APPENDIX B: SITE CHARACTERISATION FORM

File Reference:

1.0 GENERAL DETAILS (From planning application)

Prefix: First Name: Kilkenny County Council Surname:

Address: County Hall, John Street, Kilkenny

Site Location and Townland: Graigueswood, Freshford, Co. Kilkenny.

Telephone No: n/a Fax No:

E-Mail: n/a

Maximum no. of Residents: 6 No. of Double Bedrooms: 4 No. of Single Bedrooms: 0

Proposed Water Supply: Mains ✓ Private Well/Borehole Group Well/Borehole

2.0 GENERAL DETAILS (From planning application)

Soil Type, (Specify Type): BminPD (Top Soil), TLs (Subsoil).

Aquifer Category: Regionally Important Rk Locally Important Poor

Vulnerability: Extreme High Moderate Low ✓ High to Low Unknown

Bedrock Type: DLIL – Dinantian Lower Impure Limestones

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

Groundwater Protection Scheme (Y/N): Yes Source Protection Area: SI SO

Groundwater Protection Response: R1

Presence of Significant Sites (Archaeological, Natural & Historical): None in the immediate vicinity of the site.

Past experience in the area: None.

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).

Rk, Regionally Important Karstified Aquifers. R1 - Acceptable subject to normal good practice (i.e. system selection, construction, operation and maintenance in accordance with this CoP).

The main sources at risk are surface water and groundwater as a source & resource. Potential targets include existing (See Appendix Fig.1) & planned drinking water wells. The percolation area/polishing filter should be located to satisfy EPA, Code of Practise min. separation distances required

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: bottom of a hill

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

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

Houses: Existing dwelling within the site to be demolished. Nearest (occupied) dwelling located 60m southeast of test area. Existing dwelli

Existing Land Use: Garden

Vegetation Indicators: Grasses & trees present. Some willow trees noted on the site.

Groundwater Flow Direction: Northwestto Southeast.

Ground Condition: Dy & Firm underfoot.

Site Boundaries: Eastern= Roadside boundary, mature hedgerow. North & South = mature hedgerow. East = undefined.

Roads: Local road running along eastern boundary of the site.

Outcrops (Bedrock And/Or Subsoil): None within 250m of test area.

Surface Water Ponding: None within 250m of test area. Lakes: None within 250m of test area.

Beaches/Shellfish: None within 250m of test area. Areas/Wetlands: None within 250m of test area.

Karst Features: None within 250m of test area.

Watercourse/Stream*: None within 250m of test area.

Drainage Ditches*: Drainage ditch along northern boundary of the site. No water present.

Springs / Wells*: None within 250m of test area. Adjacent dwellings connected to main water supply.

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).

Underfoot conditions firm, no poaching evident. Heavy growth present. Willow Trees & excessive moss growth noted which may indicate poor draining/wet soils and/or high water table level. A shallow drain was noted in the rear garden commencing from the outlet of the existing septic tank and terminating in the drainage ditch along the northern boundary. It is likely that this drain was dug to alleviate effluent ponding when the septic tank was in use. I understand the existing dwelling on the site has not been occupied for more than 2 years. No site restrictions present. Where domestic water supplies are located nearby, particular attention should be given to the depth of subsoil over bedrock such that the minimum depths required (EPA Code of Practice 2009) are met (vulnerability=Low) and that the likelihood of microbial pollution is minimised. The main sources at risk are surface water and groundwater as a source & resource. Potential targets include existing (See Appendix Fig.1) & planned drinking water wells. The percolation area/polishing filter should be located to satisfy EPA, Code of Practice minimum separation distance requirements. There are no archaeological or natural heritage sites in the vicinity of the proposed site. Site appears to be suitable for the disposal and treatment of wastewater effluent.

