APPENDIX A: SITE CHARACTERISATION FORM

File Reference:

1.0 GENERAL DETAILS (From planning application)

Prefix: Mr First Name: Joseph Surname: Costello

Address: 25 Coldwater Lakes, Saggart, Co. Dublin

Site Location and Townland: Ballymaice, Bohernabreena, Co. Dublin (Existing house & septic tank)

Number of Bedrooms: 5 Maximum Number of Residents: 7

Comments on population equivalent

Proposed Water Supply:

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

2.0 GENERAL DETAILS (From planning application)

Soil Type, (Specify Type): Acid Brown Earths / Brown Podzolics

Subsoil. (Specify Type):

Bedrock Type: Ordovician Metasediments

Aquifer Category: Regionally Important | Locally Important | Poor Pl

Vulnerability: Extreme ☐ High ☐ Moderate ☐ Low ☑

Groundwater Body: Status

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 within 250m

Past experience in the area: Areas of 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).

Ground water is a target

Existing house and septic tank on the site. Proposed extension works and new on-site sewage system.

New well to be bored on site located >60m from the proposed percolation area.

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: Hilly

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

Slope Comment: Slopes from rear to flat

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

Houses:

Existing house on site East NE >50m
House SE >100m, houses SW >200m

Existing Land Use:

Existing house & overgrown gardens surrounded by agricultural fields

Vegetation Indicators:

No soakage indicators noted

Groundwater Flow Direction: Likely SW-NE with gradient of the hills

Ground Condition:

Firm underfoot on test days (dry sunny weather)

Site Boundaries:

Overgrowth, trees

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment (contd.)

Roads:

Ballymaise Road passing the front entrance / driveway

Outcrops (Bedrock And/Or Subsoil):

None visible

Surface Water Ponding:

None on test days (dry sunny weather)

Lakes:

None within 250m

Beaches/Shellfish Areas:

None within 250m

Wetlands:

None within 250m

Karst Features:

None

Watercourses/Streams:*

Stream lies to the NW >150m

*Note and record water level

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment (contd.)

Drainage Ditches:*

None - roadside furrows to take storm water off the road >150m

Springs:*

No springs noted

Wells:*

New well required to be located >60m from the proposed percolation area

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).

*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): 2.2

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): No rock or groundwater encountered at 2.2m

Date and time of excavation: 15-Apr-2022

Date and time of examination: 19-Apr-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 0.2 m 0.3 m	slightly sandy slightly gravelly SILT/CLAY 0-0.2m	Threads 7/6/4 Ribbons 100/85mm Dilates	Crumb	Firm	Brown	Rootlets
0.4 m 0.5 m 0.6 m 0.7 m 0.8 m 0.9 m 1.0 m	sandy slightly gravelly SILT/CLAY 0.2-0.8m	Threads 5/3/3 Ribbons 90/70mm Dilates	Blocky	Firm / Soft	Reddish Brown	Random
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	very sandy gravelly SILT/CLAY with cobbles 0.8-2.2m	Threads 5/4/3 Ribbons 90/60mm Dilates	Blocky (some smearing)	Soft / sticky	Dark Brown	Random
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	END OF PIT AT 2.2M					

Likely Subsurface Percolation Value:

Likely Surface Percolation Value:

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:

No seepage or mottling noted in the pit walls.
Groundwater is not a target

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)	600	600	600
Depth from ground surface to base of hole (mm) (B)	1,000	1,000	1,000
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	18-Apr-2022	18-Apr-2022	18-Apr-2022
	Time	09:54	09:54	09:55
2nd pre-soak start	Date	18-Apr-2022	18-Apr-2022	18-Apr-2022
	Time	15:26	15:27	15:31

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	19-04-2022	19-04-2022	19-04-2022
Time filled to 400 mm	09:12	09:12	09:14
Time water level at 300 mm	09:20	09:22	09:36
Time (min) to drop 100 mm (T_{100})	8.00	10.00	22.00
Average T_{100}			13.33

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	09:20	09:34	14.00	09:22	09:52	30.00	09:35	10:11	36.00
2	09:34	09:49	15.00	09:52	10:28	36.00	10:11	10:56	45.00
3	09:49	10:07	18.00	10:28	11:14	46.00	10:56	12:02	66.00
Average Δt Value			15.67			37.33			49.00
	Average Δt/4 = [Hole No.1]		3.92 (t_1)	Average Δt/4 = [Hole No.2]		9.33 (t_2)	Average Δt/4 = [Hole No.3]		12.25 (t_3)

Result of Test: Subsurface Percolation Value = 8.50 (min/25 mm)

Comments:

Good soakage - subsoil in tested area considered suitable for the treatment of effluent.
(Pre-soaked on Easter Monday (living close by) Test holes drained fully between pre-soak and overnight.

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: 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	$K_{ts} = T_f / T_m$	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:

3.3(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)			
Depth of hole (mm)	0	0	0
Dimensions of hole [length x breadth (mm)]	x	x	x

Step 2: Pre-Soaking Test Holes

Pre-soak start	Date			
	Time			
2nd pre-soak start	Date			
	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			
Time filled to 400 mm			
Time water level at 300 mm			
Time to drop 100 mm (T_{100})	0.00	0.00	0.00
Average T_{100}			0.00

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

Comments:

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:

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:	1:200
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: _____ Sub-surface: 8.50

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]

Proposed to install a sewage treatment plant in conjunction with a constructed subsurface trench soil polishing filter with final discharge to ground water.

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) 0.60

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

Based on the site assessment it is proposed to decommission the old septic tank and install a new sewage treatment plant in conjunction with a constructed subsurface trench soil polishing filter subject to approval by the County Council.

The percolation tests produced good soakage and there is a very low density of houses in the area. With a subsurface test result of 8.5 it is recommended to install a trench percolation area consisting of 5 X 10m percolation trenches.

The system must be installed in accordance with the EPA CoP 2021.

Only foul and grey water to discharge to the sewage system.
Storm water must not be allowed into the sewage system.

[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: Tricel Treatment Plant

Capacity PE: 8

Sizing of Primary Compartment: ____ m^3

Polishing Filter*: (Section 10.1)

Surface Area (m^2)*:

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

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

Option 3 - Gravity Discharge Trench length (m): 50.00

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
	Tricel STP En & SR66 Certified BOD 95.9 SS 95.3 NH4-N 74.9	Sewage treatment plant En / SR66 certified with a trench soil polishing filter (5x10m trenches) to include a stilling chamber and suitable distribution box with final discharge to groundwater

DISCHARGE ROUTE:

Groundwater	✔	Hydraulic Loading Rate * ($l/m^2.d$)	1,050.00	Surface area (m^2)	125.00
Surface Water **		Discharge Rate (m^3/hr)	0.40		

* 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

The installation must be supervised by suitably qualified person with a Completion Report prepared to include photographic evidence on completion of works.

On-going Maintenance

The system must be desludged annual or in accordance with the manufacturers instructions and serviced at least once every year by a suitably qualified person.

7.0 SITE ASSESSOR DETAILS

Company: Waste Water Maintenance Limited

Prefix: Mr First Name: Aidan Surname: Comerford

Address: 149 Woodfield, Scholarstown Road, Rathfarnham, Dublin 16

Qualifications/Experience: EPA SIte Assessor, Dip. Environmental Impact & Strategic Impact Assessment

Date of Report: 19-Apr-2022

Phone: E-mail info@wastewater.ie

Indemnity Insurance Number: ARB PI/D/1256/20/1

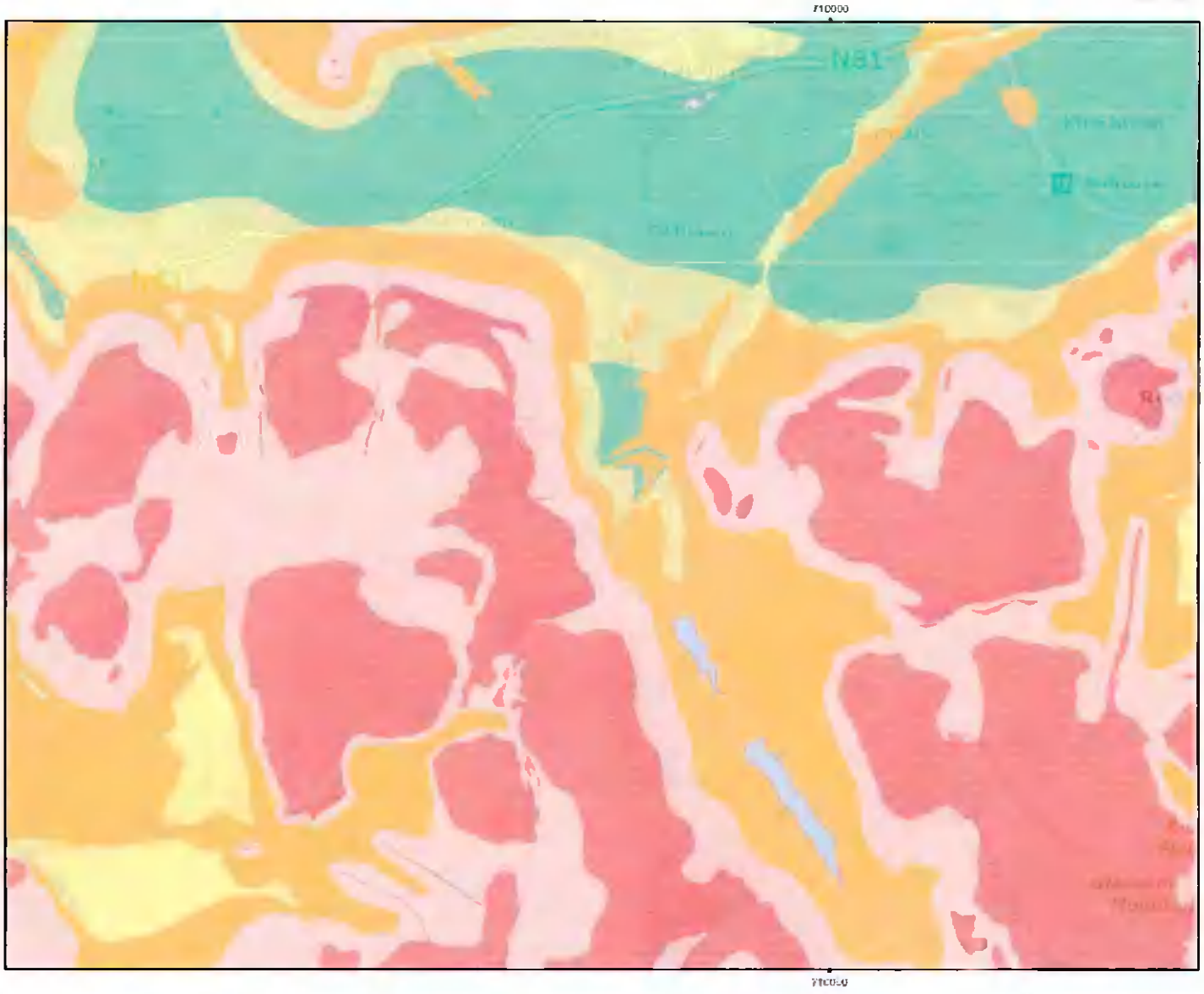
Signature: 

Site Pictures

Site view to house from test location & rear view of the house & septic tank front of house

Geological Survey

Vulnerability High



Legend

Groundwater_Vulnerability_40K_IE...

- Rock at or near Surface or Karst
- Extreme
- High
- Moderate
- Low
- Water

Scale: 1:50,000

Geological Survey Ireland

0 0.35 0.7 1.4 mi

0 0.5 1 2 km

Map Centre Coordinates (ITM) 708,156 724,079

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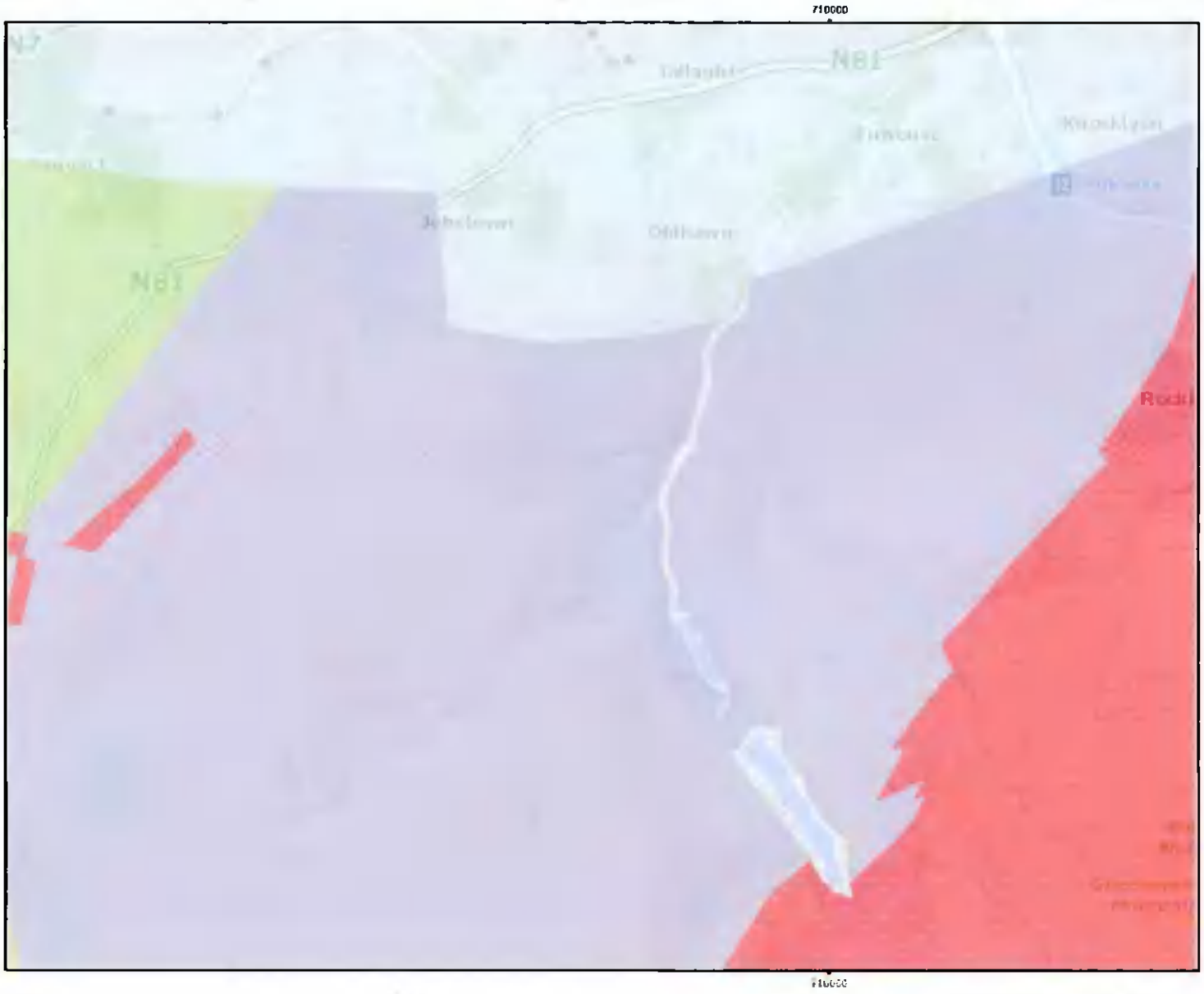
Geological Survey
Suirbhéireacht Gheolaíochta
Ireland | Éireann

Bedrock Ordovician Metasediments



Legend

Groundwater Rock Units

- Dinantian Upper Impure Limestones
- Granites & other Igneous Intrusive rocks
- Silurian Metasediments and Volcanics
- Ordovician Metasediments

Scale: 1:50,000

Geological Survey Ireland

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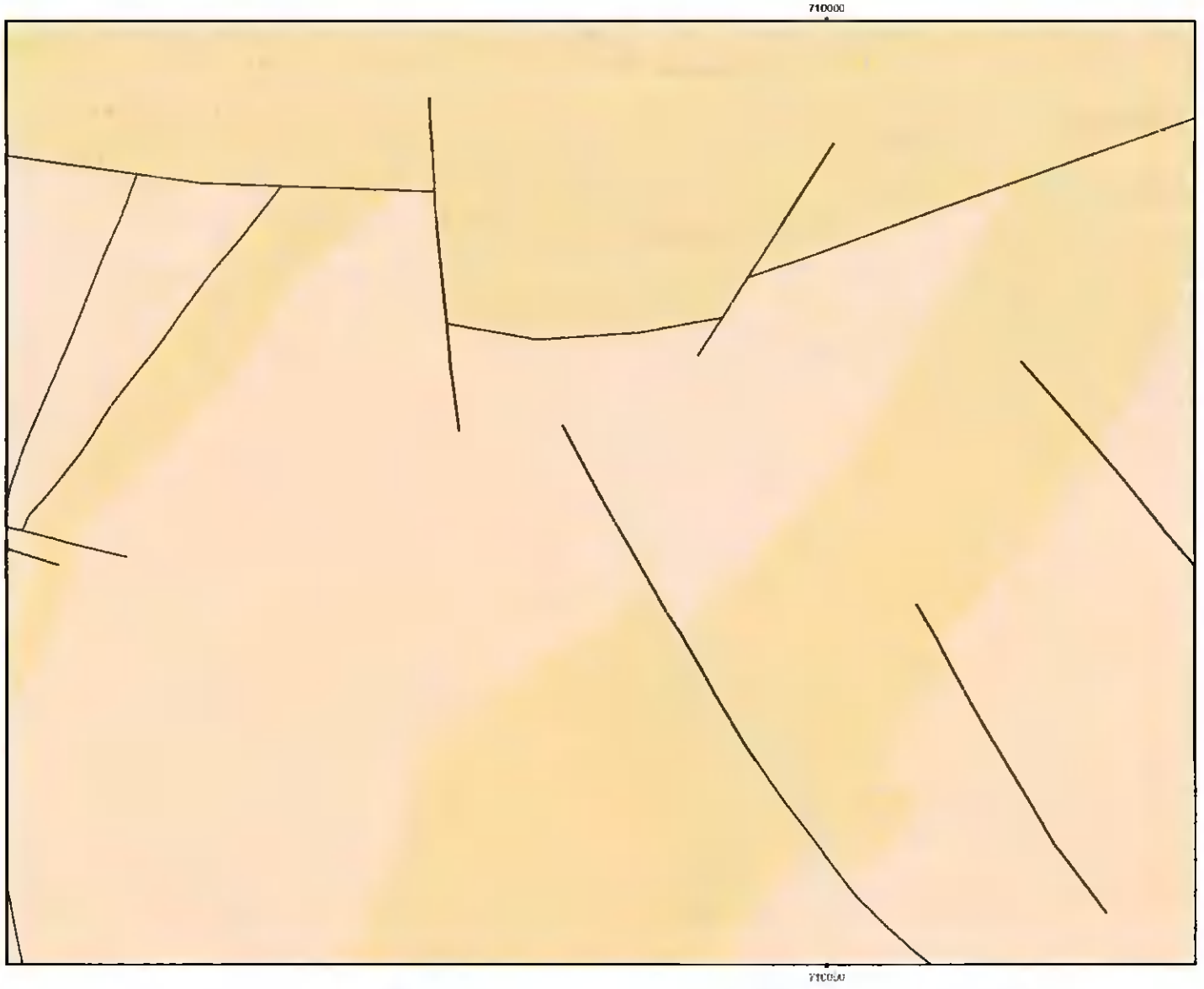
Geological Survey
Suirbhéireacht Gheolaíochta
Ireland Éireann

Aquifer Poor Pl



Legend

— Bedrock Aquifer Faults

Bedrock Aquifer

Ll - Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones

Pl - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones

Scale: 1:50,000

Geological Survey Ireland

N W E S

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