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Site Characterisation Report

By

Dr. Eugene Bolton

Applicant: John & Sheila Murphy

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APPENDIX A: SITE CHARACTERISATION FORM

File Reference:

1.0 GENERAL DETAILS (From planning application)

Prefix: First Name: John & Sheila Surname: Murphy

Address:

Site Location and Townland: The Muddies, Rathfarnham, Co. Dublin D16 Y7R0

Number of Bedrooms: 3 Maximum Number of Residents: 5

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): Made Ground

Subsoil, (Specify Type): Till derived from granites

Bedrock Type: Granites & other Igneous Intrusive rocks

Aquifer Category: Regionally Important | Locally Important _____ Poor Pl

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: R1

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

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 Pl - Vulnerability is Low - Groundwater will be a target at low risk.
may suggest slow soakage

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: Slight north facing 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 to North , Northeast, Northwest and Southwest all in 300m radius.

Existing Land Use:

Residential

Vegetation Indicators:

Nothing to suggest poor soakage - mature site

Groundwater Flow Direction: North

Ground Condition:

Dry

Site Boundaries:

Hedgerow or Not defined

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment (contd.)

Roads:

Road to North boundary

Outcrops (Bedrock And/Or Subsoil):

None

Surface Water Ponding:

None

Lakes:

None

Beaches/Shellfish Areas:

None

Wetlands:

None

Karst Features:

None

Watercourses/Streams:*

North at 100m of north boundary

***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

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 is an existing dwelling served by a septic tank that is operating effectively from a visual inspection - suggests soil has good permeability.
his 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): 2.4

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

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

Depth of water ingress:

Rock type (if present):

Date and time of excavation: 30-Mar-2022

Date and time of examination: 31-Mar-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 with few cobbles	slowly Dilatant Ribs = 9,8,10 trds = 110,110,110	Blocky	Firm	Orange Brown	
0.4 m						
0.5 m						None
0.6 m						
0.7 m						
0.8 m						
0.9 m						
1.0 m						
1.1 m						The high level of stones could lead to preferential flow
1.2 m	Gravely CLAY with few small boulders	lowly Dilatant Ribs = 9,11,10 trds = 110,110,120	Blocky	Firm to Stiff	Light Brown	
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	Base of Pit					
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: 20

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.
Compaction level is quiet low especially in top 1m - expect good soakage

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

		1	2	3
Pre-soak start	Date	31-Mar-2022	31-Mar-2022	31-Mar-2022
	Time			
2nd pre-soak start	Date	31-Mar-2022	31-Mar-2022	31-Mar-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	01-04-2022	01-04-2022	01-04-2022
Time filled to 400 mm	08:14	08:15	08:16
Time water level at 300 mm	08:50	08:56	08:54
Time (min.) to drop 100 mm (T_{100})	36.00	41.00	38.00
Average T_{100}			38.33

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	08:50	09:54	64.00	08:56	10:00	64.00	08:54	09:58	64.00
2	09:54	11:08	74.00	10:00	11:21	81.00	09:58	11:11	73.00
3	11:08	12:36	88.00	11:21	13:01	100.00	11:11	12:52	101.00
Average Δt Value			75.33			81.67			79.33
	Average Δt/4 = [Hole No.1]		18.83 (t_1)	Average Δt/4 = [Hole No.2]		20.42 (t_2)	Average Δt/4 = [Hole No.3]		19.83 (t_3)

Result of Test: Subsurface Percolation Value = 19.69 (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	$K_{fs} = T_f / T_m$	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

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

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	31-Mar-2022	31-Mar-2022	31-Mar-2022
	Time			
2nd pre-soak start	Date	31-Mar-2022	31-Mar-2022	31-Mar-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	01-Apr-22	01-Apr-22	01-Apr-2022
Time filled to 400 mm	08:19	08:20	08:21
Time water level at 300 mm	09:06	09:09	09:02
Time to drop 100 mm (T_{100})	47.00	49.00	41.00
Average T_{100}			45.67

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	09:06	10:11	65.00	09:09	10:17	68.00	09:02	10:07	65.00
2	10:11	11:30	79.00	10:17	11:31	74.00	10:07	11:19	72.00
3	11:30	13:03	93.00	11:31	13:12	101.00	11:19	12:46	87.00
Average ΔT Value			79.00			81.00			74.67
	Average ΔT/4 = [Hole No.1]		19.75 (T_1)	Average ΔT/4 = [Hole No.2]		20.25 (T_2)	Average ΔT/4 = [Hole No.3]		18.67 (T_3)

Result of Test: Surface Percolation Value = 19.56 (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

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

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

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) 0.90

Percolation test result: Surface: 19.50 Sub-surface: 19.50

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

Identify all suitable options

1. Septic tank system (septic tank and percolation area) **(Chapter 7)** — Yes
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]

Groundwater

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.

A secondary treatment system is recommended followed by a soil polishing filter.
As the top 2m is suitable for treatment the point of infiltration of the treated effluent should be at about 600mm below existing ground level.
Soil is removed down to 600mm and the area leveled. The 200mm 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 5 - Hydraulic load is 750litres.
T-value is less than 20 so load filter allowing 7.5 m2/PE (option 2 EPA Code of Practice 2021)
Area of filter is 37.5m2

[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)	37.50	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)	37.50
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

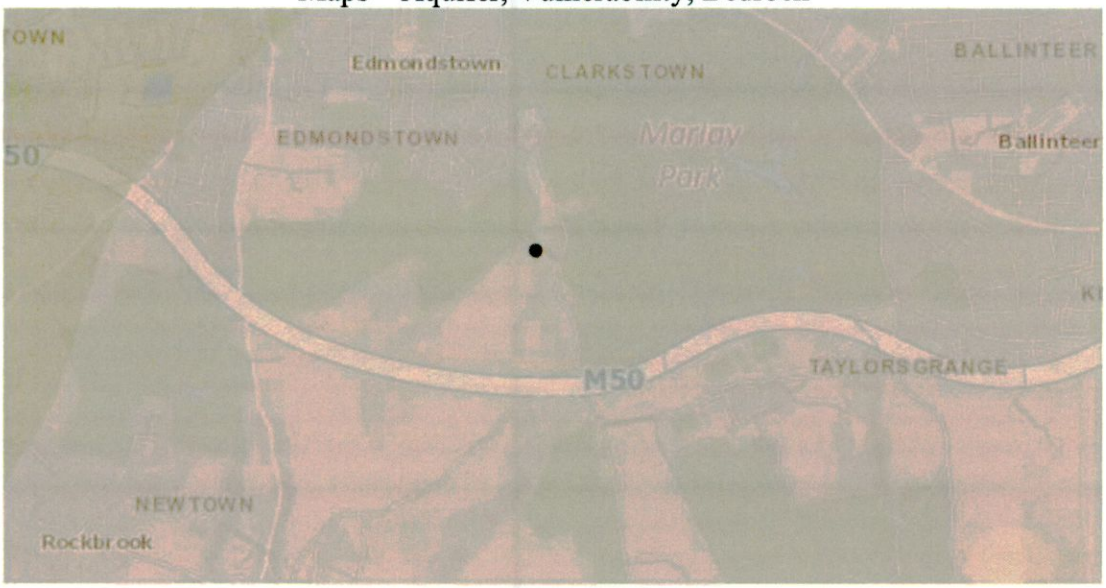
Date of Report: 19-Apr-2022

Phone: 0862434828 E-mail info@trinitygreen.ie

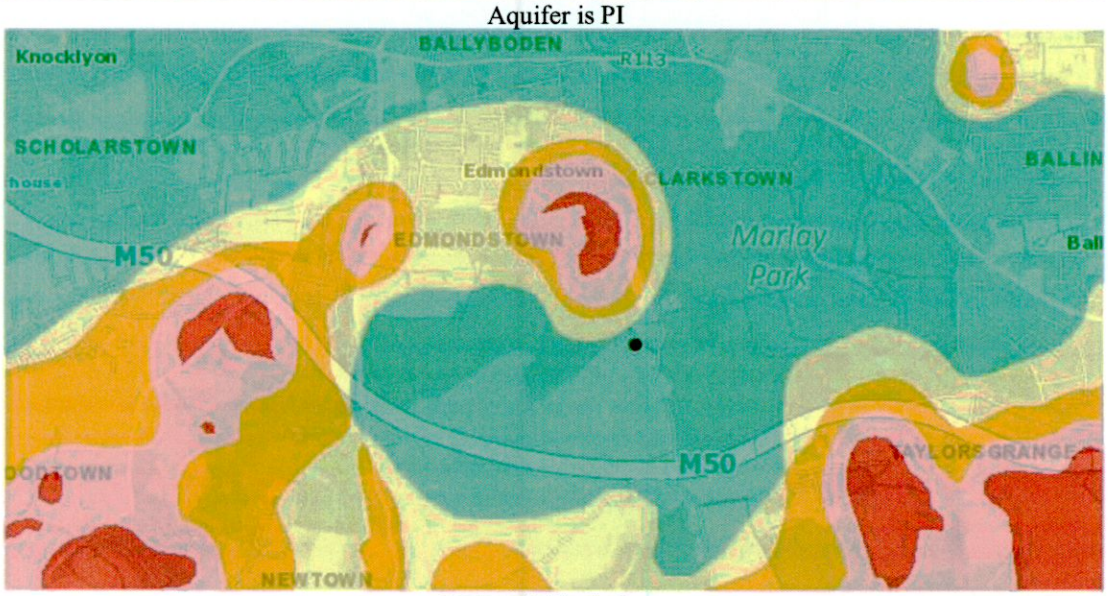
Indemnity Insurance Number: PI/C/12453/21/1

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

Maps – Aquifer, Vulnerability, Bedrock



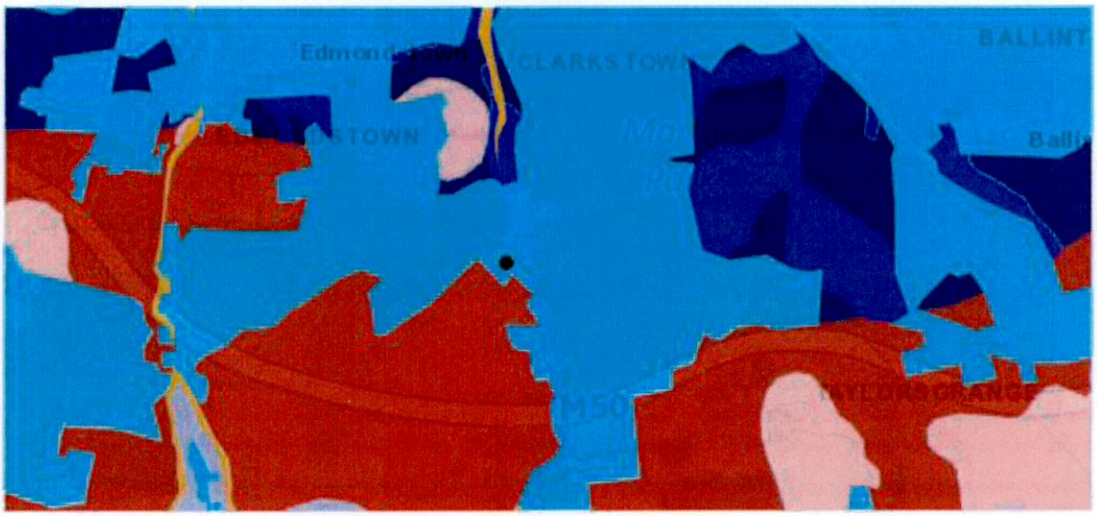
Aquifer is PI



Vulnerability is Low

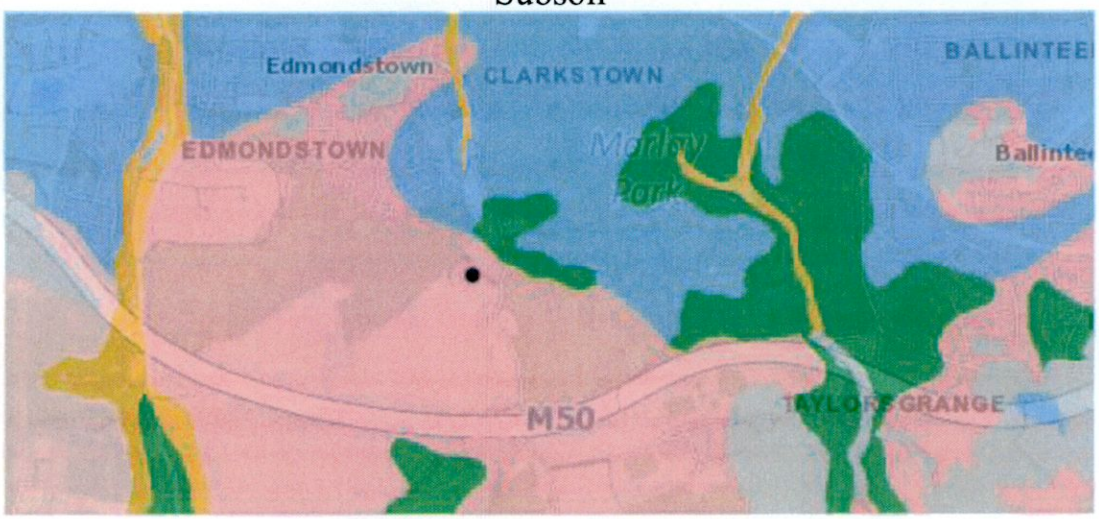
Bedrock is Granites & other Igneous Intrusive rocks

Soil



Parent Material	Made	IFS Soil Description	Made/Built land
Parent Material Name	Made ground	County	DUBLIN
Parent Material Desciption	Made ground	Category	Made ground
Soil Group		Legend	Made - Made ground
IFS Soil Code	Made		

Subsoil



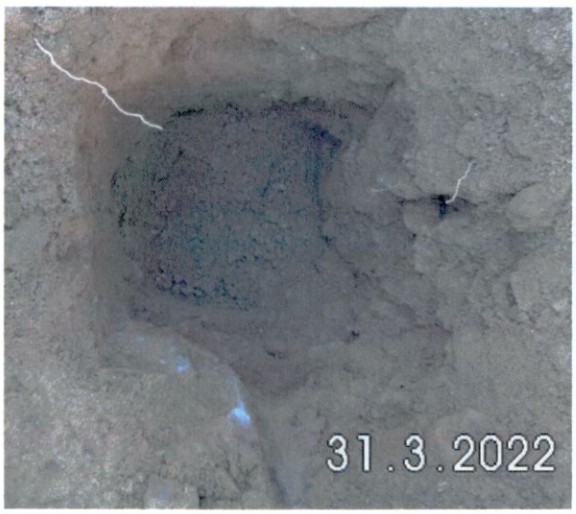
Lithology	Till derived from granites
Quaternary Sediment	TGr

Photos

Row 1 – P1, P2

Row 2 – P3, T1

Row 3 – T2, T3



Trial Pit

Site Overview

Site Location