*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): 2.10

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

Depth from ground surface to water table (m) (if present): 1.50

Depth of water ingress: 0.60 Rock type (if present):

Date and time of excavation: 30/05/2016 10:00 Date and time of examination: 02/06/2016 08:00

	Depth of P/T Test*	Soil/Subsoil Texture & Classification**	Plasticity and dilatancy***	Soil Structure	Density/ Compactness	Colour****	Preferential flowpaths
0.1 m		Topsoil with organic matter CLAY loam.	Threads: 3,4,3 Ribbons: 110, 110, 120. Dilatant: Yes with difficulty.	Crumb	Un-compact	Dark brown	Along roots and earth worm casts
0.2 m							
0.3 m							
0.4 m	P Invert	Subsoil: Clay (heavy) with gravels Mottling noted 400mm below G.L.	Threads: 5,6,6 Ribbons: 130, 140,130 Dilatant: Yes	massive	compact	Brown	Roots, pores
0.5 m							
0.6 m							
0.7 m							
0.8 m							
0.9 m	T Invert						
1.0 m							
1.1 m							
1.2 m							
1.3 m							
1.4 m							
1.5 m		Watertable level					
1.6 m							
1.7 m							
1.8 m							
1.9 m							
2.0 m							
2.1 m		Base of trial hole at 2.1m					
2.2 m							
2.3 m							
2.4 m							
2.5 m							
2.6 m							
2.7 m							
2.8 m							
2.9 m							
3.0 m							

Likely T value: 75.00

Note: *Depth of percolation test holes should be indicated on log above. (Enter P or T at depts 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:

The saturated nature of the topsoil and in particular the subsoil layer would indicate low permeability soils. Mottling was extensively noted approx. 400mm below G.L. indicating a high water table level. It is not possible at this stage to determine whether or not the water table is due to a low permeability subsoil or a naturally high water table due to the site's hydrological location.

A septic tank system will not be permitted as 1.2m of unsaturated soil/subsoil beneath the invert of the percolation trench of a septic tank does not exist. A secondary treatment system with a minimum thickness of 0.3m unsaturated soil/subsoil may be allowed if P/T-values from 3 to 75 are achieved. Surface water and Groundwater as a source and resource is the potential target at risk. The percolation area/polishing filter should be located within a safe distance of the private well/borehole and proposed dwelling to satisfy EPA minimum separation distance requirements.

3.3(a) Percolation ("T") Test for Deep Subsoils and/or Water Table

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

Date and Time pre-soaking started	31/05/2016	10:00	31/05/2016	10:01	31/05/2016	10:03

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

Step 3: Measuring T_{100}

Percolation Test Hole No.	1	2	3
Date of test	02/06/2016	02/06/2016	02/06/2016
Time filled to 400 mm	08:10	08:12	08:14
Time water level at 300 mm	13:55	13:12	13:37
Time to drop 100 mm (T_{100})	345.00	300.00	323.00
Average T_{100}			322.67

If T_{100} > 300 minutes then T-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			0.00			0.00			0.00
2			0.00			0.00			0.00
3			0.00			0.00			0.00
Average Δt Value			0.00			0.00			0.00
	Average Δt/4 = [Hole No.1]		0.00 (t_1)	Average Δt/4 = [Hole No.2]		0.00 (t_2)	Average Δt/4 = [Hole No.3]		0.00 (t_3)

Result of Test: T = 0.00 (min/25 mm)

Comments:

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

Percolation Test Hole No.	1				2				3			
Fall of water in hole (mm)	Time Factor = T_f	Time of fall (mins) = T_m	K_{fs} = T_f / T_m	T – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	K_{fs} = T_f / T_m	T – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	K_{fs} = T_f / T_m	T – Value = 4.45 / K_{fs}
300 - 250	8.1	486	0.02	267.00	8.1	420	0.02	230.74	8.1	445	0.02	244.48
250 - 200	9.7				9.7				9.7			
200 - 150	11.9				11.9				11.9			
150 - 100	14.1				14.1				14.1			
Average T- Value	T- Value Hole 1= (t_1)			66.75	T- Value Hole 1= (t_2)			57.69	T- Value Hole 1= (t_3)			61.12

Result of Test: T = 61.85 (min/25 mm)

Comments:

T-test abandoned. No result obtained.

