GEOTON Pty Ltd
**Geotechnical Consultants**

**Geoton Pty Ltd** ABN 81 129 764 629
PO Box 522 Prospect TAS 7250
Unit 24, 16-18 Goodman Court
Invermay TAS 7248
Tel (+61) (3) 6326 5001
**www.geoton.com.au**

29 January 2024

Reference No. GL21145Bc

Mr Nick Campion
162 Wingaroo Road
MEMANA TAS 7255

Dear Sir

**RE: On-site Wastewater Disposal Assessment and Design**
**162 Wingaroo Road, Memana**

We have pleasure in submitting herein our report detailing the results of the geotechnical investigation conducted at the above site.

Should you require clarification of any aspect of this report, please contact Brett Street on (03) 6326 5001.

For and on behalf of

**Geoton Pty Ltd**

**Tony Barriera**

Director – Principal Geotechnical Engineer

# 1 INTRODUCTION

A limited scope investigation has been conducted for Mr Nick Campion at the site of a proposed residential unit development at 162 Wingaroo Road, Memana.

The investigation has been conducted to assess the suitability of the site for the disposal of domestic wastewater and the design of an on-site wastewater system in accordance with AS/NZS 1547:2012 “On-site Domestic Wastewater Management”.

No plans of the proposed development were provided; however, we understand a 2-bedroom unit is proposed to be constructed approximately 40m north of the existing dwelling.

# 2 FIELD INVESTIGATION

The field investigation was conducted on 31 March 2021 and involved the drilling of 3 boreholes by hand auger to depths 0.8m to 1.1m.

The permeability of the site was tested using a Constant Head Permeameter.

The logs of the boreholes are included in Appendix A and their locations are shown on Figure 3 attached.

# 3 SITE CONDITIONS

The site is a large farming acreage and is currently developed with an existing dwelling. The proposed unit is to be located on generally level ground approximately 40m north of the existing dwelling. The proposed wastewater disposal area is to be located to the northeast of the unit.

The Mineral Resources Tasmania (MRT) Digital Geological Atlas, 1:250,000 Series, shows the site to be located on Quaternary period sediments.

Examination of the LIST Landslide Planning Map – Hazard Bands Overlay indicates that the site is not within a mapped landslide hazard band.

The investigation indicated that the soil profile was generally uniform over the site. The boreholes generally encountered a silty sand topsoil to depths of 0.1m to 0.15m, overlying sand to depths of 0.35m to 0.65m, underlain by sandy clay to the investigated depths of 0.9m to 1.1m.

The boreholes did not encounter any signs of groundwater seepage over the investigated depths.

# 4 EFFLUENT DISPOSAL

The AS/NZS 1547:2012 and the *Building Act 2016:* Director's Guidelines for On-site Wastewater Management Systems provide guidelines for typical wastewater flow allowances under a range of circumstances. The documents recommend a typical wastewater flow of 120 litres/person/day for households on a tank water supply. As the unit is 2-bedrooms with a population equivalent of 4, a value of 480L/day has been adopted.

## 4.1 Permeability of Soil and Soil Category

The soil has been classified as follows:

- Texture – Sandy Loam (Table E1 from AS1547-2012);
- Structure – Massive (Table E4 from AS/NZS1547-2012); and
- Category – 2 (Table E1 from AS/NZS1547:2012).

The permeability ($K_{sat}$) at the site was measured at 1.4m/day. For massive structured Category 2 soils the indicative permeability from AS/NZS1547 Table 5.1 is 1.4 – 3.0m/day. Therefore, the permeability is within the range for massively structured Category 2 soils.

- Adopted Permeability – 1.4m/day.

## 4.2 Disposal and Treatment Method

This site assessment indicates that the site is suitable for the disposal of domestic effluent by way of a septic tank, which is required to have a minimum capacity of **3,000L,** and absorption trenches.

**Due to the limited sandy soil horizon, it is a requirement to increase the encountered sandy soil profile by a minimum of 400mm. The sandy material can be site-sourced. This will allow a minimum 600mm separation from the base of the trench to the encountered silty clay.**

## 4.3 Design Loading Rate

The adopted design loading rate for the absorption trenches has been set at the conservative rate of 15mm/day as outlined in AS/NZS 1547:2012 Table L1.

## 4.4 Absorption Trench System

Guidelines for the design of the trench systems are outlined in AS/NZS 1547:2012 Appendix L. The method of determining the dimensions for the trenches is outlined in AS/NZS 1547:2012 Section L4 and is as follows:

$$L = \frac{Q}{DLR \times W}$$

Where L = Length in metres

Q = Design daily flow in L/day

DLR = Design Loading Rate in mm/day

W = Trench width in metres (set at 1.0m)

As the DLR value has been set at 15mm/day and the design daily flow (Q) has been set at 480L/day, when the parameters are inserted in the above equation the trench dimensions required are as follows:

- Trench length = 32 (**2 x 16m trenches)**
- Trench width = 1.0m
- Trench depth = 0.5m
- A downslope separation of 2m (minimum) must be left between trenches.

This would give a disposal area of approximately 64m$^2$.

There is adequate secondary (back-up) area of 64m$^2$ if required.

The trenches are to be located within the area shown on the site plan. A distribution box is to be installed to ensure even distribution of effluent to the two trenches.

The trench is to be constructed as per the cross-section shown on Figure WW-02 attached.

## 4.5 Pump-Out Chamber

Due to the gentle fall of the site, a pump and pump pit may be required once levels have been confirmed after site works.

The pump is to be hard-wired to the dwelling and comes fitted with audible and visual high-water alarms. The alarms will notify you of a failing submersible pump or blocked line, which causes the liquid level to rise in your septic tank/pump pit.

## 4.6 Setbacks

The minimum separation distance between the disposal area and horizontal and vertical features is based on Appendix R from AS/NZS 1547:2012 “Recommended Setback Distances for Land Application Systems” and Section 3.1 from the *Building Act 2016:* Director’s Guidelines for On-site Wastewater Management Systems. The following setbacks are required:

- 22.0m from downslope watercourses and sensitive features;
- 2.0m from downslope property boundaries;
- 1.5m from cross-slope or up-slope property boundaries;
- 4.0m from buildings situated cross-slope or up-slope; and
- 5.0m from downslope buildings.

## 4.7 Wastewater Recommendations

It is recommended that the following actions are undertaken in looking after your system:

- Septic tanks **must be** pumped out at least every 3 to 5 years or more frequently depending on usage;

- Minimise domestic water use;
- Minimise the use of non-biodegradable detergents;
- Minimise the use of detergents containing phosphorous (eg calgon and similar);
- Avoid discharging polluting chemicals into wastewater systems; and
- Monitor quality of groundwater.

## References:

AS 1726 - 2017 Geotechnical Site Investigations

AS/NZS 1547- 2012 On-site Domestic Wastewater Management

*Building Act 2016:* Director's Guidelines for On-site Wastewater Management Systems

## Attachments:

Limitations of report

Figure 1 – Locality Plan

Figure 2 – Site Plan

Figure 3 – Wastewater Disposal Plan

Figure WW-02 – Typical Trench Section

Appendix A – Borehole Logs & Explanation Sheets

Appendix B – Certificate Forms

GEOTON Pty Ltd

# Geotechnical Consultants - Limitations of report

These notes have been prepared to assist in the interpretation and understanding of the limitations of this report.

**Project specific criteria**

The report has been developed on the basis of unique project specific requirements as understood by Geoton and applies only to the site investigated. Project criteria are typically identified in the Client brief and the associated proposal prepared by Geoton and may include risk factors arising from limitations on scope imposed by the Client. The report should not be used without further consultation if significant changes to the project occur. No responsibility for problems that might occur due to changed factors will be accepted without consultation.

**Subsurface variations with time**

Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. In the event of significant delays in the commencement of a project, further advice should be sought.

**Interpretation of factual data**

Site assessment identifies actual subsurface conditions only at those points where samples are taken and at the time they are taken. All available data is interpreted by professionals to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, as it is virtually impossible to provide a definitive subsurface profile which includes all the possible variabilities inherent in soil and rock masses.

**Report Recommendations**

The report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until earthworks and/or foundation construction is almost complete and therefore the report recommendations can only be regarded as preliminary. Where variations in conditions are encountered, further advice should be sought.

**Specific purposes**

This report should not be applied to any project other than that originally specified at the time the report was issued.

**Interpretation by others**

Geoton will not be responsible for interpretations of site data or the report findings by others involved in the design and construction process. Where any confusion exists, clarification should be sought from Geoton.

**Report integrity**

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way.

**Geoenvironmental issues**

This report does not cover issues of site contamination unless specifically required to do so by the client. In the absence of such a request, Geoton take no responsibility for such issues.

