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Site Characterisation Report

By

Dr. Eugene Bolton

Applicant: Paddy Eustace

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APPENDIX A: SITE CHARACTERISATION FORM

File Reference:

1.0 GENERAL DETAILS (From planning application)

Prefix: Mr First Name: Paddy Surname: Eustace

Address:

Site Location and Townland: Glenoraneen, Britas Co. Wicklow

Number of Bedrooms: 2 Maximum Number of Residents: 4

Comments on population equivalent

Pop equivelent is no. of bedroms plus 2

Proposed Water Supply:

Mains ☑ Private Well/Borehole ☐ To be bored on-site Group Well/Borehole ☐

2.0 GENERAL DETAILS (From planning application)

Soil Type, (Specify Type): Glaciofluvial Sands & Gravels

Subsoil, (Specify Type): Gravels derived from Limestones

Bedrock Type: Silurian Metasediments and Volcanics

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).

The surface water and groundwater are likely to be targets at risk

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

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment

Landscape Position:	On east 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:

Site borders 2 houses to North, Pub to east

Existing Land Use:

Residential

Vegetation Indicators:

Nothing to suggest poor soakage

Groundwater Flow Direction: East

Ground Condition:

dry

Site Boundaries:

Hedgerow

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment (contd.)

Roads:

Lane to South leading to road to East

Outcrops (Bedrock And/Or Subsoil):

Nothing exposed

Surface Water Ponding:

None

Lakes:

North 500m lake into which river Camac flows

Beaches/Shellfish Areas:

None

Wetlands:

None

Karst Features:

None

Watercourses/Streams:*

*Note and record water level

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment (contd.)

Drainage Ditches:*

None bordering site

Springs:*

None

Wells:*

Area served by mains - but there is a well to Northeast

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).

Ground conditions are dry
There are no ditches bordering site suggests good soakage.

***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):

Date and time of excavation: 24-Jul-2020

Date and time of examination: 28-Jul-2020

Depth of Surface and Subsurface Percolation Tests	Soil/Subsoil Texture & Classification**	Plasticity and dilatancy***	Soil Structure	Density/ Compactness	Colour****	Preferential flowpaths
0.1 m P	Top soil - Clayey loam	dilatant	Crumb	Firm	Black	Rootlets
0.2 m P						
0.3 m P						
0.4 m P						
0.5 m T	Gravely CLAY (Low Gravel)	Dilatent Trds = 9,10, 10 Ribs = 110,110,120	Blocky	Firm	Redish Brown	None
0.6 m T						
0.7 m T						
0.8 m T						
0.9 m						
1.0 m	Silty SAND (Coarse - granite derived)	No trds or Ribs	Structureless	Hard	Light Brown	
1.1 m						
1.2 m						
1.3 m						
1.4 m						
1.5 m						
1.6 m						
1.7 m						
1.8 m						
1.9 m						
2.0 m						
2.1 m						
2.2 m						
2.3 m						
2.4 m						
2.5 m						
2.6 m	Base of trench					
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: 30

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:

Topsoil is likely to have good soakage. Subsoil is Sand or Gravel but with some silt present and is compacted - will have slowish 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)	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 300	300 x 300	300 x 300

Step 2: Pre-Soaking Test Holes

Pre-soak start	Date	28-Jul-2020	28-Jul-2020	28-Jul-2020
	Time			
2nd pre-soak start	Date	28-Jul-2020	28-Jul-2020	28-Jul-2020
	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	29-07-2020	29-07-2020	29-07-2020
Time filled to 400 mm	08:17	08:18	08:19
Time water level at 300 mm	09:09	09:14	09:15
Time (min.) to drop 100 mm (T_{100})	52.00	56.00	56.00
Average T_{100}			54.67

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	09:09	10:31	82.00	09:14	10:44	90.00	09:15	10:43	88.00
2	10:31	12:04	93.00	10:44	12:27	103.00	10:43	12:31	108.00
3	12:04	13:57	113.00	12:27	14:33	126.00	12:31	14:42	131.00
Average Δt Value			96.00			106.33			109.00
	Average Δt/4 = [Hole No.1]		24.00 (t_1)	Average Δt/4 = [Hole No.2]		26.58 (t_2)	Average Δt/4 = [Hole No.3]		27.25 (t_3)

Result of Test: Subsurface Percolation Value = 25.94 (min/25 mm)

Comments:

Soakage is well within the acceptable 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	$K_{ts} = T_f / T_m$	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

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_3)			0.00

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

Comments:

3.3(b) Surface Percolation Test for Soil

Step 1: Test Hole Preparation

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

Step 2: Pre-Soaking Test Holes

Pre-soak start	Date	28-Jul-2020	28-Jul-2020	28-Jul-2020
	Time			
2nd pre-soak start	Date	28-Jul-2020	28-Jul-2020	28-Jul-2020
	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	29-Jul-20	29-Jul-20	29-Jul-2020
Time filled to 400 mm	08:23	08:24	08:25
Time water level at 300 mm	09:26	09:23	09:28
Time to drop 100 mm (T_{100})	63.00	59.00	63.00
Average T_{100}			61.67

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	09:26	10:27	61.00	09:23	10:26	63.00	09:28	10:31	63.00
2	10:27	11:40	73.00	10:26	11:37	71.00	10:31	11:41	70.00
3	11:40	13:02	82.00	11:37	13:11	94.00	11:41	13:08	87.00
Average ΔT Value			72.00			76.00			73.33
	Average ΔT/4 = [Hole No.1]		18.00 (T_1)	Average ΔT/4 = [Hole No.2]		19.00 (T_2)	Average ΔT/4 = [Hole No.3]		18.33 (T_3)

Result of Test: Surface Percolation Value = 18.44 (min/25 mm)

Comments:

Soakage is within acceptable 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: Surface Percolation Value = 0.00 (min/25 mm)

Comments:

9.0 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: 18.00 Sub-surface: 26.00

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]

groundwater

10.0 SELECTED DWWTS

Propose to install: Tertiary Treatment System and Infiltration /treatment area

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.

It is recommended to install a Package aeration system and to polish the effluent through a Sand polishing filter and discharge to ground.
The proposed approach is to achieve secondary treatment in an Oakstown BAF unit and Tertiary treatment in a Sand Filter. The disposal of the treated wastewater is then achieved by distributing the effluent from the sand filter over a gravel distribution layer. As the watertable is in excess of 2m bgl it is recommended that the base of the distribution gravel is at about 1000mm below existing ground level. The soil is removed down to 1m. A 300mm layer of washed gravel (8-32mm diameter) is placed over the prepared area. The Sand Filter is placed on this gravel. Effluent flows from the sand filter percolated into the gravel by gravity.
On this site the T-value is 26 and the PE is 4. Allow 7.5m2/PE. With 4 PE require gravel infiltration bed of 30m2
The sand filter can be loaded at up to 60 litres/m2 - thus requiring 10m2 filter. It must be constructed in accordance with the EPA code of practice using Sand certified to be of the required particle size and with a Cu <4
The BAF unit should be at least 7m from the dwelling and 10m from all ditches. The Sand Filter and disposal pad should be located at least 10m from all dwellings,10m from all ditches and 3m from all boundaries.

[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.

TREATMENT SYSTEM DETAIL

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	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)		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
Reduce footprint	EPA Code of Practice	4PE, 10m2 sand filter Allow 7.5m2 gravel base /PE require total of 30m2 gravel bed

DISCHARGE ROUTE:

Groundwater	✓	Hydraulic Loading Rate * (l/m^2.d)	20.00	Surface area (m^2)	30.00
Surface Water **		Discharge Rate (m^3/hr)			

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

** Water Pollution Act discharge licence required

6.0 TREATMENT SYSTEM DETAILS

QUALITY ASSURANCE:

Installation & Commissioning

Install system as specified - Supervised and Certified by Assessor

On-going Maintenance

Anual maintenance by independent maintenance technician

7.0 SITE ASSESSOR DETAILS

Company: Trinity Green

Prefix: Dr First Name: Eugene Surname: Bolton

Address: Clonfert Maynooth, Co. Kildare

Qualifications/Experience: PhD Microbiology, Site Suitability Assessment Course (FETAC)

Date of Report: 09-Dec-2021

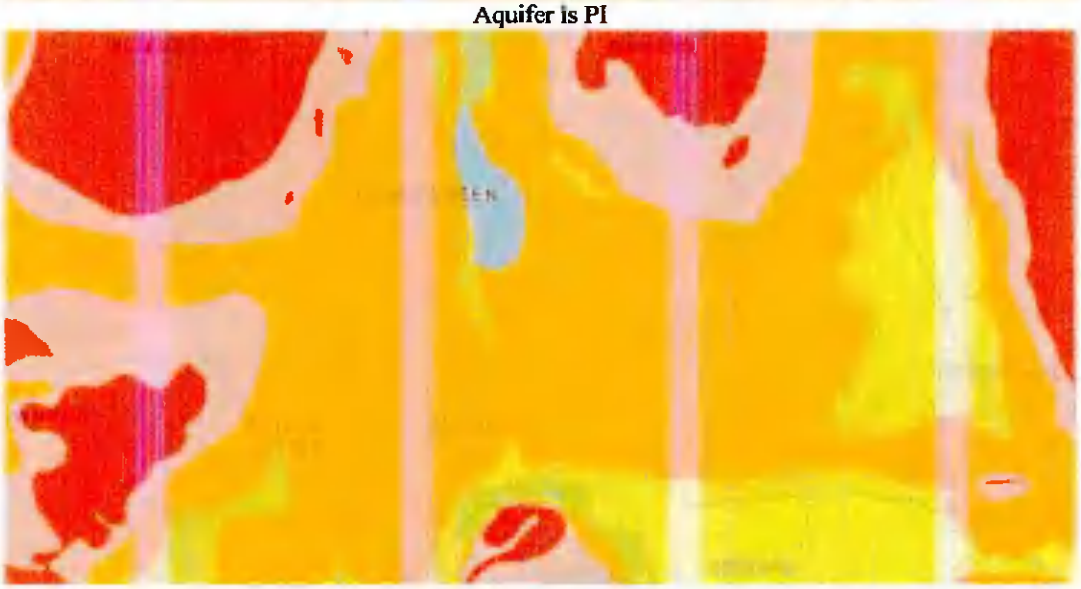
Phone: 0862434828 E-mail info@trinitygreen.ie

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

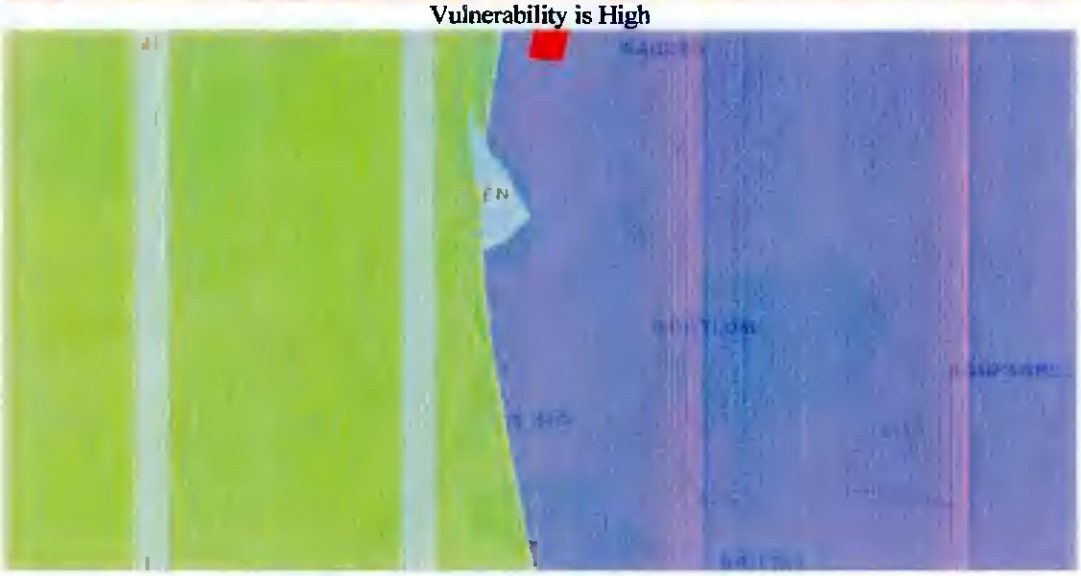
Signature: _____

Maps – Aquifer, Vulnerability, Berdock

Aquifer is PI



Vulnerability is High



Bedrock is Silurian Metasediments and Volcanics

Soil

Parent Material	GLs
Parent Material Name	Glaciofluvial sands and gravels
Parent Material Description	Limestone sands and gravels (Carboniferous)
Soil Group	Rendzinas, Lithosols
IFS Soil Code	BminSW
IFS Soil Description	Derived from mainly calcareous parent materials
County	DUBLIN
Category	Shallow well drained mineral (Mainly basic)
Legend	BminSW - Shallow well drained mineral (Mainly basic)

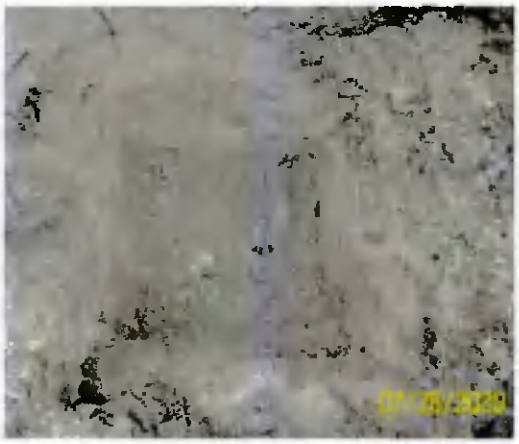
Subsoil

Lithology	Gravels derived from Limestones
Quaternary Sediment	GLs

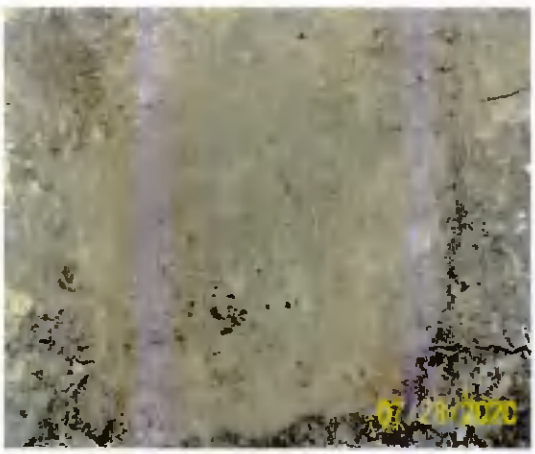
Photos

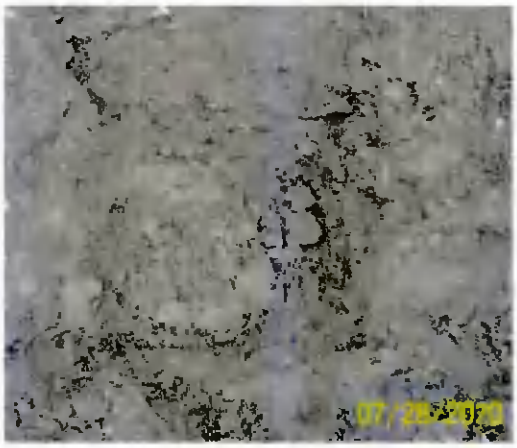
Row 1 - P1, P2

Row 2 - P3, T1



Row 3 - T2, T3





Trial Pit

Site overview

Site Location