3.3(b) Percolation ("P") Test for Shallow Soil / Subsoils and/or Water Table

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	400.00	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

Date and Time pre-soaking started	31/05/2016	08:15	31/05/2016	08:16	31/05/2016	08:17

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

Step 3: Measuring P_{100}

Percolation Test Hole No.	1	2	3
Date of test	02/06/2016	02/06/2016	02/06/2016
Time filled to 400 mm	08:20	08:21	08:22
Time water level at 300 mm	08:40	08:46	08:42
Time to drop 100 mm (P_{100})	20.00	25.00	20.00
Average P_{100}			21.67

If P_{100} > 300 minutes then P-value >90 – site unsuitable for discharge to ground
If $P_{100} \leq 210$ minutes then go to Step 4;
If P_{100} > 210 minutes then go to Step 5;

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

Percolation Test Hole	1			2			3		
Fill no.	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)
1	08:40	09:32	52.00	08:46	09:58	72.00	08:43	09:28	45.00
2	09:33	11:21	108.00	09:59	11:44	105.00	09:29	10:39	70.00
3	11:22	13:36	134.00	11:45	13:58	133.00	10:40	12:24	104.00
Average Δp Value			98.00			103.33			73.00
	Average Δp/4 = [Hole No.1]		24.50 (p_1)	Average Δp/4 = [Hole No.2]		25.83 (p_2)	Average Δp/4 = [Hole No.3]		18.25 (p_3)

Result of Test: P = 22.86 (min/25 mm)

Comments:

Good result. Site potentially suitable for a secondary treatment system with polishing filter overground.

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

Percolation Test Hole No.	1				2				3			
Fall of water in hole (mm)	Time Factor = T_f	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	P – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	P – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	P – Value = 4.45 / K_{fs}
300 - 250	8.1				8.1				8.1			
250 - 200	9.7				9.7				9.7			
200 - 150	11.9				11.9				11.9			
150 - 100	14.1				14.1				14.1			
Average P- Value	P- Value Hole 1= (p_1)			0.00	P- Value Hole 1= (p_2)			0.00	P- Value Hole 1= (p_3)			0.00

Result of Test: P = 0.00 (min/25 mm)

Comments:

3.4 The following associated Maps, Drawings and Photographs should be appended to this site characterisation form.

1. Discovery Series 1:50,000 Map indicating overall drainage, groundwater flow direction and housing density in the area.
2. Supporting maps for vulnerability, aquifer classification, soil, bedrock.
3. North point should always be included.
4. (a) Sketch of site showing measurements to Trial Hole location and
   (b) Percolation Test Hole locations,
   (c) wells and
   (d) direction of groundwater flow (if known),
   (e) proposed house (incl. distances from boundaries)
   (f) adjacent houses,
   (g) watercourses,
   (h) significant sites
   (i) and other relevant features.
5. Cross sectional drawing of the site and the proposed layout[1] should be submitted.
6. Photographs of the trial hole, test holes and site (date and time referenced).

[1] The calculated percolation area or polishing filter area should be set out accurately on the site layout drawing in accordance with the code of practice's requirements.

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.

Not Suitable for Development ☐

Suitable for [1]		**Discharge Route**
1. Septic tank system (septic tank and percolation area)	No	Discharge to Ground Water
2. Secondary Treatment System		
a. septic tank and filter system constructed on-site and polishing filter; or	Yes	
b. packaged wastewater treatment system and polishing filter	Yes	

5.0 RECOMMENDATION

Propose to install: Packaged wastewater treatment system and polishing filter

and discharge to: Ground Water

Trench Invert level (m): 500.00

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

Propose to install: 2 module puraflo wastewater treatment system followed by a gravity fed raised trench percolation area and discharge to groundwater. It is proposed to decommission the existing septic tank and outflow pipe.

R1 response refers to the EPA manual minimum requirements. According to the EPA Manual on Treatment Systems for Single Houses COP: Acceptable subject to normal good practice.