N

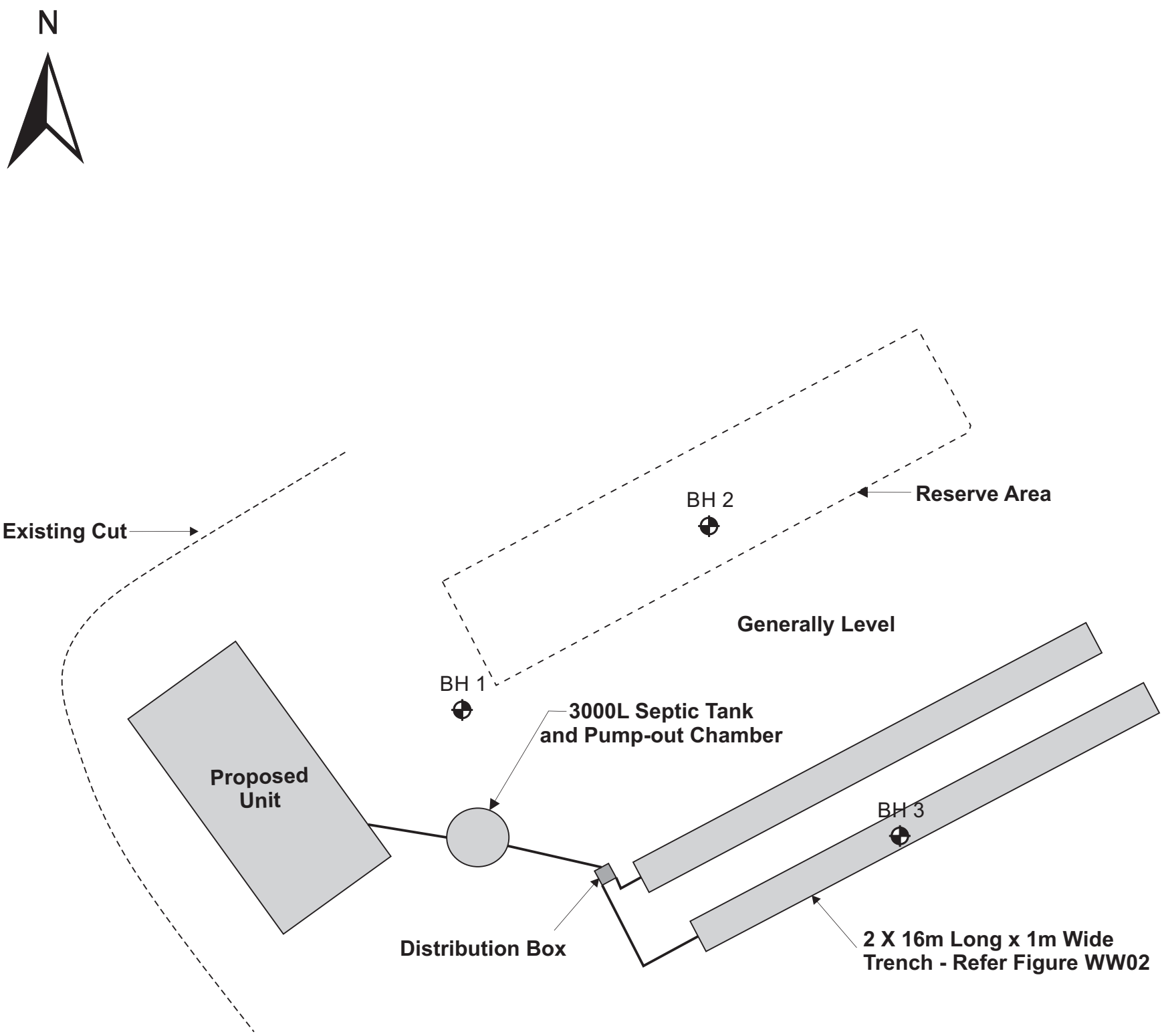

Approximate Scale (m)

0 500 1000 1500

| | | | | | |
|---|---|---|---|---|---|
| GEOTON Pty Ltd | | | | client: | MR NICK CAMPION |
| | | | | project: | 162 WINGAROO ROAD MEMANA |
| date | 29/01/2024 | drawn | BS | | |
| scale | AS SHOWN | approved | TB | title: | LOCALITY PLAN |
| original size | A3 | rev | | project no: GL21145B | figure no. 1 |

N


| | | | | | |
|---|---|---|---|---|---|
| GeoTon Pty Ltd | | | | client: | MR NICK CAMPION |
| | | | | project: | 162 WINGAROO ROAD MEMANA |
| date | 29/01/2024 | drawn | BS | | |
| scale | AS SHOWN | approved | TB | title: | SITE PLAN |
| original size | A3 | rev | | project no: GL21145B | figure no. 2 |




***NOTES***

PLUMBING CONNECTIONS TO BE CARRIED OUT IN ACCORDANCE WITH PLUMBING CODES AND REGULATIONS

VENTS, OVERFLOW RELIEF GULLY AND INSPECTION OPENINGS TO BE PROVIDED AS PER THE PLUMBING CODES AND REGULATIONS

TRENCHES TO BE SET BACK:
- 22.0m FROM DOWNHILL SENSITIVE FEATURES SUCH AS WATER COURSES,
- 2.0m FROM DOWNSLOPE PROPERTY BOUNDARIES,
- 1.5m UPHILL AND LATERALLY FROM PROPERTY BOUNDARIES AND ;
- 5.0M FROM DOWNSLOPE BUILDINGS.

Approximate Scale (m)

0 5 10 15 20

**Due to the limited sandy soil horizon, it is a requirement to increase the encountered sandy soil profile by a minimum of 400mm, the sandy material can be site-sourced. This will allow a minimum 600mm separation from the base of the trench to the encountered silty clay.**

## Legend

BH 1 Approximate Borehole Location

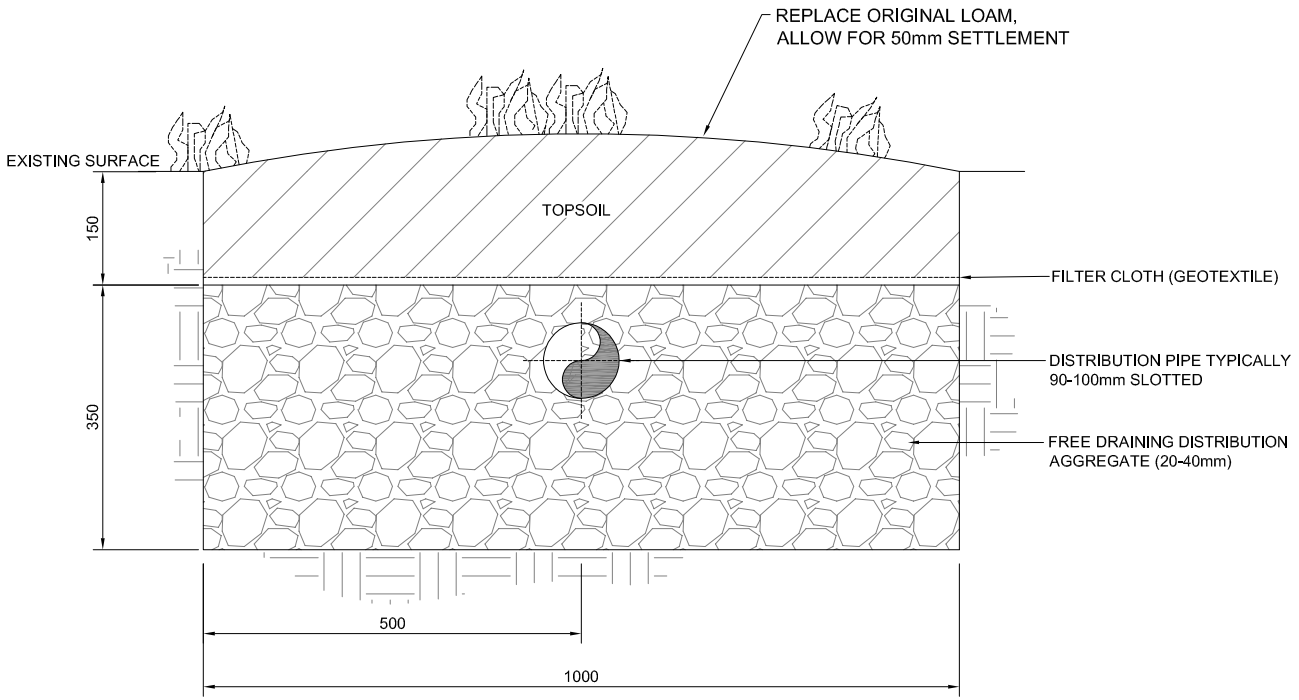
| | | | | | |
|---|---|---|---|---|---|
| GEOTON Pty Ltd | | | | client: | MR NICK CAMPION |
| | | | | project: | 162 WINGAROO ROAD MEMANA |
| date | 29/01/2024 | drawn | BS | | |
| scale | AS SHOWN | approved | TB | title: | WASTEWATER DISPOSAL PLAN |
| original size | A3 | rev | | project no: GL21145B | figure no. 3 |

GEOTON PTY LTD
GEOTECHNICAL CONSULTANTS

- GEOTECHNICAL INVESTIGATIONS
- SITE CLASSIFICATION
- WASTEWATER ASSESSMENT
- ROADWORKS
- LANDSLIDE RISK ASSESSMENT
- DAMS
- ENVIRONMENTAL ASSESSMENT
- FOUNDATION INVESTIGATION

PO Box 522 Prospect Vale TAS 7250
Unit 24, 16-18 Goodman Court
Invermay, TAS
T- (03) 6326 5001
www.geoton.com.au

| | |
|---|---|
| FIGURE: | WW-02 |
| DATE: | 27/10/2020 |
| REVISION: | A |
| SCALE: | @ A4 |
| DRAWN: | B.STREET |
| DESIGNED: | T.BARRIERA |
| APPROVED: | T.BARRIERA |




TYPICAL ARCH SECTION

SCALE 1:10

SCALE

0mm 250mm 500mm

# Appendix A

**Borehole Logs**

GEOTON Pty Ltd
**Geotechnical Consultants**
PO Box 522 Prospect TAS 7250
Unit 24, 16-18 Goodman Court, Invermay TAS
Tel (03) 6326 5001

# ENGINEERING BOREHOLE LOG

Borehole no. BH1
Sheet no. 1 of 1
Job no. GL21145A

Client : Mr Nick Campion — Date : 31/03/21
Project : Onsite Wastewater Disposal Assessment & Design — Logged By : BS
Location : 162 Wingaroo Road, Memana

Drill model : Hand Auger — Easting: — Slope: 90° — RL Surface :
Hole diameter : 55mm — Northing: — Bearing: - — Datum :

| Method | Support | Penetration | Water | Notes Samples Tests (DCP) | Depth (m) | Graphic log | Classification Symbol | Material Description | Moisture condition | Consistency density, index | Structure, additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HA | N | | | | | | SM | TOPSOIL - Silty Sand, fine/medium grained, black/brown | M | MD/L | |
| | | | | | 0.25 | | SW | SAND - medium/coarse grained, light brown/grey | M | MD | |
| | | | | | 0.50 | | CH | Silty CLAY - high plasticity, orange | M | St | |
| | | | | | 0.75 | | | | | | |
| | | | | | 1.00 | | | Borehole BH1 terminated @ 0.9m | | | |
| | | | | | 1.25 | | | | | | |
| | | | | | 1.50 | | | | | | |
| | | | | | 1.75 | | | | | | |
| | | | | | 2.00 | | | | | | |
| | | | | | 2.25 | | | | | | |

GEOTON Pty Ltd
**Geotechnical Consultants**
PO Box 522 Prospect TAS 7250
Unit 24, 16-18 Goodman Court, Invermay TAS
Tel (03) 6326 5001

# ENGINEERING BOREHOLE LOG

Borehole no. BH2
Sheet no. 1 of 1
Job no. GL21145A

Client : Mr Nick Campion — Date : 31/03/21
Project : Onsite Wastewater Disposal Assessment & Design — Logged By : BS
Location : 162 Wingaroo Road, Memana

Drill model : Hand Auger — Easting: — Slope: 90° — RL Surface :
Hole diameter : 55mm — Northing: — Bearing: - — Datum :

| Method | Support | Penetration | Water | Notes Samples Tests (DCP) | Depth (m) | Graphic log | Classification Symbol | Material Description | Moisture condition | Consistency density, index | Structure, additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HA | N | | | | | | SM | TOPSOIL - Silty Sand, fine/medium grained, black/brown | M | MD/L | |
| | | | | | 0.25 | | SW | SAND - medium/coarse grained, light brown/grey | M | MD | |
| | | | | | 0.50 | | | | | | |
| | | | | | 0.75 | | CH | Silty CLAY - high plasticity, orange | M | St | |
| | | | | | 1.00 | | | | | | |
| | | | | | 1.25 | | | Borehole BH2 terminated @ 1.1m | | | |
| | | | | | 1.50 | | | | | | |
| | | | | | 1.75 | | | | | | |
| | | | | | 2.00 | | | | | | |
| | | | | | 2.25 | | | | | | |

GEOTON Pty Ltd
**Geotechnical Consultants**
PO Box 522 Prospect TAS 7250
Unit 24, 16-18 Goodman Court, Invermay TAS
Tel (03) 6326 5001

# ENGINEERING BOREHOLE LOG

Borehole no. BH3
Sheet no. 1 of 1
Job no. GL21145A

Client : Mr Nick Campion — Date : 31/03/21
Project : Onsite Wastewater Disposal Assessment & Design — Logged By : BS
Location : 162 Wingaroo Road, Memana

Drill model : Hand Auger — Easting: — Slope: 90° — RL Surface :
Hole diameter : 55mm — Northing: — Bearing: - — Datum :

| Method | Support | Penetration | Water | Notes Samples Tests (DCP) | Depth (m) | Graphic log | Classification Symbol | Material Description | Moisture condition | Consistency density, index | Structure, additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HA | N | | | | | | SM | TOPSOIL - Silty Sand, fine/medium grained, black/brown | M | MD/L | |
| | | | | | 0.25 | | SW | SAND - medium/coarse grained, light brown/grey | M | MD | |
| | | | | | 0.50 | | CH | Silty CLAY - high plasticity, orange | M | St | |
| | | | | | 0.75 | | | | | | |
| | | | | | 1.00 | | | Borehole BH3 terminated @ 0.8m | | | |
| | | | | | 1.25 | | | | | | |
| | | | | | 1.50 | | | | | | |
| | | | | | 1.75 | | | | | | |
| | | | | | 2.00 | | | | | | |
| | | | | | 2.25 | | | | | | |

GEOTON Pty Ltd

# **Investigation Log** Explanation Sheet

## METHOD – BOREHOLE

| TERM | Description |
|---|---|
| AS | Auger Screwing* |
| AD | Auger Drilling* |
| RR | Roller / Tricone |
| W | Washbore |
| CT | Cable Tool |
| HA | Hand Auger |
| DT | Diatube |
| B | Blank Bit |
| V | V Bit |
| T | TC Bit |

* Bit shown by suffix e.g. ADT

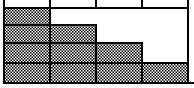
## METHOD – EXCAVATION

| TERM | Description |
|---|---|
| N | Natural exposure |
| X | Existing excavation |
| H | Backhoe bucket |
| B | Bulldozer blade |
| R | Ripper |
| E | Excavator |

## SUPPORT

| TERM | Description |
|---|---|
| M | Mud |
| N | Nil |
| C | Casing |
| S | Shoring |

## PENETRATION

| 1 | 2 | 3 | 4 | |
|---|---|---|---|---|
|  | | | | No resistance ranging to Refusal |

## WATER

| Symbol | Description |
|---|---|
|  | Water inflow |
|  | Water outflow |
|  | 17/3/08 water on date shown |

## NOTES, SAMPLES, TESTS

| TERM | Description |
|---|---|
| $U_{50}$ | Undisturbed sample 50 mm diameter |
| $U_{63}$ | Undisturbed sample 63 mm diameter |
| D | Disturbed sample |
| N | Standard Penetration Test (SPT) |
| N* | SPT – sample recovered |
| $N_C$ | SPT with solid cone |
| V | Vane Shear |
| PP | Pocket Penetrometer |
| P | Pressumeter |
| $B_S$ | Bulk sample |
| E | Environmental Sample |
| R | Refusal |
| DCP | Dynamic Cone Penetrometer (blows/100mm) |
| PL | Plastic Limit |
| LL | Liquid Limit |
| LS | Linear Shrinkage |

## CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION

Based on AS 1726:2017

## MOISTURE

| TERM | Description |
|---|---|
| D | Dry |
| M | Moist |
| W | Wet |

## CONSISTENCY/DENSITY INDEX

| TERM | Description |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fr | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | Very dense |

GEOTON Pty Ltd

# **Soil Description** Explanation Sheet (1of 2)

### DEFINITION

In engineering terms, soil includes every type of uncemented or partially cemented inorganic or organic material found in the ground. In practice, if the material can be remoulded or disintegrated by hand in its field condition or in water it is described as a soil. Other materials are described using rock description terms.

### CLASSIFICATION SYMBOL AND SOIL NAME

Soils are described in accordance with the AS 1726: 2017 as shown in the table on Sheet 2.

### PARTICLE SIZE DEFINITIONS

| NAME | SUBDIVISION | SIZE (mm) |
|---|---|---|
| BOULDERS | | >200 |
| COBBLES | | 63 to 200 |
| GRAVEL | Coarse | 19 to 63 |
| | Medium | 6.7 to 19 |
| | Fine | 2.36 to 6.7 |
| SAND | Coarse | 0.6 to 2.36 |
| | Medium | 0.21 to 0.6 |
| | Fine | 0.075 to 0.21 |
| SILT | | 0.002 to 0.075 |
| CLAY | | <0.002 |

### MOISTURE CONDITION

**Coarse Grained Soils**

**Dry** Non-cohesive and free running.

**Moist** Soil feels cool, darkened in colour. Soil tends to stick together.

**Wet** As for moist but with free water forming when handling.

**Fine Grained Soils**

**Moist, dry of Plastic Limited – w < PL**
Hard and friable or powdery.

**Moist, near Plastic Limit – w ≈ PL**
Soils can be moulded at a moisture content approximately equal to the plastic limit.

**Moist, wet of Plastic Limit – w > PL**
Soils usually weakened and free water forms on hands when handling.

**Wet, near Liquid Limit - w ≈ LL**

**Wet, wet of Liquid Limit - w > LL**

### CONSISTENCY TERMS FOR COHESIVE SOILS

| TERM | UNDRAINED STRENGTH $s_u$ (kPa) | FIELD GUIDE |
|---|---|---|
| Very Soft | ≤12 | Exudes between the fingers when squeezed in hand |
| Soft | 12 to 25 | Can be moulded by light finger pressure |
| Firm | 25 to 50 | Can be moulded by strong finger pressure |
| Stiff | 50 to 100 | Cannot be moulded by fingers |
| Very Stiff | 100 to 200 | Can be indented by thumb nail |
| Hard | >200 | Can be indented with difficulty by thumb nail |
| Friable | – | Can be easily crumbled or broken into small pieces by hand |

### RELATIVE DENSITY OF NON-COHESIVE SOILS

| TERM | DENSITY INDEX (%) |
|---|---|
| Very Loose | ≤15 |
| Loose | 15 to 35 |
| Medium Dense | 35 to 65 |
| Dense | 65 to 85 |
| Very Dense | > 85 |

### DESCRIPTIVE TERMS FOR ACCESSORY SOIL COMPONENTS

| DESIGNATION OF COMPONENT | IN COARSE GRAINED SOILS | | IN FINE GRAINED SOILS | TERM |
|---|---|---|---|---|
| | % Fines | % Accessory coarse fraction | % Sand/ gravel | |
| Minor | ≤5 | ≤15 | ≤15 | Trace |
| | >5, ≤12 | >15, ≤30 | >15, ≤30 | With |
| Secondary | >12 | >30 | >30 | Prefix |

### SOIL STRUCTURE

| ZONING | | CEMENTING | |
|---|---|---|---|
| Layer | Continuous across the exposure or sample. | Weakly cemented | Easily disaggregated by hand in air or water. |
| Lens | Discontinuous layer of different material, with lenticular shape. | Moderately cemented | Effort is required to disaggregate the soil by hand in air or water. |
| Pocket | An irregular inclusion of different material. | | |

### GEOLOGICAL ORIGIN

### WEATHERED IN PLACE SOILS

| | |
|---|---|
| Extremely Weathered material | Material is weathered to such an extent that it has soil properties. Structure and/or fabric of parent rock material retained and visible. |
| Residual soil | Structure and/or fabric of parent rock material not retained and visible. |

### TRANSPORTED SOILS

| | |
|---|---|
| Aeolian soil | Carried and deposited by wind. |
| Alluvial soil | Deposited by streams and rivers. |
| Colluvial soil | Soil and rock debris transported downslope by gravity. |
| Estuarine soil | Deposited in coastal estuaries, and including sediments carried by inflowing rivers and streams, and tidal currents. |
| Fill | Man-made deposit. Fill may be significantly more variable between tested locations than naturally occurring soils. |
| Lacustrine soil | Deposited in freshwater lakes. |
| Marine soil | Deposited in a marine environment. |

GEOTON Pty Ltd

# **Soil Description** Explanation Sheet (2 of 2)

**SOIL CLASSIFICATION INCLUDING IDENTIFICATION AND DESCRIPTION**

| **FIELD IDENTIFICATION PROCEDURES** (Excluding particles larger than 63 mm and basing fractions on estimated mass) | | | | | | **GROUP SYMBOL** | **PRIMARY NAME** |
|---|---|---|---|---|---|---|---|
| COARSE GRAINED SOIL More than 65% of soil excluding oversize fraction is larger than 0.075 mm | (A 0.075 mm particle is about the smallest particle visible to naked eyes) | GRAVEL More than half of coarse fraction is larger than 2.36 mm | CLEAN GRAVEL (Little or no fines) | Wide range in grain size and substantial amounts of all intermediate particle sizes | | GW | GRAVEL |
| | | | | Predominantly one size or a range of sizes with some intermediate sizes missing | | GP | GRAVEL |
| | | | GRAVEL WITH FINES (Appreciable amount of fines) | Non-plastic fines (for identification procedures see ML and MH below) | | GM | Silty GRAVEL |
| | | | | Plastic fines (for identification procedures see CL, CI and CH below) | | GC | Clayey GRAVEL |
| | | SAND More than half of coarse fraction is smaller than 2.36 mm | CLEAN SAND (Little or no fines) | Wide range in grain size and substantial amounts of all intermediate sizes | | SW | SAND |
| | | | | Predominantly one size or a range of sizes with some intermediate sizes missing | | SP | SAND |
| | | | SAND WITH FINES (Appreciable amount of fines) | Non-plastic fines (for identification procedures see ML and MH below) | | SM | Silty SAND |
| | | | | Plastic fines (for identification procedures see CL, CI and CH below) | | SC | Clayey SAND |
| FINE GRAINED SOIL More than 35% of soil excluding oversize fraction is smaller than 0.075 mm | | IDENTIFICATION PROCEDURES ON FRACTIONS <0.075 mm | | | | | |
| | | | **DRY STRENGTH** | **DILATANCY** | **TOUGHNESS** | | |
| | | SILT & CLAY (low to medium plasticity, LL ≤ 50) | None to Low | Slow to Rapid | Low | ML | SILT |
| | | | Medium to High | None to Slow | Medium | CL, CI | CLAY |
| | | | Low to Medium | Slow | Low | OL | ORGANIC SILT |
| | | SILT & CLAY (high plasticity, LL > 50) | Low to Medium | None to Slow | Low to Medium | MH | SILT |
| | | | High to Very High | None | High | CH | CLAY |
| | | | Medium to High | None to Very Slow | Low to Medium | OH | ORGANIC CLAY |
| | | Highly Organic Soil | Readily identified by colour, odour, spongy feel and frequently by fibrous texture. | | | Pt | PEAT |

● LL – Liquid Limit.

**COMMON DEFECTS IN SOILS**

| **TERM** | **DEFINITION** | **DIAGRAM** |
|---|---|---|
| PARTING | A surface or crack across which the soil has little or no tensile strength. Parallel or sub parallel to layering (e.g. bedding). May be open or closed. |  |
| FISSURE | A surface or crack across which the soil has little or no tensile strength, but which is not parallel or sub parallel to layering. May be open or closed. May include desiccation cracks. |  |
| SHEARED SEAM | Zone in clayey soil with roughly parallel near planar, curved or undulating boundaries containing closely spaced, smooth or slickensided, curved intersecting fissures which divide the mass into lenticular or wedge-shaped blocks. |  |
| SHEARED SURFACE | A near planar curved or undulating, smooth, polished or slickensided surface in clayey soil. The polished or slickensided surface indicates that movement (in many cases very little) has occurred along the defect. |  |

| **TERM** | **DEFINITION** | **DIAGRAM** |
|---|---|---|
| SOFTENED ZONE | A zone in clayey soil, usually adjacent to a defect in which the soil has a higher moisture content than elsewhere. |  |
| TUBE | Tubular cavity. May occur singly or as one of a large number of separate or inter-connected tubes. Walls often coated with clay or strengthened by denser packing of grains. May contain organic matter. |  |
| TUBE CAST | An infilled tube. The infill may be uncemented or weakly cemented soil or have rock properties. |  |
| INFILLED SEAM | Sheet or wall like body of soil substance or mass with roughly planar to irregular near parallel boundaries which cuts through a soil mass. Formed by infilling of open defects. |  |

# Appendix B

**Certificate Forms**

# CERTIFICATE OF THE RESPONSIBLE DESIGNER

**Section 94**
**Section 106**
**Section 129**
**Section 155**

Form **35**

To: Mr Nick Campion *Owner name*
162 Wingaroo Road *Address*
Memana Tas 7255 *Suburb/postcode*

## Designer details:

Name: Tony Barriera
Category: Civil Engineer
Hydraulic - Domestic
Business name: Geoton Pty Ltd
Phone No: 03 6326 5001
Business address: P O Box 522
Prospect TAS 7250
Fax No:
Licence No: IEAust 471929, CC6220 P
Email address: tbarriera@geoton.com.au

## Details of the proposed work:

**Owner/Applicant** Mr Nick Campion
Designer's project reference No. GL21145Bc
**Address:** 162 Wingaroo Road
Lot No: 241027/77
Memana Tas 7255

**Type of work:** Building work ☐ Plumbing work ☒ *(X all applicable)*

**Description of work:**
New building
on-site wastewater management system

*(new building / alteration / addition / repair / removal / re-erection water / sewerage / stormwater / on-site wastewater management system / backflow prevention / other)*

**Description of the Design Work (Scope, limitations or exclusions):** *(X all applicable certificates)*

| Certificate Type: | Certificate | Responsible Practitioner |
|---|---|---|
| | ☐ Building design | Architect or Building Designer |
| | ☐ Structural design | Engineer or Civil Designer |
| | ☐ Fire Safety design | Fire Engineer |
| | ☐ Civil design | Civil Engineer or Civil Designer |
| | ☒ Hydraulic design | Building Services Designer |
| | ☐ Fire service design | Building Services Designer |
| | ☐ Electrical design | Building Services Designer |
| | ☐ Mechanical design | Building Service Designer |
| | ☐ Plumbing design | Plumber-Certifier; Architect, Building Designer or Engineer |
| | ☐ Other (specify) | |

Deemed-to-Satisfy: ☒ Performance Solution: ☐ (*X the appropriate box*)

Other details:
**All design documents provided in Report GL21145Bc, dated 29/01/2024**

## Design documents provided:

The following documents are provided with this Certificate –

*Document description:*

| | | |
|---|---|---|
| Drawing numbers: | Prepared by: | Date: |
| Schedules: | Prepared by: | Date: |
| Specifications: | Prepared by: | Date: |
| Computations: | Prepared by: | Date: |
| Performance solution proposals: | Prepared by: | Date: |
| Test reports: | Prepared by: | Date: |

## Standards, codes or guidelines relied on in design process:

All design documents are contained within report

AS/NZS1547:2012 On-site domestic-wastewater management

## Any other relevant documentation:

## Attribution as designer:

I Tony Barriera of Geoton Pty Ltd am responsible for the design of that part of the work as described in this certificate;

The documentation relating to the design includes sufficient information for the assessment of the work in accordance with the *Building Act 2016* and sufficient detail for the builder or plumber to carry out the work in accordance with the documents and the Act;

This certificate confirms compliance and is evidence of suitability of this design with the requirements of the National Construction Code.

| | *Name: (print)* | *Signed* | *Date* |
|---|---|---|---|
| Designer: | Tony Barriera |  | 29/01/2024 |
| Licence No: | CC6220P | | |

## Assessment of Certifiable Works: (TasWater)

**Note: single residential dwellings and outbuildings on a lot with an existing sewer connection are not considered to increase demand and are not certifiable.**

**If you cannot check ALL of these boxes, LEAVE THIS SECTION BLANK.**

**TasWater must then be contacted to determine if the proposed works are Certifiable Works.**

**I confirm that the proposed works are not Certifiable Works, in accordance with the Guidelines for TasWater CCW Assessments, by virtue that all of the following are satisfied:**

- ☐ The works will not increase the demand for water supplied by TasWater
- ☐ The works will not increase or decrease the amount of sewage or toxins that is to be removed by, or discharged into, TasWater's sewerage infrastructure
- ☐ The works will not require a new connection, or a modification to an existing connection, to be made to TasWater's infrastructure
- ☐ The works will not damage or interfere with TasWater's works
- ☐ The works will not adversely affect TasWater's operations
- ☐ The work are not within 2m of TasWater's infrastructure and are outside any TasWater easement
- ☐ I have checked the LISTMap to confirm the location of TasWater infrastructure
- ☐ If the property is connected to TasWater's water system, a water meter is in place, or has been applied for to TasWater.

## Certification:

I Tony Barriera of Geoton Pty Ltd being responsible for the proposed work, am satisfied that the works described above are not Certifiable Works, as defined within the *Water and Sewerage Industry Act 2008,* that I have answered the above questions with all due diligence and have read and understood the Guidelines for TasWater CCW Assessments.

Note: the Guidelines for TasWater Certification of Certifiable Works Assessments are available at: www.taswater.com.au

| | *Name: (print)* | *Signed* | *Date* |
|---|---|---|---|
| Designer: | Tony Barriera |  | 29/01/2024 |

GEOTON Pty Ltd
Geotechnical Consultants

# LOADING CERTIFICATE

| | | | | |
|---|---|---|---|---|
| To: | **Mr Nick Campion** | | *Owner /Agent* | Certificate Ref: AS/NZS 1547:2012 Section 7.4.2 |
| | **162 Wingaroo Road** | | *Address* | |
| | **Memana Tas** | **7255** | *Suburb/postcode* | |

## Details of work:

| | | | |
|---|---|---|---|
| Address: | **162 Wingaroo Road** | Lot No: | 77 |
| | **Memana Tas** **7255** | Certificate of title No: | 241027/77 |
| The work related to this certificate: | On-site domestic-wastewater management | *(description of the work or part work being certified )* | |

## Certificate details:

In issuing this certificate the following matters are relevant –

| | |
|---|---|
| Documents: | Report GL21145Bc dated 29/01/2024<br>Figure 1 – Locality Plan<br>Figure 2 – Site Plan<br>Figure 3- Wastewater Disposal Plan<br>Figure WW-02 – Typical Trench Section |
| Relevant calculations: | Contained in the above |
| References: | AS/NZS1547:2012 On-site domestic-wastewater management |

***Substance of Certificate:***

This certificate sets out the design criteria and the limitations associated with use of the system.

**Wastewater Characteristics**

*Population equivalent used for this assessment* = 4 (2 Bedroom)
*Wastewater volume (L/day) used for this assessment* = 480 (120 Litres per person)
*Approximate blackwater volume (L/day)* =192
*Approximate greywater volume (L/day)* = 288

**Soil Characteristics/Design Criteria**

*Texture (Table E1 from AS/NZS 1547)* = Sandy Loam
*Soil category (Table E1 from AS/NZS 1547)* = 2
*Soil structure (Table E4 from AS/NZS 1547)* = Massive structured
*Indicative permeability (Table 5.1 from AS/NZS 1547)* = 1.4-3.0m/day
*Measured permeability* =1.4m/day
*Adopted permeability* = 1.4m/day
*Adopted Design Loading Rate* = 15mm/day
*Soil thickness for disposal* = >1.1m
*Minimum depth (m) to water* = >1.1m

**Dimensions for On-Site Treatment System**

*Disposal and treatment methods* = Septic tank and effluent Trenches
*Site modification and specific design* = N/A
*Primary disposal area required* = 64m$^2$
*Reserve disposal area required* = 64m$^2$
*Location and use of Reserve area* = Reserve area located to the north of the proposed existing dwelling. Currently vacant.
*Is there sufficient area available on-site for disposal (including reserve)* = Yes

Notes

*The purpose of the reserve area is to allow for future extension of the land application system to allow a factor of safety against unforseen malfunction or failure, perhaps following increased household occupancy or inadvertent misuse of the system.*

*The land application area may be reduced to account for flow reductions by water-saving devices, provided the organic loading rate is not higher than it would have been without the flow reduction.*

**Allowable Variation from Design Flow**

Based on a septic tank capacity of 3,000L and wastewater design volume of 480L/day the allowable variation from design flow (peak loading events) would be an additional 520L/day (Total flow of 1000L/day as per table J1 of AS/NZS 1547:2012).

**System Limitations**

*Consequences of overloading the system:*
Overloading the system can result in failure of the septic tank and land application system. This is a serious health and environmental hazard and can lead to any one or more of the following:

- Spread of infectious disease;
- Breeding of mosquitoes and attraction of flies and rodents;
- Nuisance and unpleasantness;
- Pollution of waterways;

- Contamination of bores, wells and groundwater; and
- Alteration to local ecology.

*Consequences of under loading the system:*
Under loading the system may result in the bacteria to stop working and system failure.

**Operation Requirements**
Refer to Section T5.2.1 of AS/NZS 1547:2012 for additional requirements.
For on-site system to work well the following is required:

- Reduce sludge building up through scraping all dishes to remove fats/grease; don't use a food waste disposal unit; and don't put sanitary napkins into the system.
- To keep bacteria working in the septic tank use biodegradable soaps; use a low phosphorous detergent; don't use powerful bleaches and disinfectants; and don't put chemicals or paint down the drain.
- Conservation of water will reduce the volume of effluent requiring disposal to the land application area, make it last longer and improve its performance.

**Maintenance Requirements**
Refer to Section T5.2.2 of AS/NZS 1547:2012 for additional requirements.
Maintenance of the system should include the following:

- Septic tanks must be inspected at least annually and pumped out regularly once the scum and sludge occupy two thirds of the tank volume. Typically a septic tank must be pumped out at least every 3 to 5 years or more frequently depending on usage.
- Grease traps must be inspected at least quarterly and cleaned out regularly.
- Deep rooting trees or shrubs should not be grown over absorption trenches or pipes.
- Surface water diversion drains should be maintained upslope of and around the land application area and kept clean to reduce seepage of rainwater into the trenches.
- Maintain disposal area by maintaining plants and mowing grass to ensure that plants/grasses take up nutrients with maximum efficiency.
- Check disposal area for blockages such as wet spots and uneven grass colour.

**I certify the matters described in this certificate.**

| | *Signed:* | *Date:* | *Certificate No.* |
|---|---|---|---|
| Certifier: |  | 29/01/2024 | GL21145Bc |