Site Characterization Report

EPA 2009 CoP

Reference Number: SEE-S385/40230
Site: Beasley's Lane, Bohernabreena, Tallaght, Dublin24, D24TC56
Name: Mairead Murphy

May 2022

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- Personal data will be adequate, relevant, and limited to what is necessary in relation to the purposes for which they are processed.
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Introduction

This report is based on the findings of a site assessment and soil percolation test as per EPA CoP, carried out by Biocycle Ltd. on the 30th of September 2010.

As required by South Dublin County Council, this report provides recommendations for the on-site wastewater treatment systems and polishing filter/percolation area.

1. Site Specific Information

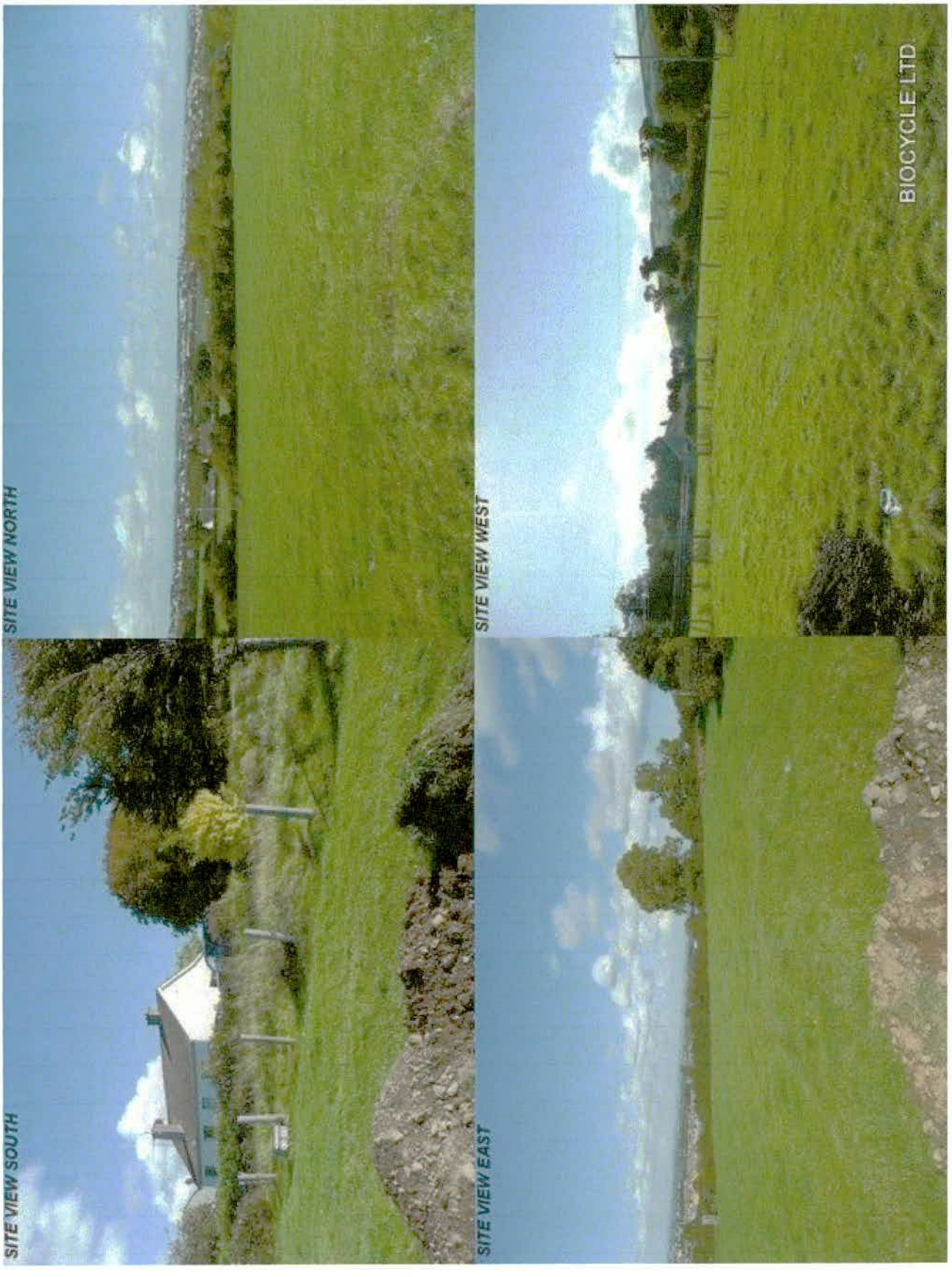
Information supplied by client /architect

- Maximum occupancy:
  - ✓ **4 bedrooms (6PE population equivalent)**
- Client: **Mairead Murphy**
- Site Address: **Beasley's Lane, Bohernabreena, Tallaght, Dublin 24, D24TC56**

Site Location: D24TC56

- Water supply: **Mains.**
- Foul Inlet: **DN100 UPVC. Depth CL – IL (to be confirmed).**