The mottling noted approx. 0.4m below ground level in the subsoil and the watertable level encountered in the trial hole would indicate a seasonal high water table which would result in an inadequate depth of unsaturated subsoil to treat wastewater effluent. We are confident an attenuation issue can be avoided if a minimum of 0.9m of soil is used above the level of the water table. Hence, we recommend that a raised bed soil polishing filter be used to treat wastewater effluent. From our visual assessment, all separation distance are in compliance with the EPA requirements. We therefore deem the site suitable for the treatment and disposal of wastewater effluent, in compliance with EPA standards and recommendations.

We advise that the soil polishing filter be such that an adequate depth of soil will be beneath the inverts. We propose that the soil polishing filter is raised (to comply with EPA requirements) such that 0.9m (minimum) of soil with a P/T Value of between 3 and 30 will be beneath the invert of the soil polishing filter. This shall ensure adequate treatment of the effluent before it reaches a receptor i.e. groundwater (free of viruses and bacteria) so that the likelihood of microbial pollution is minimised. The treated wastewater from the secondary treatment unit (min. 6 pe) will be gravity fed to a raised trench percolation area. In accordance with Table 10.1 of EPA COP for a P Value of between 21-40, a minimum of 72m (6 x 12m) of linear percolation trench shall be installed. The filter will be protected by a geotextile membrane, soil covered and sown with grass.

The proposed effluent treatment system and polishing filter should be designed, installed, constructed and maintained in strict accordance with the recommendations and design standards directed by the, 'EPA' CODE OF PRACTICE- Wastewater Treatment and Disposal Systems Serving Single Houses (p.e. < 10).

When installed certification from the designer, supplier, or installer that the treatment system and its percolation areas have been satisfactorily installed and commissioned and is suitable for the site in question, should be submitted to the planning authority along with certification from t

[1] note: more than one option may be suitable for a site and this should be recorded

[2] 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 2.6.2.

6.0 TREATMENT SYSTEM DETAILS

SYSTEM TYPE: Septic Tank System

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

Filter Systems

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

Package Treatment Systems

Type: 2 Module PURAFLO Peat Filter

Capacity PE: 6.00

Sizing of Primary Compartment: 2.90 m^3

SYSTEM TYPE: Tertiary Treatment System

Polishing Filter: Surface Area (m^2)*

or **Gravity Fed:**

No. of Trenches	8
Length of Trenches (m)	9.00
Invert Level (m)	500.00

Package Treatment System: Capacity (pe)

Constructed Wetland: Surface Area (m^2)*

DISCHARGE ROUTE:

Groundwater	✓	Hydraulic Loading Rate * ($l/m^2.d$)	25.00
Surface Water **		Discharge Rate (m^3/hr)	

TREATMENT STANDARDS:

Treatment System Performance Standard (mg/l)	BOD	SS	NH_4 - N	Total N	Total P

QUALITY ASSURANCE:

Installation & Commissioning	On-going Maintenance
Certificate of installation from a Competent person/Service provider. All septic tanks should be followed by a percolation area that is in compliance with I.S. CEN/TR 12566:2.	Regular inspections (approximately every 6 months) and sludge pumping (at a minimum frequency once every year or more often if the rate of sludge build-up requires more frequent removal) are the minimum operation and maintenance requirements. All de-sludging of septic tank should be documented.

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

** Water Pollution Act discharge licence required

7.0 SITE ASSESSOR DETAILS

Company: Brendan Moore Architecture & Design

Prefix: Mr. First Name: Brendan Surname: Moore

Address: 53 The Fairways, New Orchard Road, Kilkenny.

Qualifications/Experience: C.Arch.(hons) BSc.(hons) Arch. Tech. Site Suitability Assessor (Fetac qualified).

Date of Report: 23/06/2014

Phone: 087 4120718 Fax: e-mail moore.brendanl@gmail.com

Indemnity Insurance Number: MFL15S014843C

Signature: