutes then go to Step 4;
If T_{100} > 210 minutes then go to Step 5;

Step 4: Standard Method (where $T_{100} \leq 210$ minutes)

Percolation Test Hole	1			2			3		
Fill no.	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)
1	09:55	11:18	83.00	09:57	11:32	95.00	09:45	11:04	79.00
2	11:18	13:17	119.00	11:32	13:43	131.00	11:04	12:41	97.00
3	13:17	15:35	138.00	13:43	16:18	155.00	12:41	14:46	125.00
Average Δt Value			113.33			127.00			100.33
	Average Δt/4 = [Hole No.1]		28.33 (t_1)	Average Δt/4 = [Hole No.2]		31.75 (t_2)	Average Δt/4 = [Hole No.3]		25.08 (t_3)

Result of Test: Subsurface Percolation Value = 28.39 (min/25 mm)

Comments:

Soakage is good and well within the required range

Step 5: Modified Method (where $T_{100} > 210$ minutes)

Percolation Test Hole No.	1					
Fall of water in hole (mm)	Time Factor = T_f	Start Time hh:mm	Finish Time hh:mm	Time of fall (mins) = T_m	$K_{t_s} = T_f / T_m$	T – Value = 4.45 / K_{t_s}
300 - 250	8.1			0.00		
250 - 200	9.7			0.00		
200 - 150	11.9			0.00		
150 - 100	14.1			0.00		
Average	T- Value		T- Value Hole 1 = (T_1)			0.00

Percolation Test Hole No.	2					
Fall of water in hole (mm)	Time Factor = T_f	Start Time hh:mm	Finish Time hh:mm	Time of fall (mins) = T_m	$K_{t_s} = T_f / T_m$	T – Value = 4.45 / K_{t_s}
300 - 250	8.1			0.00		
250 - 200	9.7			0.00		
200 - 150	11.9			0.00		
150 - 100	14.1			0.00		
Average	T- Value		T- Value Hole 2 = (T_2)			0.00

Percolation Test Hole No.	3					
Fall of water in hole (mm)	Time Factor = T_f	Start Time hh:mm	Finish Time hh:mm	Time of fall (mins) = T_m	$K_{t_s} = T_f / T_m$	T – Value = 4.45 / K_{t_s}
300 - 250	8.1			0.00		
250 - 200	9.7			0.00		
200 - 150	11.9			0.00		
150 - 100	14.1			0.00		
Average	T- Value		T- Value Hole 3 = (T_3)			0.00

Result of Test: Subsurface Percolation Value =

0.00 (min/25 mm)

Comments:

3.3(b) Surface Percolation Test for Soil

Step 1: Test Hole Preparation

Percolation Test Hole	1	2	3
Depth from ground surface to top of hole (mm)	0	0	0
Depth from ground surface to base of hole (mm)	400	400	400
Depth of hole (mm)	400	400	400
Dimensions of hole [length x breadth (mm)]	300 x 300	300 x 300	300 x 300

Step 2: Pre-Soaking Test Holes

		1	2	3
Pre-soak start	Date	20-Jan-2022	20-Jan-2022	20-Jan-2022
	Time			
2nd pre-soak start	Date	20-Jan-2022	20-Jan-2022	20-Jan-2022
	Time			

Each hole should be pre-soaked twice before the test is carried out.

Step 3: Measuring T_{100}

Percolation Test Hole No.	1	2	3
Date of test	21-Jan-22	21-Jan-22	21-Jan-2022
Time filled to 400 mm	08:47	08:48	08:49
Time water level at 300 mm	09:39	09:48	09:51
Time to drop 100 mm (T_{100})	52.00	60.00	62.00
Average T_{100}			58.00

If T_{100} > 480 minutes then Surface Percolation value >90 – site unsuitable for discharge to ground
If $T_{100} \leq 210$ minutes then go to Step 4;
If T_{100} > 210 minutes then go to Step 5;

Step 4: Standard Method (where $T_{100} \leq 210$ minutes)

Percolation Test Hole	1			2			3		
Fill no.	Start Time (at 300 mm)	Finish Time (at 200 mm)	ΔT (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	ΔT (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	ΔT (min)
1	09:39	10:42	63.00	09:48	10:51	63.00	09:51	11:02	71.00
2	10:42	11:54	72.00	10:51	12:00	69.00	11:02	12:22	80.00
3	11:54	13:12	78.00	12:00	13:26	86.00	12:22	13:53	91.00
Average ΔT Value			71.00			72.67			80.67
	Average ΔT/4 = [Hole No.1]		17.75 (T_1)	Average ΔT/4 = [Hole No.2]		18.17 (T_2)	Average ΔT/4 = [Hole No.3]		20.17 (T_3)

Result of Test: Surface Percolation Value = 18.69 (min/25 mm)

Comments:

Soakage in topsoil is good

Step 5: Modified Method (where $T_{100} > 210$ minutes)

Percolation Test Hole No. 1

Fall of water in hole (mm)	Time Factor = T_f	Start Time hh:mm	Finish Time hh:mm	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	T – Value = 4.45 / K_{fs}
300 - 250	8.1			0.00		
250 - 200	9.7			0.00		
200 - 150	11.9			0.00		
150 - 100	14.1			0.00		
Average	T- Value		T- Value Hole 1 = (T_1)			0.00

Percolation Test Hole No. 2

Fall of water in hole (mm)	Time Factor = T_f	Start Time hh:mm	Finish Time hh:mm	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	T – Value = 4.45 / K_{fs}
300 - 250	8.1			0.00		
250 - 200	9.7			0.00		
200 - 150	11.9			0.00		
150 - 100	14.1			0.00		
Average	T- Value		T- Value Hole 2 = (T_2)			0.00

Result of Test: Surface Percolation Value = 0.00 (min/25 mm)

Percolation Test Hole No. 3

Fall of water in hole (mm)	Time Factor = T_f	Start Time hh:mm	Finish Time hh:mm	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	T – Value = 4.45 / K_{fs}
300 - 250	8.1			0.00		
250 - 200	9.7			0.00		
200 - 150	11.9			0.00		
150 - 100	14.1			0.00		
Average	T- Value		T- Value Hole 3 = (T_2)			0.00

Comments:

4.0 CONCLUSION of SITE CHARACTERISATION

Integrate the information from the desk study and on-site assessment (i.e. visual assessment, trial hole and percolation tests) above and conclude the type of system(s) that is (are) appropriate. This information is also used to choose the optimum final disposal route of the treated wastewater.

Slope of proposed infiltration / treatment area: Flat

Are all minimum separation distances met? ✓

Depth of unsaturated soil and/or subsoil beneath invert of gravel (or drip tubing in the case of drip dispersal system) 1.00

Percolation test result: Surface: 19.00 Sub-surface: 28.00

Not Suitable for Development ☐ **Suitable for Development** ✓

Identify all suitable options		**Discharge Route** [1]
1. Septic tank system (septic tank and percolation area) **(Chapter 7)**	No	Groundwater
2. Secondary Treatment System **(Chapters 8 and 9)** and soil polishing filter **(Section 10.1)**	Yes	
3. Tertiary Treatment System and Infiltration / treatment area **(Section 10.2)**	Yes	

5.0 SELECTED DWWTS

Propose to install: Secondary Treatment System and soil polishing filter

and discharge to: Ground Water

Invert level of the trench/bed gravel or drip tubing (m)

Site Specific Conditions (e.g. special works, site improvement works testing etc.

Watertable is at 2.1m bgl so site could ber suitable for standard septic tank. however there is limited space so a secondary treatment unit is recommended. This is to be followed by a soil polishing filter.
The base of the distribution gravel can be at 500mm bgl.
Soil is removed and the area leveled. The 300mm deep, bed of distribution gravel (20mm pebble) is placed on the prepared area. The distribution pipes are placed on this and covered with 100mm gravel.

The PE is 6 - Hydraulic load is 900litres.
T-value is between 20 and 40 so load filter allowing 15 m2/PE (option 2 EPA Code of Practice 2021)
Area of filter is 90m2

[1] A discharge of sewage effluent to "waters" (definition includes any or any part of any river, stream, lake, canal, reservoir, aquifer, pond, watercourse or other inland waters, whether natural or artificial) will require a licence under the Water Pollution Acts 1977-90. Refer to Section 2.4.

6.0 TREATMENT SYSTEM DETAILS

SYSTEM TYPE: Septic Tank Systems (Chapter 7)

Tank Capacity (m^3)		Percolation Area		Mounded Percolation Area	
		No. of Trenches		No. of Trenches	
		Length of Trenches (m)		Length of Trenches (m)	
		Invert Level (m)		Invert Level (m)	

SYSTEM TYPE: Secondary Treatment System (Chapters 8 and 9) and polishing filter (Section 10.1)

Secondary Treatment Systems receiving septic tank effluent (Chapter 8)

Media Type	Area (m^2)*	Depth of Filter	Invert Level
Sand/Soil			
Soil			
Constructed Wetland			
Other			

Packaged Secondary Treatment Systems receiving raw wastewater (Chapter 9)

Type	Oakstown BAF
Capacity PE	6
Sizing of Primary Compartment	3.00 m^3

Polishing Filter*: (Section 10.1)

Surface Area (m^2)*		Option 3 - Gravity Discharge Trench length (m)	
Option 1 - Direct Discharge Surface area (m^2)		Option 4 - Low Pressure Pipe Distribution Trench length (m)	
Option 2 - Pumped Discharge Surface area (m^2)	90.00	Option 5 - Drip Dispersal Surface area (m^2)	

SYSTEM TYPE: Tertiary Treatment System and infiltration / treatment area (Section 10.2)

Identify purpose of tertiary treatment	Provide performance information demonstrating system will provide required treatment levels	Provide design information

DISCHARGE ROUTE:

Groundwater	✓	Hydraulic Loading Rate * ($l/m^2.d$)	10.00	Surface area (m^2)	90.00
Surface Water **		Discharge Rate (m^3/hr)			

* Hydraulic loading rate is determined by the percolation rate of subsoil

** Water Pollution Act discharge licence required

6.0 TREATMENT SYSTEM DETAILS

QUALITY ASSURANCE:

Installation & Commissioning

Install as specified & supervised by appropriately qualified person

On-going Maintenance

Regular desludging & Maintenance contract with supplier or installer

7.0 SITE ASSESSOR DETAILS

Company: Trinity Green

Prefix: Dr First Name: Eugene Surname: Bolton

Address: Clonfert, Maynooth, Co. Kildare

Qualifications/Experience: FETAC Site assessor, PhD Microbiology

Date of Report: 29-Jan-2022

Phone: 0862434828 E-mail info@trinitygreen.ie

Indemnity Insurance Number: PI/C/12453/21/1

Signature: Eugene Bolton Digitally signed by Eugene Bolton Date: 2022.01.04 15:17:00 Z

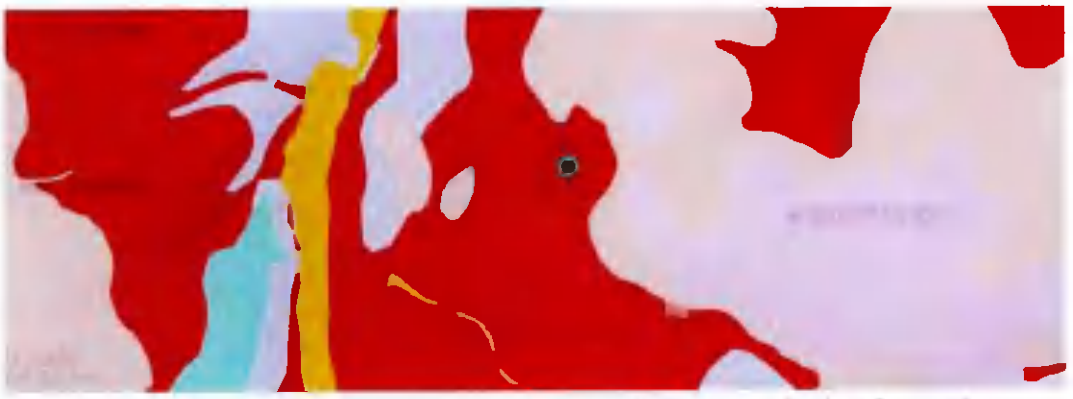
Maps – Aquifer, Vulnerability, Berdock

Aquifer is PI

Vulnerability is Extreme

Bedrock is Ordovician Metasediments

Soil



Parent Material	TLPSsS	IFS Soil Description	Derived from mainly non-calcareous parent materials
Parent Material Name	Till derived chiefly from Lower Palaeozoic rocks	County	DUBLIN
Parent Material Description	Sandstone and shale till (Lower Palaeozoic)	Category	Deep well drained mineral (Mainly acidic)
Soil Group	Acid Brown Earths/Brown Podzolics	Legend	AminDW - Deep well drained mineral (Mainly acidic)
IFS Soil Code	AminDW		

Subsoil

Lithology	Till derived from Lower Palaeozoic sandstones and shales
Quaternary Sediment	TLPSsS

Photos

Row 1 - P1, P2

Row 2 - P3, T1

Row 3 - T2, T3

Trial Pit

Site overview

Site Location