2. Photographs

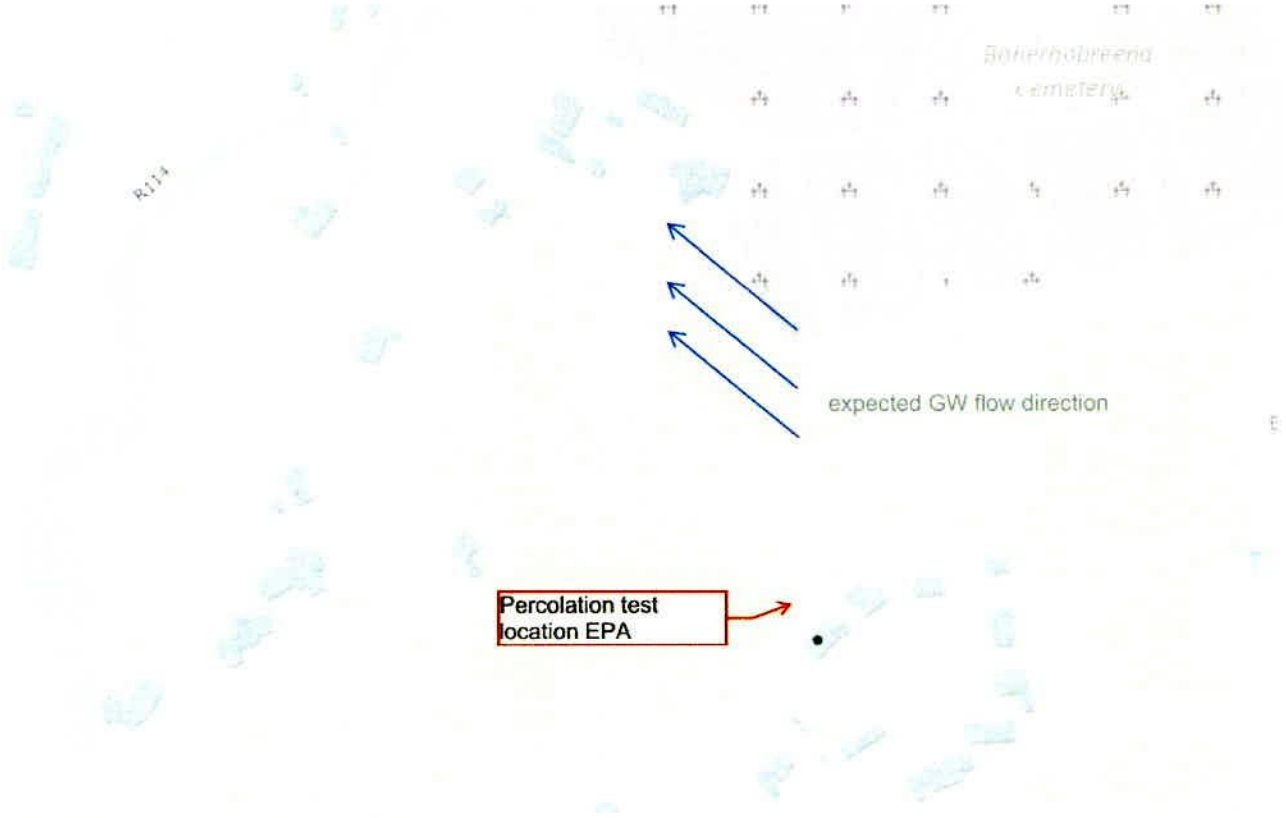



TRIAL PIT
T-TEST HOLE NO.1
P-TEST HOLES NO.2
TRIAL PIT/SOIL HEAP
BIOCYCLE LTD

3. Site characterization

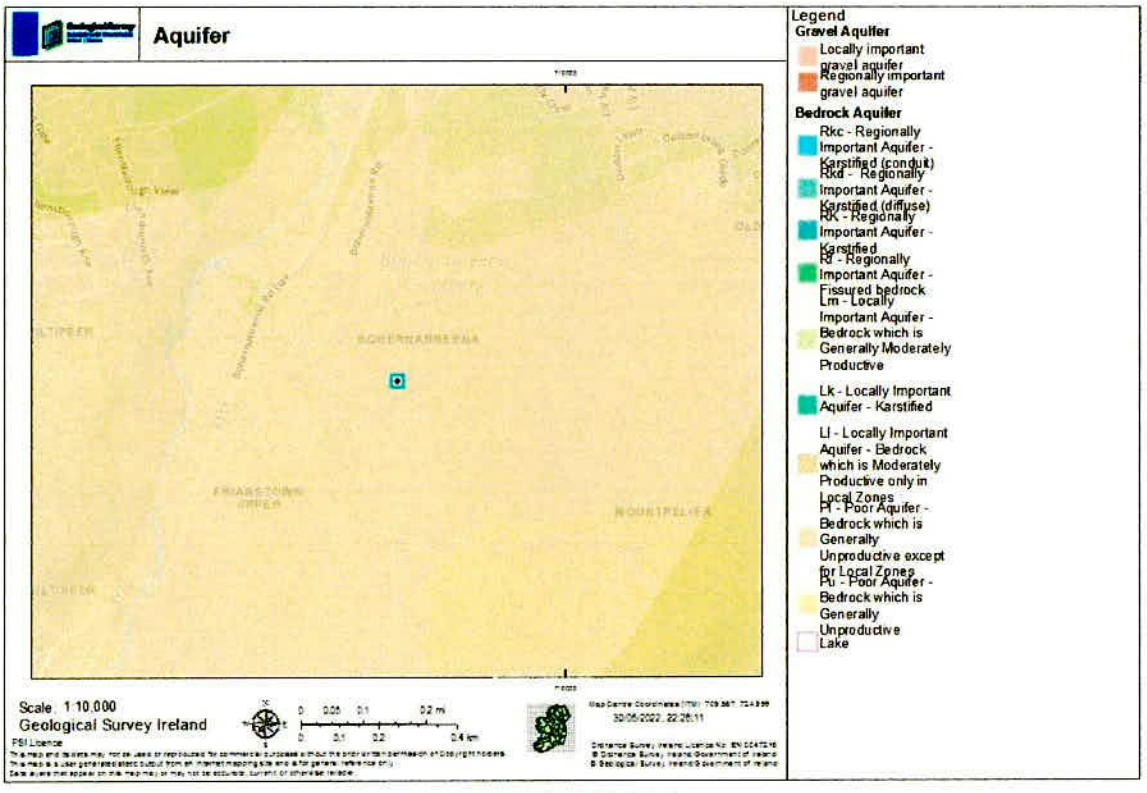
The main findings of the site characterisation assessment were as follows:

- Groundwater was not encountered on-site at a depth of 2100mm below ground level.
- Bedrock was not encountered on-site at a depth of 2100mm below ground level.
- The average T-Value was 11.11min/25mm.
- The average P-Value was 28.28 min/25mm.
- The proposed development is sited over a Poor aquifer.
- The vulnerability rating is High.
- There are no wells within 60m of area tested

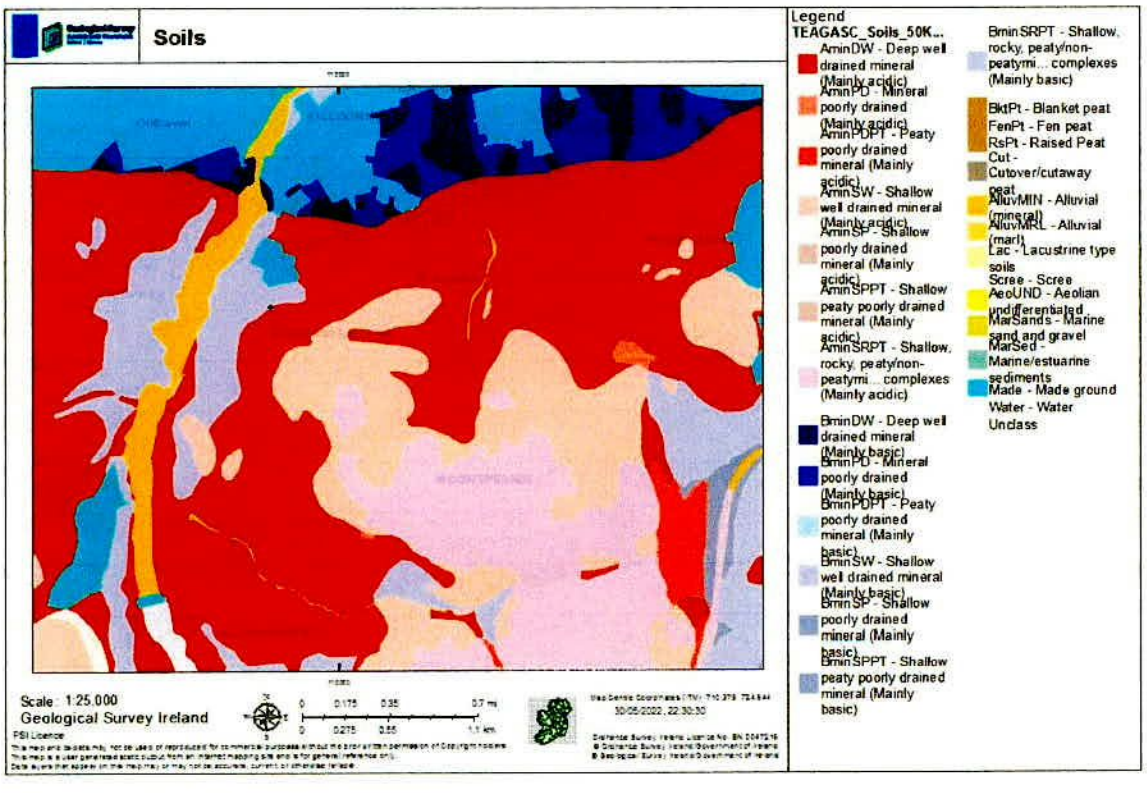


Test Location and Groundwater flow direction

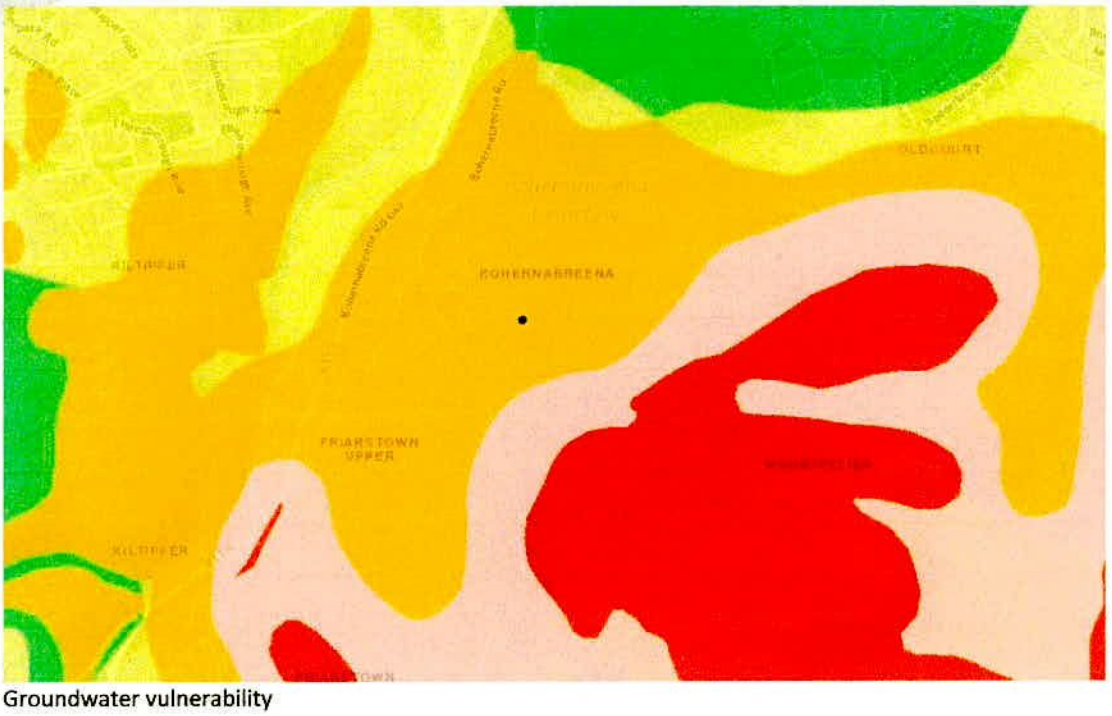
4. Supporting Maps



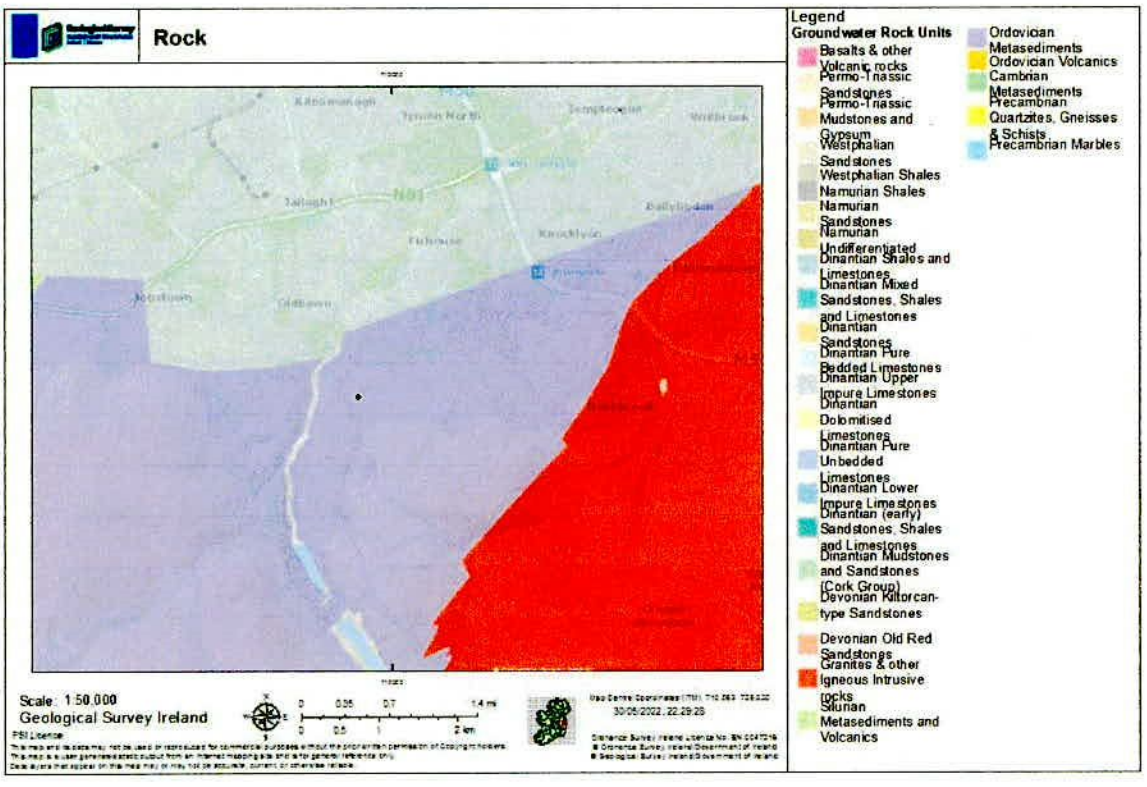
Groundwater Aquifers



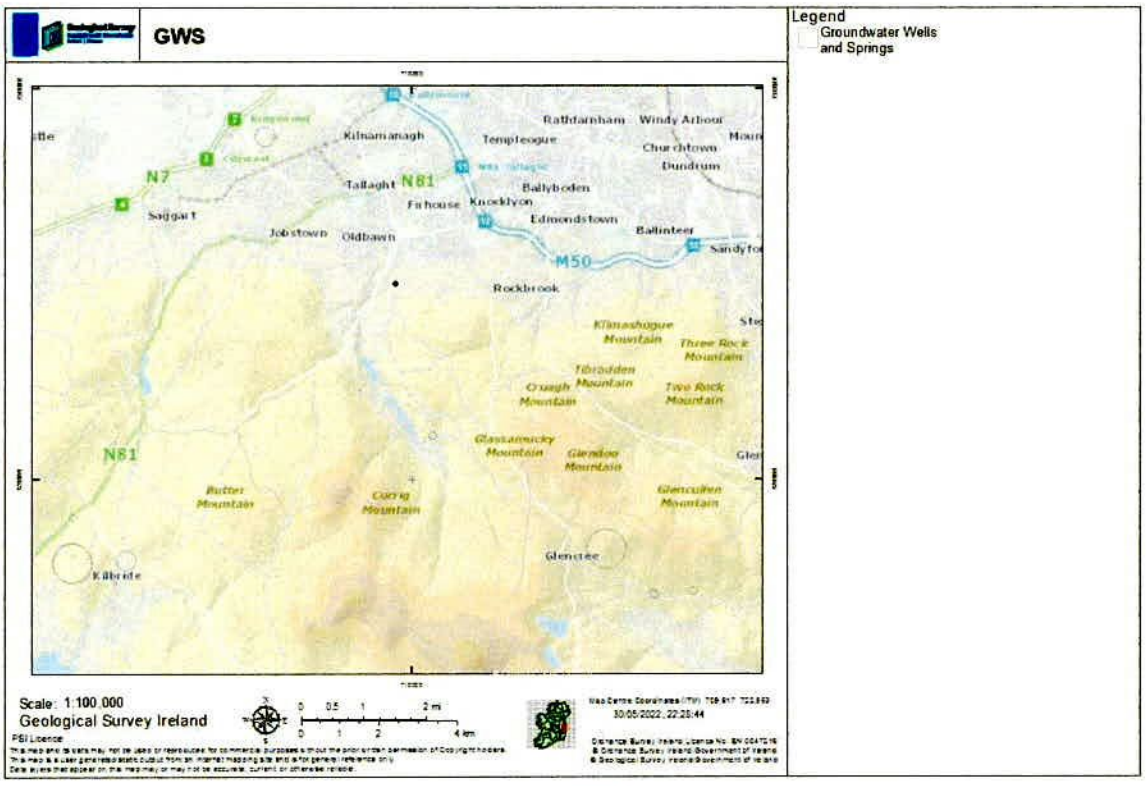
Soils



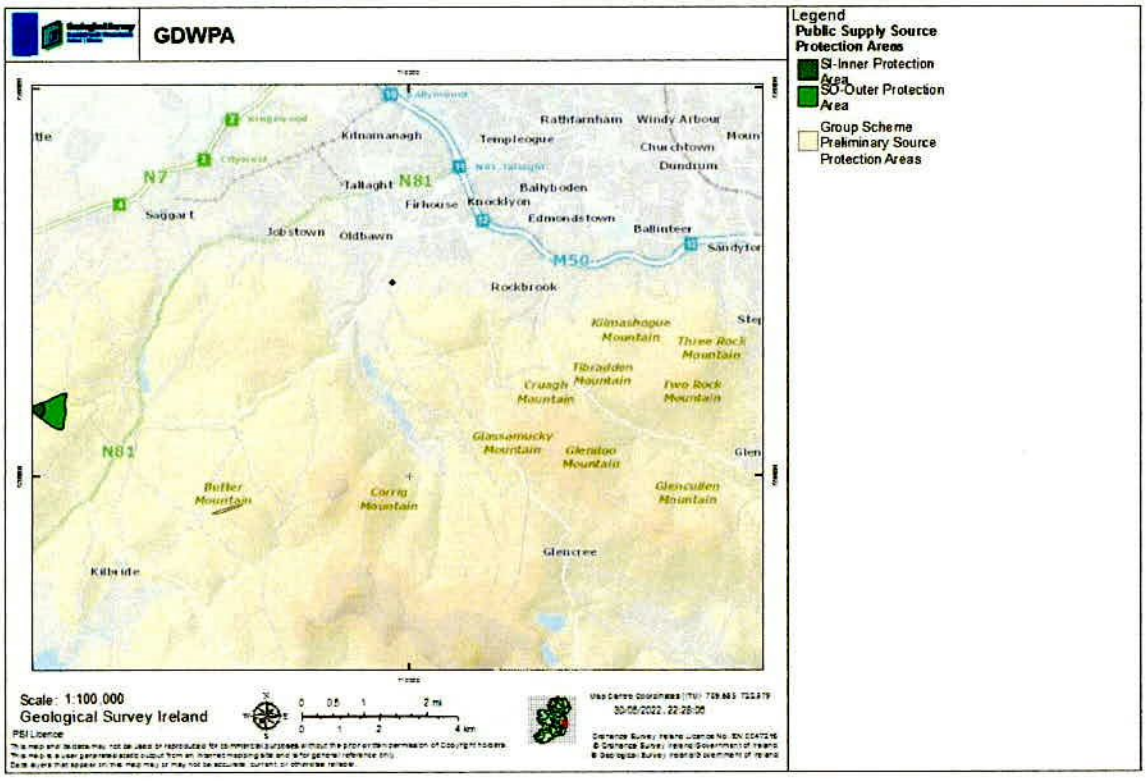
Groundwater vulnerability



Bedrock



GW Wells & Springs



Ground Drinking Water Protection Area

5. On-site Wastewater Treatment System

- **Wastewater loading rates**

Bedroom type	Number of Bedrooms	Population Equivalent PE	Hydraulic [Ltr] 150ltr/p.day	BOD [g] 60gBOD/p.day	Ammonia [g] 8g NH3/p.day
Single	2	2	300	120	16
Double	2	4	600	240	32
Total	**4bed**	**6PE**	**900**	**360**	**48**

Table 1. Projected Wastewater loading rates -maximum occupancy

Proposed System

Based on the information contained in Table 1, it is recommended that a Biocycle 6PE package treatment plant compliant with national standard NSAI S.R.66-2015 and International Standard IS EN12566-3:2005 will be installed on proposed site.

Package wastewater treatment system can operate on the principle of:

- Biological/Submerged aerated filter BAF/SAF systems. Details Appendix D. Drw. 314-C01

The number of factors should be taken into consideration when choosing the on-site wastewater treatment system, with the main objects as follows:

- Compliance with national and international standards
- Supervision during construction, installation, and commissioning
- Supervision during construction of effluent disposal system
- Frequency and access for servicing
- Maintenance and operating procedures requirements
- Life span of the entire system
- Correct operating procedures.
- Sludge storage, desludging frequency and access for desludging
- Plant alarm features and fail-safe measures
- Capital, operation and maintenance cost.
- System performance
- Power requirements
- Access arrangements for installation

General information

- Plant alarm system

  Package wastewater treatment system should incorporate alarm system, which operate as the warning device. An alarm panel (audio / visual) should be installed in a prominent location within the proposed development. On remote sites, or where required, an automatic dial out alarm system can be provided.

- Surface water

  Package wastewater treatment systems are not designed to accept surface water run-off from either the development or its surroundings. Surface water should be disposed of to a purpose-built surface water disposal / reuse system.

- Oils, Fats and Greases

  As oils, fats and greases are not easily biodegradable they can cause many problems in the collection network. Ideally grease removal is desirable at source, prior to discharge to the collection network. Therefore, we would recommend choosing the WWTS with large capacity primary settlement chamber, where the concentrations of oils, fats and greases typically associated with domestic applications can be accommodated within the system without the need to install a separate grease trap.

- Manufacturer's Guarantee

  The wastewater treatment system should come with a free minimum 12 months manufacturer's guarantee starting from the installation date. In case of defective system installed, supplier should repair or replace, free of charge, any part of the system affecting operation and performance of the unit installed. This guarantee should be given on the basis that the system is installed and operated in accordance with the manufacturer's instructions.

- Frequency of Servicing

  Package system supplier shall maintain the system free of charge for the first 12 months following installation and commissioning, and thereafter should be able to provide the Client with an Annual Service Agreement to service and inspect the system at least once per annum.

- Installation supervision

  It should be responsibility of the Project Supervisor (i.e. Engineer, Architect or other competent person) to ensure that the on-site wastewater treatment system is located and installed in accordance with planning conditions and EPA 2009 CoP requirements.

- Package WWTS performance

Package wastewater treatment system should be used only in accordance with the design parameters. To ensure proper operation of the system, it is important to comply with the manufacturer's instructions and guidance.

6. Effluent disposal system

Secondary treatment systems require a polishing filter for the disposal of effluent. The polishing filter is designed to provide a dual function.

- Polishes the effluent, further reducing the concentrations of various parameters (e.g. phosphorus, microorganisms, etc.) in the treated effluent; and
- Disposes of the treated effluent into the ground.

Design of Disposal System

Based on the findings and recommendations of the Site Characterisation Report (Appendix A), we propose to construct a subsurface soil polishing filter in the area adjacent to soil test location. The polishing filter should be constructed after the secondary package wastewater treatment system but before discharging into ground water.

It is the responsibility of the Engineer or Architect to ensure that the polishing filter is incorporated into the site drainage scheme. All drainage construction works should be designed and constructed using best practice and should only be attempted under the supervision of an Engineer or other suitably qualified professional.

The polishing filter can be calculated as follows:

- **Soil Polishing filter (T value in range 3 to 20min/25mm) SPF=6person 7.5l/p.msq; SPF=45msq**
- The final effluent from secondary treatment systems shall be evenly discharged to a 400 mm deep gravel distribution area (washed stone, 20 mm), sized according to Option 2 in Table 10.1.

Table 10.1: Infiltration/treatment area and trench length design for tertiary treatment, per PE

Percolation values (PVs)	Pumped or underlying gravity discharge (Options 1 and 2)	Gravity discharge into 500 mm wide trenches (Option 3)	Low-pressure pipe distribution into 300 mm wide trenches (Option 4)	Drip dispersal system (Option 5)	Tertiary infiltration area (Option 6)
	Area required per person (m^2)	Trench length required per person (m)	Trench length required per person (m)	Area required per person (m^2)	Area required per person (m^2)
$3 \leq PV \leq 20$	≥7.5	≥6	≥6	≥5	≥3.75
$21 < PV \leq 40$	≥15	≥12	≥12	≥14	≥7.5
$41 < PV \leq 50$	≥30	≥17	≥17	≥16	≥15
$51 < PV \leq 75$	≥50	≥19	≥19	≥22	≥25
$76 < PV \leq 90$	-	-	≥28	≥34	-
$91 < PV \leq 120$	-	-	-	≥54	-

Table 10.1 Source EPA 2021 COP

- The polishing filter should be constructed in accordance with the layout and cross-sectional drawing, as contained in Appendix C Drw.684-C02.

- The storm water disposal system for the proposed development should be constructed downgradient of the polishing filter.

- To allow for access and inspection of the polishing filter, an inspection points should be located at the ends of distribution laterals.

- The minimum depth between the base of the distribution gravel and the bedrock and the water table is given in Table 6.3.

Table 6.3: Minimum unsaturated soil and/or subsoil depth requirements

Infiltration/treatment area	Minimum depth (m)[a]		
	GWPR R1 and R2[1]	GWPR R2[2], R2[3], R2[4] and R3[1]	GWPR R3[4]
Percolation trenches and intermittent soil filters following septic tanks	1.2	2.0	Not acceptable
Polishing filters following secondary systems and infiltration areas following tertiary systems (other than below)	0.9	1.2	1.8
Drip dispersal systems where the percolation value is >75. Infiltration areas following tertiary systems where the tertiary treatment system is proved to reduce E. coli to 1,000 cfu/100 ml prior to discharge to the infiltration area.[b]	0.6	0.9	1.2

[a] These depths refer to the minimum depth of unsaturated soil and/or subsoil between the point of infiltration and the bedrock and the water table. The point of infiltration is at the base of the distribution gravel in all systems, except for (a) sand filter with underlying polishing filter where it is at the base of the basal gavel layer (Figure 8.4) and (b) drip dispersal where the tubing itself is the point of infiltration.

[b] Tertiary system tested using representative secondary effluent; 90% of values complying, no value exceeding by more than 30%.

Table 6.3; Source EPA 2021 COP

- Layer of minimum 900mm of unsaturated subsoil must be present between the base of the trail pit (2100mm BGL) and the invert level of the distribution gravel. Appendix C Drw.684-C01.

7. WWTS & SPF location

The location and configuration of the test holes, WWTS and effluent disposal area will depend on the site topography, the presence of underground services, planning conditions, and on or other factors, whether existing, planned, or anticipated.

The test holes dug have been adjacent to green area set within the separation distances contained in Table 2.

Separation distances for placing the WWTS and effluent disposal area should be such, that any excavation work required for the wastewater treatment and disposal system does not undermine adjacent features, such as buildings, roads, or walls.

Features	WWTS	Disposal system
Wells (as per GPR)	GPR	GPR
Surface Water Soakaway	5m	5m
Watercourse/Stream	10m	10m
Open Drain	10m	10m
Heritage Features	NHA/SAC	NHA/SAC
Lake/Foreshore	50m	50m
Dwelling House	7m	10m
Site Boundary	3m	3m
Trees/Canopy spread	3m	3m
Road	4m	4m
Slope break/cuts	4m	4m

Table 2. Minimum separation distances-source EPA 2021 COP

8. Summary

- The 6PE Biocycle package wastewater treatment system, designed in accordance with EPA 2021 CoP and SR66:2015 should be installed at proposed development.
- The 45msq of subsurface soil polishing filter should be constructed for effluent disposal.

Signed: *Waldemar Debowski* Date: 30 May 2022

Qualifications: B.Eng. P.Grad.Dips. FETAC Cert MIEI MIAH

Appendix A. EPA 2021 COP Site Characterization Form Mairead Murphy, D24

SITE CHARACTERISATION FORM
COMPLETING THE FORM

Note: This form requires the latest version of Adobe Acrobat Reader

and on PC's Windows 7 or later. Windows XP produces errors in calculations

Step 1:

Goto Menu Item **File, Save As** and save the file under a reference relating to the client or the planning application reference if available.

Use the **Clear Form** button to clear all information fields.

Notes:

All calculations in this form are automatic.

Where possible information is presented in the form of drop down selection lists to eliminate potential errors.

Variable elements are recorded by tick boxes. In all cases only one tick box should be activated.

All time record fields must be entered in twenty four hour format as follows: HH:MM

All date formats are DD-MM-YYYY.

All other data fields are in text entry format.

This form can be printed out fully populated for submission with related documents and for your files. It can also be submitted by email.

Section 3.2 In this section use an underline _____ across all six columns to indicate the depth at which changes in classification / characteristics occur.

Section 3.4 Lists supporting documentation required.

Section 4 Select the treatment systems suitable for this site and the discharge route.

Section 5 Indicate the system type that it is proposed to install.

Section 6 Provide details, as required, on the proposed treatment system.

APPENDIX A: SITE CHARACTERISATION FORM

File Reference: SEE-S385/Biocycle 40230

1.0 GENERAL DETAILS (From planning application)

Prefix: Ms First Name: Mairead Surname: Murphy

Address: Beasley's Lane, Bohernabreena, Tallaght, D24

Site Location and Townland: Beasley's Lane, Bohernabreena, Tallaght, D24

Number of Bedrooms: 4 Maximum Number of Residents: 6

Comments on population equivalent

For full wastewater loading breakdown refer to Site Characterisation Report

Proposed Water Supply:

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

2.0 GENERAL DETAILS (From planning application)

Soil Type, (Specify Type): H Vul: High permeability subsoil (sand & gravel) overlain by well drained soil, Moderate permeability subsoil overlain by well drained soil; Soil Drainage DRY

Subsoil, (Specify Type): GLs Glaciofluvial sands and gravels, TLPSsS Till derived chiefly from Lower Palaeozoic rocks

Bedrock Type: Ordovician Metasediments

Aquifer Category: Regionally Important | Locally Important Poor PI

Vulnerability: Extreme ☐ High ☑ Moderate ☐ Low ☐

Groundwater Body: Status

Name of Public/Group Scheme Water Supply within 1 km: none within 1km

Source Protection Area: ZOC ☐ SI ☐ SO ☐ Groundwater Protection Response: R1

Presence of Significant Sites (Archaeological, Natural & Historical): None within 500m

Past experience in the area: Existing old malfunctioning septic tank currently serving the existing dwelling, percolation system unable to locate, number of treatment systems and polishing filter installed in vicinity

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).

The main target at risk is the ground water.
Based on the available hydro geological data, an on-site treatment system should be acceptable, subject to normal good practice.
There doesn't appear to be site restriction existing or potential in place. Site is acceptable subject to normal good practice [i.e. system selection, construction, operation and maintenance in accordance with EPA (COP 2021)].

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:	Gently sloping residential and agricultural land.		
Slope:	Steep (>1:5) ☐	Shallow (1:5-1:20) ☑	Relatively Flat (<1:20) ☐
Slope Comment		Please refer to site survey.	

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

Houses:

Applicants family home (detached dwelling) >11m SE of proposed polishing filter. No Neighbouring dwellings within 60m radius of area tested. Reference Drw.684-C01

Existing Land Use:

Residential (gardens) , agricultural (pasture).

Vegetation Indicators:

Rough grass, occasional thistles, shrubs and ornamental trees. No indicators of poor drainage present.

Groundwater Flow Direction: Unknown but expected S towards N heading for River Dodder, following land contour.

Ground Condition:

Dry and firm underfoot at the time of assessment.

Site Boundaries:

As per attached maps, site layout plan Drw.684-C01

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment (contd.)

Roads:

Local access road, Beasley's Lane; as per attached OSI layout map

Outcrops (Bedrock And/Or Subsoil):

None observed within 250 of area tested.

Surface Water Ponding:

None observed within site tested.

Lakes:

None within 300m radius of area tested

Beaches/Shellfish Areas:

None within 1000m radius of area tested

Wetlands:

None within 500m radius of area tested

Karst Features:

None observed. None within 350m radius of area tested

Watercourses/Streams:*

None within 250m radius of area tested

***Note and record** water level

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment (contd.)

Drainage Ditches:*

None within 250m radius of area tested.

Springs:*

None recorded within 100m radius of area tested.

Wells:*

None recorded within 100m radius of area tested

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).

The main target at risk is the ground water. Ensuring that recommended setback distances are achieved site deems suitable for construction of on-site waste water treatment system and effluent disposal 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): 2.1

Depth from ground surface to bedrock (m) (if present): none at 2.1m

Depth from ground surface to water table (m) (if present): none at 2.1m

Depth of water ingress: none at 2.1m

Rock type (if present): none encountered at 2.1m

Date and time of excavation: 28-Sep-2010 10:00

Date and time of examination: 30-Sep-2010 15:00

Depth of Surface and Subsurface Percolation Tests		Soil/Subsoil Texture & Classification**	Plasticity and dilatancy***	Soil Structure	Density/ Compactness	Colour****	Preferential flowpaths
0.1 m		SILT loam (top soil)	Threads 4,3,3 Ribbon 60, 60,60 Sample Dillatant	Crumb	Soft	Dark Brown	Rootlets
0.2 m							
0.3 m		SILT/SAND with gravels	Threads 3,2,2 Ribbon 60,80,65 Dilatant	Variable structureless, loose grains to blocky	Soft	Medium Brown	Single rootlets
0.4 m	P test						
0.5 m							
0.6 m							
0.7 m							
0.8 m	T test						
0.9 m							
1.0 m							
1.1 m							
1.2 m							
1.3 m		SAND/ GRAVEL with cobbles throughout	Very difficult to form hand sample, recorded ribbon 20mm	Structureless, Granular	Very Soft	Yellow Brown	None
1.4 m							
1.5 m							
1.6 m							
1.7 m							
1.8 m							
1.9 m							
2.0 m							
2.1 m	Base						
2.2 m		Base @2.1m					
2.3 m							
2.4 m							
2.5 m							
2.6 m							
2.7 m							
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: 10

Likely Surface Percolation Value: 30

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:

Trial pit examination would indicate good permeability and relatively fast percolation rates. SILT/SAND with gravel and cobbles present. Secondary treatment package plant and soil polishing filter to be considered the best alternative for the existing septic tank replacement.

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)	400	400	400
Depth from ground surface to base of hole (mm) (B)	800	800	800
Depth of hole (mm) [B - A]	400	400	400
Dimensions of hole [length x breadth (mm)]	300 x 280	300 x 300	300 x 300

Step 2: Pre-Soaking Test Holes

		1	2	3
Pre-soak start	Date	28-Sep-2010	28-Sep-2010	28-Sep-2010
	Time	09:00	09:00	09:00
2nd pre-soak start	Date	28-Sep-2010	28-Sep-2010	28-Sep-2010
	Time	15:00	15:00	15:00

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	30-09-2010	30-09-2010	30-09-2010
Time filled to 400 mm	09:00	09:05	09:08
Time water level at 300 mm	09:30	09:38	09:35
Time (min.) to drop 100 mm (T_{100})	30.00	33.00	27.00
Average T_{100}			30.00

If T_{100} > 300 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	09:30	10:10	40.00	09:38	10:11	33.00	09:35	10:20	45.00
2	10:11	10:50	39.00	10:11	10:59	48.00	10:20	11:00	40.00
3	10:50	11:46	56.00	10:59	11:58	59.00	11:00	11:40	40.00
Average Δt Value			45.00			46.67			41.67
	Average Δt/4 = [Hole No.1]		11.25 (t_1)	Average Δt/4 = [Hole No.2]		11.67 (t_2)	Average Δt/4 = [Hole No.3]		10.42 (t_3)

Result of Test: Subsurface Percolation Value = 11.11 (min/25 mm)

Comments:

T-test would indicate good permeability in deeper subsoil as expected from trial hole examination.

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: Subsurface 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_3)			0.00

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	28-Sep-2010	28-Sep-2010	28-Sep-2010
	Time	10:00	10:00	10:00
2nd pre-soak start	Date	28-Sep-2010	28-Sep-2010	28-Sep-2010
	Time	15:00	15:00	15:00

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	30-Sep-10	30-Sep-10	30-Sep-2010
Time filled to 400 mm	09:30	09:31	09:32
Time water level at 300 mm	11:00	11:10	11:20
Time to drop 100 mm (T_{100})	90.00	99.00	108.00
Average T_{100}			99.00

If T_{100} > 300 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	11:00	12:45	105.00	11:10	12:52	102.00	11:20	13:15	115.00
2	12:45	14:31	106.00	12:52	14:46	114.00	13:15	15:20	125.00
3	14:31	16:28	117.00	14:46	16:30	104.00	15:20	17:30	130.00
Average ΔT Value			109.33			106.67			123.33
	Average ΔT/4 = [Hole No.1]		27.33 (T_1)	Average ΔT/4 = [Hole No.2]		26.67 (T_2)	Average ΔT/4 = [Hole No.3]		30.83 (T_3)

Result of Test: Surface Percolation Value = 28.28 (min/25 mm)

Comments:

P-test would indicate moderate permeability and average percolation rates in top-soil and shallow sub-soil as expected form trial hole examination.

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	$K_{ts} = T_f / T_m$	T – Value = 4.45 / K_{ts}
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	$K_{ts} = T_f / T_m$	T – Value = 4.45 / K_{ts}
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	$K_{ts} = T_f / T_m$	T – Value = 4.45 / K_{ts}
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:

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, subsoil, bedrock.
3. North point should always be included.
4. (a) Scaled 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. Site specific cross sectional drawing of the site and the proposed layout[1] should be submitted.
6. Photographs of the trial hole, test holes and site including landmarks (date and time referenced).
7. Pumped design must be designed by a suitably qualified person.

[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.

Slope of proposed infiltration / treatment area: no slope required

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) 1.40

Percolation test result: Surface: 28.28 Sub-surface: 11.11

Not Suitable for Development ☐ **Suitable for Development** ✔

Identify all suitable options

1. Septic tank system (septic tank and percolation area) **(Chapter 7)** — No
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

Discharge Route [1]

Mechanical Secondary WWTS with pumped discharge into soil polishing filter and ground disposal. Drw.684-C01 & Drw.684-C02

The new 6PE package secondary treatment system followed by the soil polishing filter to be installed. Reference Drw.314-C01

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) Drw.684-C02

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

No site improvement works required.

For more details refer to Site Characterisation Report

[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: BAF

Capacity PE: 6

Sizing of Primary Compartment: 4.50 m^3

Polishing Filter*: (Section 10.1)

Surface Area (m^2)*: 45.00

Option 1 - Direct Discharge Surface area (m^2):

Option 2 - Pumped Discharge Surface area (m^2):

Option 3 - Gravity Discharge Trench length (m):

Option 4 - Low Pressure Pipe Distribution Trench length (m):

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 * ($l/m^2.d$)	20.00	Surface area (m^2)	45.00
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

6PE BAF WWTS in compliance with S.R.66:2015 for the design, supply, installation, monitoring & servicing of waste water treatment systems.
Installation to be completed and commissioned by qualified and insured contractor.
Installation to be supervised and certified by suitable qualified engineer.

Soil Polishing Filter 45msq in compliance with EPA 2021 COP
Installation to be completed and commissioned by qualified and insured contractor.
Installation to be supervised and certified by suitable qualified engineer.

On-going Maintenance

Preventative annual service contract performed by indemnified and inoculated service technicians.min 1 year warranty and 1 year free maintenance contract .

7.0 SITE ASSESSOR DETAILS

Company: Biocycle Ltd.

Prefix: Mr First Name: Waldemar Surname: Debowski

Address: Baldoyle Industrial Estate, Unit 107, D13

Qualifications/Experience: B.Eng.Mech, P.Grad.Dpls(Env.Eng, Proj.Mgmt),MIEI,MIAH,FETAC/FAS certified

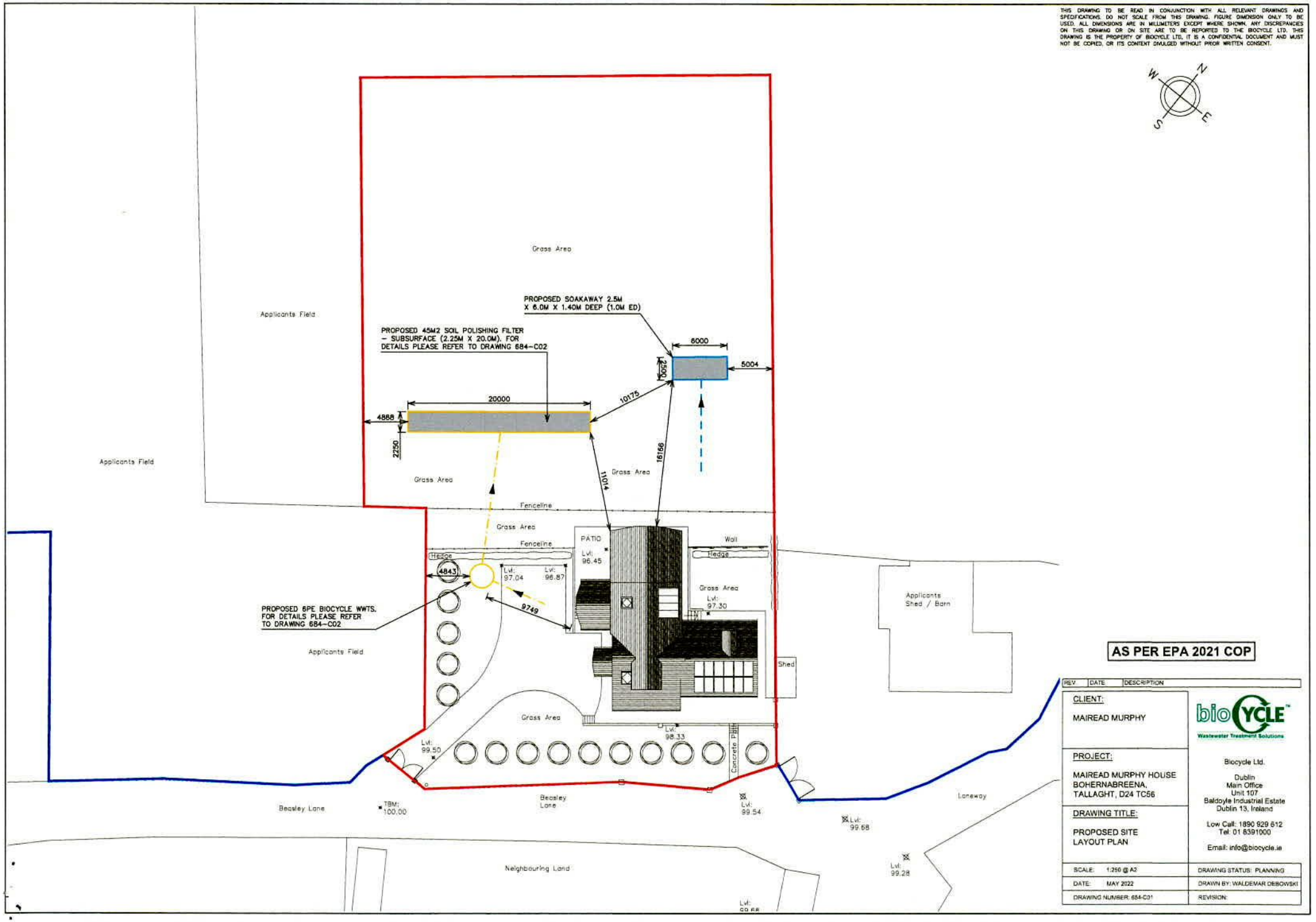
Date of Report: 27-May-2022

Phone: 018391000 E-mail info@biocycle.ie

Indemnity Insurance Number: A6300424/425

Signature: Waldemar Debowski

Appendix B. EPA Drw.684-C01 Mairead Murphy, D24_FW drainage layout



AS PER EPA 2021 COP

REV	DATE	DESCRIPTION

CLIENT:
MAIREAD MURPHY

PROJECT:
MAIREAD MURPHY HOUSE
BOHERNABREENA,
TALLAGHT, D24 TC56

DRAWING TITLE:
PROPOSED SITE LAYOUT PLAN

bioCYCLE™ Wastewater Treatment Solutions

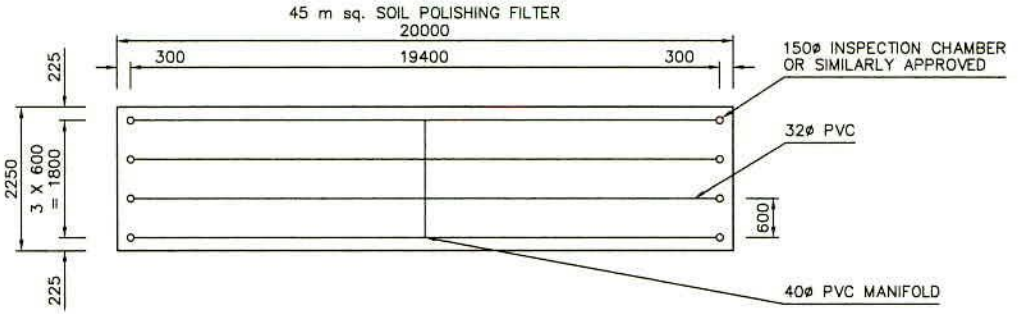
Biocycle Ltd.
Dublin
Main Office
Unit 107
Baldoyle Industrial Estate
Dublin 13, Ireland

Low Call: 1890 929 612
Tel: 01 8391000

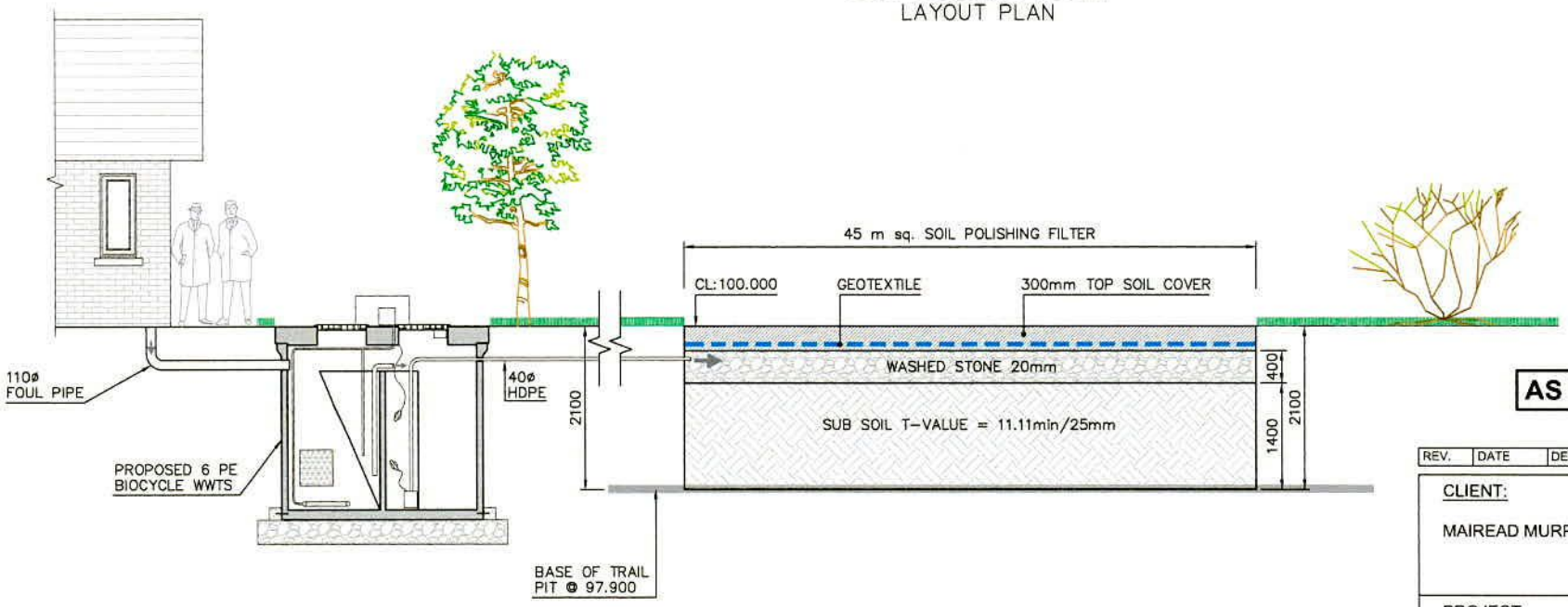
Email: info@biocycle.ie

SCALE: 1:250 @ A2	DRAWING STATUS: PLANNING
DATE: MAY 2022	DRAWN BY: WALDEMAR DEBOWSKI
DRAWING NUMBER: 684-C01	REVISION:

Appendix C. EPA Drw.684-C02 Mairead Murphy, D24_FW drainage section



SOIL POLISHING FILTER
LAYOUT PLAN



SOIL POLISHING FILTER
TYPICAL SECTION

AS PER EPA 2021 COP

REV.	DATE	DESCRIPTION

CLIENT:

MAIREAD MURPHY

PROJECT:

MAIREAD MURPHY HOUSE
BOHERNABREENA,
TALLAGHT, D24 TC56

DRAWING TITLE:

ON-SITE WASTE WATER
DISPOSAL SYSTEM DETALS

bioCYCLE™
Wastewater Treatment Solutions

Biocycle Ltd.

Dublin
Main Office
Unit 107
Baldoyle Industrial Estate
Dublin 13, Ireland

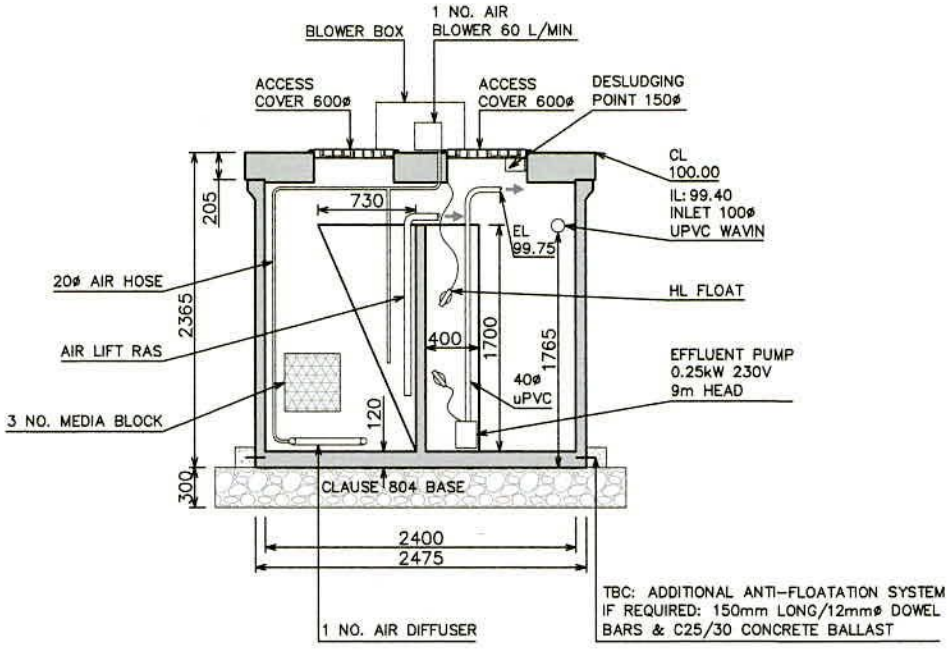
Low Call: 1890 929 612
Tel: 01 8391000

Email: info@biocycle.ie

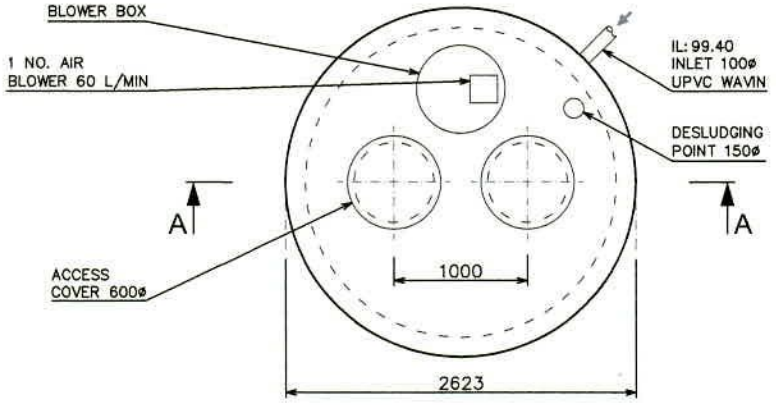
SCALE: NTS @ A3	DRAWING STATUS: PLANNING
DATE: MAY 2022	DRAWN BY: WALDEMAR DEBOWSKI
DRAWING NUMBER: 684-C02	REVISION:

Appendix D. EPA Drw.314-C01 Biocycle BAF 6PE WWTS Typical Details

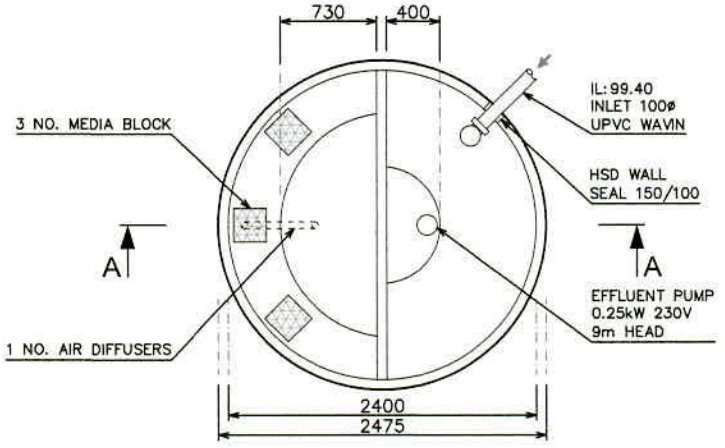
6PE	Working Volume [m3]	Surface Area [m2]	Tank Weight [t]	Lid Weight [t]
Primary	3.1	2.0	5.5	2.2
Aeration	2.6	1.4		
Clarifier	0.8	0.8		
Effluent Sump	0.4	0.3		
Max Load Bearing	10kN/m2 UDL or 1m overburden DL			



SECTION A-A



LID PLAN



TANK PLAN

bioCYCLE™ Wastewater Treatment Solutions	Biocycle Ltd. Main Office Unit 107 Baldoyle Industrial Estate Dublin 13, Ireland Low Call: 1890 929 612 Tel: 01 8391000 Email: info@biocycle.ie	CLIENT: BIOCYCLE	PROJECT: SR 66 POPULATION EQUIVALENT 6 PE	DRAWING TITLE: PLANS AND SECTION	REV. / DATE / DESCRIPTION SCALE: NTS @ A4 DATE: MARCH 2019 DRAWING NUMBER: 314-C01 DRAWING STATUS: DRAFT FOR DISCUSSION PURPOSES ONLY DRAWN BY: WALDEMAR DEBOWSKI REVISION: