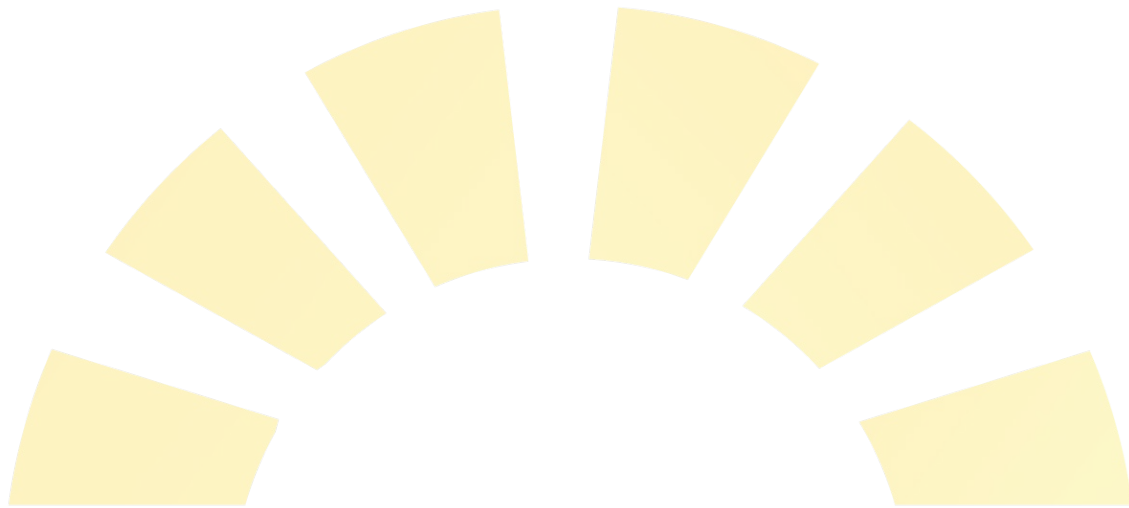




Appendices

For an intensive animal husbandry - dairy (loose housing) system at
106 Bream Creek Rd Bream Creek, Tasmania

October 2025

EIS - VOLUME THREE



Progressive Rural Solutions

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Appendix 4

Geotechnical Report



GEOTECHNICAL INVESTIGATION

Stroud Dairies

Proposed Dairy Shed and Dairy Effluent
Storage Facility

106 Bream Creek Road, Bream Creek

GL24627Ab
10 February 2025

10 February 2025

Reference No. GL24627Ab

Stroud Dairies
143 Bream Creek Road
BREAM CREEK TAS 7175

Attention: Mr Jack Bignell

Dear Sir

**RE: Geotechnical Investigation
Proposed Dairy Shed and Dairy Effluent Storage Facility
106 Bream Creek Road, Bream Creek**

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 Anne Foster on 03 6326 5001.

For and on behalf of Geoton Pty Ltd



Tony Barriera

Director – Principal Geotechnical Engineer



Document History and Status

Rev	Date	Written By	Reviewed By	Revision Details
0	10 February 2025	A Foster	T Barriera	Original

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Author: A Foster

Client: Stroud Dairies

Project: 106 Bream Creek Road, Bream Creek

Subject: Geotechnical Investigation

Document Report

Document Version 0

Job No. GL24627Ab

**Sorell Council**

Development Application: Development
Application - 106 Bream Creek Road, Bream
Creek - P1.pdf
Plans Reference:P1
Date Received:27/10/2025

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- Appendix A: Dam Consequences Category Assessment
- Appendix B: Excavation Logs and Explanation Sheets
- Appendix C: Laboratory Test Certificates
- Appendix D: Hydrology and Spillway Calculations
- Appendix E: Certificate Forms

**Sorell Council**
Development Application: Development
Application - 106 Bream Creek Road, Bream
Creek - P1.pdf
Plans Reference:P1
Date Received:27/10/2025

1 INTRODUCTION

At the request of Mr Christian Bannan of South East Soil & Water, on your behalf, Geoton Pty Ltd has carried out a Geotechnical Investigation for a proposed dairy shed and dairy effluent storage facility at 106 Bream Creek Road, Bream Creek.

The purpose of the investigation was:

- To assess the subsurface conditions for the dairy effluent storage facility to ensure the effluent ponds and solids trench can be excavated to the required depth and determine if sufficient on-site materials exist for lining the effluent storage ponds and solids trench;
- To assess the general subsurface conditions at the site and insofar as it may be applicable, consequently assign a Site Classification in accordance with AS 2870 – 2011 “Residential Slabs and Footings”; and
- To assess the surrounding topography and insofar as it may be applicable, provide a Wind Classification in accordance with AS 4055 – 2021 “Wind Loads for Housing”.

1.1 Proposed Development

We understand that the proposed development will comprise the following:

- A 25ML effluent pond;
- A 7.9ML solids trench;
- The enlarging of the existing effluent pond to 15ML; and
- The construction of an 18,000m² dairy shed on a fill platform.

The following KML files were provided:

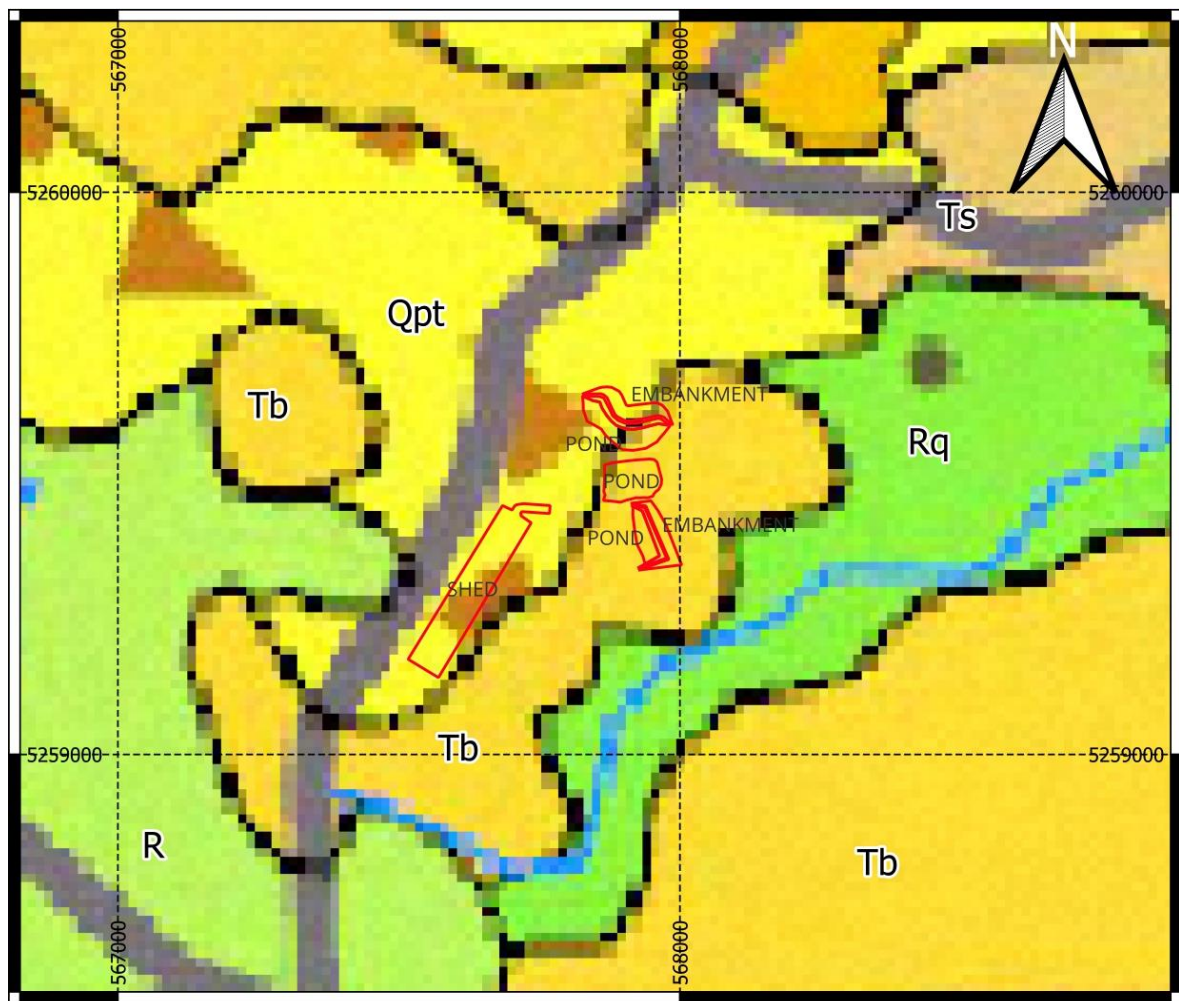
- Proposed effluent ponds, solids trench, and dairy shed, file name ‘IS-674_Bream Creek Dairy - road shed NO LEVELS’; and
- A revised proposed dairy shed and fill batters, file name ‘IS-674_Bream Creek Dairy - road shed – ROTATED’.



2 BACKGROUND

2.1 Geology

The Mineral Resources Tasmania (MRT) Digital Geological Atlas, 1:25,000 Series, shows the site of the proposed dairy shed and the western portion of the new effluent pond to be located on Quaternary period talus. The eastern portion of the new effluent pond, the existing effluent pond and the solids trench are to be located on Paleogene-Neogene period basalt. Late Carboniferous-Triassic period sandstone is mapped to the southeast of the solids trench (Figure 1).



Legend

Qpt	Quaternary talus, vegetated and active.
Tb	Paleogene-Neogene basalt (tholeiitic to alkalic) and related pyroclastic rocks.
Ts	Paleogene-Neogene dominantly non-marine sequences of gravel, sand, silt, clay and regolith.
R	Late Carboniferous to Triassic undifferentiated Triassic fluviolacustrine sequences of sandstone, siltstone and mudstone.
Rq	Late Carboniferous to Triassic dominantly quartz sandstone.

Figure 1: MRT 1:250,000 Scale Geology Map Extract.

2.2 Landslide Hazards

Examination of the LIST Landslide Planning Map – indicates the proposed development area is not within a mapped landslide hazard band. Low and medium landslide hazard bands are mapped elsewhere on the property. Examination of the LIST Landslide Polygon overlay indicates that three recent or active landslides and one landslide with activity unknown are located a short distance to the north and northwest of the larger effluent pond.

2.3 Acid Sulfate Soils

Examination of the LIST Coastal and Inland Acid Sulfate Soils overlays indicate that the proposed dairy development site is not within a mapped acid sulfate probability zone.

2.4 Karst

Examination of the LIST CFEV Karst – Integrated Conservation Value overlay indicates that the site is not within a mapped karst area, being underlain by rocks not known to be susceptible to karst.

3 CONSEQUENCE CATEGORY

In keeping with the Australian National Committee on Large Dams Incorporated (ANCOLD) 2012 - *Guidelines on Consequence Categories for Dams*, the following key points have been considered in assessing the consequences of failure of the pond embankment:

- Risk to human life expressed either as the Population At Risk (PAR) or Potential Loss of Life (PLL); and
- Damage and loss expressed in terms of:
 - Cost of damage to property, commerce and infrastructure;
 - The effect on the owner's business such as pond function and operability;
 - Loss of credibility, loss of financial viability and political impact;
 - Health, social and economic disruption; and
 - Environmental impacts.

A consequence assessment matrix sheet for the pond embankment is provided in Appendix A, and the assessed consequences are given below in Section 3.2.

3.1 Downstream Features

From site observations as well as a review of topographic mapping, the LISTmap and LiDAR derived hill-shade mapping, it is considered that the flood waters from the new effluent pond would discharge toward the north towards the tributary of Sedbury Creek. The flood waters from the existing effluent pond after enlarging would discharge towards the east directly into tributaries of Sedbury Creek. The following features are observed to be downstream of the ponds:

- An unregistered dam, approximately 780m downstream; and
- Dam I.D. 3364, approximately 1.2km downstream.

The flood effects distance from a new 25ML pond and enlarged existing pond is estimated to be less than 1km, after which distance the flood waters would be absorbed, having no further effect.

3.2 Assessment of Damages and Losses

For an initial to intermediate level consequence category assessment, the ANCOLD guidelines provide guidance on the assessment of potential damages and losses that may be caused by the pond break flood waters.

The severity of the damages and losses are classified as minor, medium, major or catastrophic on the potential financial, social, political or environmental impacts of a pond break. For this assessment, the general parameters as described within the ANCOLD guidelines have been adopted and are discussed below.

3.2.1 Total Infrastructure Costs

It is considered for a worst credible scenario pond break that a maximum severity level of 'MINOR' would apply for repairing the downstream access roads, pond and minor farm damage as well as possible provision of temporary services by the owner and clean up.

3.2.2 Impact on Owners Business

It is considered that there will generally be 'MEDIUM' effects on services to the business, with restrictions needed during peak days and peak hours.

3.2.3 Health and Social Impacts

It is considered for a worst credible scenario, a pond break will have 'MINOR' health and social impacts, generally with less than 100 people affected.

3.2.4 Environmental Impact

It is considered that a pond break would generally have a 'MEDIUM' environmental impact, with the discharge from a pond break having short term impacts on ecosystems and stock and fauna water supplies.

3.3 Persons At Risk/Potential Loss Of Life

It is considered that there would be a PAR of <1 recognised for a pond break.

3.4 Consequence Category Assessment

From the above assessment, it is considered that the effluent ponds would have at worst, a consequence category of **LOW**.



4 FIELD INVESTIGATION

The field investigation was conducted on 04 December 2024 and involved a site walkover and the excavation of 20 test pits with a 25-tonne excavator to depths of 1.4m to 4.3m.

In-situ vane shear strength tests and pocket penetrometer tests were conducted in the clay layers encountered in the investigation.

Samples of the clay soils were obtained for subsequent laboratory testing.

The GPS coordinates of the test pits are shown on the excavation logs.

The detailed subsurface conditions encountered within the test pits are provided on the excavation logs included in Appendix B with the location of the test pits presented on Drawing 1, attached.

5 SITE CONDITIONS

No. 106 Bream Creek Road is located on the eastern side of Beam Creek Road with the existing dairy located within the northwest portion of the property.

The central portion of the proposed new effluent pond has the approximate coordinates of 567900mE, 5259590mN.

The proposed new dairy effluent pond is located within a gully upstream of a small pond and wet area within existing grazing paddocks approximately 60m to the northeast of the existing dairy (Plate 1). The existing effluent pond is of turkey's nest construction and is located approximately 30m to the east of the existing dairy and is fenced off from livestock (Plate 2). The proposed solids trench is located within an existing grazing paddock approximately 100m to the southeast of the existing dairy (Plate 3). These locations are characterised by smooth undulating slopes of between approximately 6° and 10° and a patchy cover of low to moderate grass.

The existing effluent pond was full at the time of the field investigation and was observed to be generally in a good condition, with no evidence of dispersive soils.

There are wetlands and a pond within the gully at the site of the proposed new effluent pond.

No springs or seeps were observed within the area of the existing effluent pond or proposed solids trench.

The dairy shed is to be located within an existing grazing paddock approximately 110m to the southwest of the existing dairy. The ground surface across the shed site is undulating, and generally has an easterly fall of approximately 6° to 10° and a cover of low grass. A pond, previously filled in and having soft saturated fill material, is located centrally within the shed site. A small dam is located immediately downslope of the proposed shed (Plates 4 and 5). Photographs of the site are provided as Plates 1 to 5.





Plate 1: View of the proposed new effluent pond site looking to the north.



Plate 2: View of the existing effluent pond looking to the east.



Plate 3: View of the proposed solids trench site looking to the southeast.



Plate 4: View of the northern portion of the shed site looking to the northwest.



Plate 5: View of the southern portion of the shed site looking to the southwest.

6 SUBSURFACE CONDITIONS

The test pits indicated that the soil profile varies across the site.

Three geological units were encountered:

- Paleogene-Neogene period basalt;
- Late Carboniferous-Triassic period sandstone; and
- Quaternary period talus.

Paleogene-Neogene period basalt-derived soils were encountered in Test Pits TP01 to TP04 and TP12 to TP16. Generally, the encountered basalt-derived soils comprised clayey silt topsoil to depths of 0.3m, overlying medium to high plasticity silty to gravelly clay and clayey silt to depths of 0.7m to 1.7m, underlain by extremely weathered basalt (basalt weathered to such an extent that it has soil properties but retains a rock fabric) to the excavator refusal or near refusal depths, or investigated depths of 1.4m to 4.0m. Additionally, **fill was encountered at the location of the filled-in pond within Test Pit TP04, comprising Silty to gravelly clay fill to a depth of 3.1m**, underlain by natural low plasticity gravelly clay to the test pit collapse depth of 3.2m.

Late Carboniferous-Triassic period sandstone-derived soils were encountered in Test Pits TP07 to TP11. Generally, the sandstone-derived soils comprised topsoil and surficial fill comprising clayey silt, silty clay and silty sand to depths of 0.2m to 0.4m, overlying low to high plasticity silty to sandy clay and clayey silt to depths of 0.9m to 2.0m, overlying sand and silty sand to depths of 1.3m to 3.4m, underlain by extremely weathered sandstone to the excavator refusal or investigated depths of 1.5m to 4.0m. Additionally, Test Pits TP08 and TP11 did not

Geotechnical Investigation

encounter extremely weathered sandstone, and Test Pit TP11 encountered interbedded sand and silty clay horizons between the depths of 2.0m and 4.0m.

Quaternary period talus was encountered in Test Pits TP05, TP06 and TP17 to TP20. The encountered soils in these test pits generally comprised clayey silt topsoil to depths of 0.4m to 0.5m, underlain by medium to high plasticity silty to sandy clay to the investigated depths of 2.0m to 4.3m.

Excavator refusal or near refusal in Test Pits TP01 to TP03 was inferred to be on highly weathered basalt bedrock. Excavator refusal in Test Pits TP07, TP09 and TP10 was inferred to be on highly weathered sandstone bedrock.

Groundwater seepage was not encountered in the test pits over the investigated depths, however the encountered fill in Test Pit TP04 was wet.

7 LABORATORY TEST RESULTS

The results of the laboratory tests are summarised in Table 1, below. The laboratory certificates are provided in Appendix C.

Table 1: Summary of Laboratory Test Results

Sample Identification	TP05 0.6m-0.8m	TP07 1.0m-1.2m	TP08 0.5m-0.7m	TP11 1.3m-1.5m	TP13 2.5m-3.0m	TP17 1.6m-1.8m
Liquid Limit (%)	51	N/O	49	44	60	54
Plastic Limit (%)	21	N/O	20	23	40	19
Plastic Index (%)	30	Non-plastic	29	21	20	35
Linear Shrinkage (%)	14.5	N/O	13.0	12.0	10.0	15.0
Emerson Class Number		5	6	4	5	6
Natural Moisture Content (%)		15.2	32.9	21.5	20.7	29.6
Optimum Moisture Content (%)		14.8	30.7	23.8	24.3	27.6
Maximum Dry Density (t/m ³)		1.79	1.41	1.57	1.59	1.47
Permeability (m/sec)		1.4×10^{-9}	1.2×10^{-10}	2.7×10^{-10}	2.1×10^{-9}	1.3×10^{-10}
Unified Classification	Silty CLAY (CH)	Silty SAND (SM)	Silty CLAY (CI)	Silty CLAY (CI)	Extremely weathered Basalt (GW)	Silty CLAY (CH)

N/O: Not Obtainable

Emerson Class tests returned Emerson Class numbers of 4 to 6. Class 4 indicates that the remoulded soil does not disperse in water. Calcium carbonate or calcium sulfate (gypsum) is present. Class 4 does indicate that the soil may have some dispersive nature due to the soluble salts diffusing out of soils containing calcium, the percentage of exchangeable sodium ions will reduce for calcium ions derived from the calcium-bearing minerals (calcium carbonate) present, and the soil becomes less and less dispersive with time.

Class 5 indicates that the remoulded soil does not disperse in water and the 1:5 soil/water suspension remains dispersed after 5 minutes. Class 5 is considered to be indicative of non-dispersive soils.

Class 6 indicates that the remoulded soil does not disperse in water and the 1:5 soil/water suspension begins to flocculate within 5 minutes. Class 6 soils are considered to be indicative of non-dispersive soils.

Fell et. al. suggests that while laboratory tests are a useful way of identifying dispersive soils, much can be determined by observing the behaviour of the soils in the field, such as, the presence of deep erosion gullies and piping failures in existing farm dams which usually indicates the presence of dispersive soils. No significant signs of dispersive soils were observed in the immediate area of the proposed dairy effluent facilities during the field investigation.

Based on the laboratory test results and site observations, it is considered that the soils encountered during the investigation are non-dispersive at the site.

8 DISCUSSION AND RECOMMENDATIONS

8.1 EPA Liner Specification

The EPA Division document – Environmental Standards Applying to Liner Construction (March 2006) is generally applied for domestic sewage and industrial wastewater treatment lagoons. Key points of the Minimum Standard Based approach for a liner are:

- The minimum depth to groundwater (from bottom of lagoon) must be 2 metres;
- Only undertake clay lining with appropriately selected clay;
- Liner thickness requirements – lagoon bottom minimum 400mm, lagoon walls minimum 600mm (with further wave wall treatment required to prevent erosion); and
- Maximum in-situ permeability is 1×10^{-9} m/sec (10^{-7} cm/sec), throughout the full depth of liner.

8.2 General

The new larger effluent pond will have an embankment located across a gully to impound the effluent within the gently sloping terrain. The effluent pond wall is to be founded on extremely weathered basalt or high plasticity silty clay below a depth of 0.7m from the existing ground surface.

The existing effluent pond turkey's nest embankment to be enlarged is located on the gently sloping terrain. The existing effluent pond embankment enlargement is to be founded on

medium to high plasticity silty clay encountered below a depth of 0.7m from the existing ground surface.

The solids trench will have an embankment located across the gently sloping terrain to impound the effluent. The solids trench wall is to be founded on highly weathered sandstone encountered at depths below 1.7m to 2.0m from the existing ground surface.

In general, the excavations and the embankments shall be battered at slope angles no steeper than 1 Vertical to 3 Horizontal (1V:3H).

Also, as a rule, the effluent ponds should be able to hold an additional 1 in 10-year storm event, i.e., the spillways will only spill during a rainfall event greater than 1 in 10-year return period.

8.3 Cut-off Trench and Effluent Pond Wall Foundation

Based on the findings of the investigation it is considered that the cut-off trench (or keyway) for the new larger effluent pond will be excavated approximately 0.5m into the natural high plasticity silty clay soil, or extremely weathered basalt.

The cut-off trench (or keyway) for the existing effluent pond enlargement will be excavated approximately 0.5m into the natural medium to high plasticity silty clay soil.

The cut-off trench (or keyway) for the solids trench will be excavated to highly weathered sandstone encountered below approximately 1.7m to 2.0m from the ground surface.

The cut-off trenches are required to be a minimum of 1.0m to 1.5m deep below the existing ground surface and backfilled with the compacted silty clay, then lined with the medium to high plasticity silty clay. The backfill materials will need to be screened to remove cobbles and boulders greater than 75mm in diameter.

8.4 Clay Blanket Liner

The medium to high plasticity silty clay soil returned permeability results of 2.7×10^{-10} m/sec to 1.3×10^{-10} m/sec., It is considered that, provided the silty clay lining material is screened to remove cobbles and boulders, the on-site medium to high plasticity silty clay would be suitable as a clay liner for the proposed effluent pond. Therefore, it is considered that a synthetic pond liner would not be required within the effluent pond and up the embankments.

The tested silty sand soil and extremely weathered basalt returned permeability results of 1.4×10^{-9} m/sec to 2.1×10^{-9} m/sec which is above the threshold for clay liner material permeability of 1×10^{-9} m/sec, and these materials are therefore considered unsuitable to use within the clay liner. These soils are, however, suitable for earthworks within the embankments.

Good quality control is required for fill selection to ensure no sandy or gravelly permeable soils are placed within the liner zone of the ponds.

The clay liner is required to be a minimum depth of 400mm along the base of the dairy effluent ponds. The clay liner on the embankment slopes is required to be 600mm thick.

Clay materials should be stockpiled, replaced and compacted to ensure the minimum depth of the clay blanket is met.

8.5 Borrow Area

The silty clay soils at the site are generally considered suitable for clay lining.

Good quality control is required for fill selection to ensure no sandy or gravelly permeable soils are placed as liner material within the upstream embankment batter slopes of the pond wall. In general, the better silty clay material should be used within the keyway and upstream clay liner embankment batter slopes with the lesser quality materials used in the downstream embankment construction.

Excavated material which in the Engineer's opinion is not suitable for use in the embankment shall be disposed of clear of the works area.

Materials for the construction of the wall should be sourced from within the proposed effluent pond area.

Due to the relatively limited volume of silty clay and suitable liner materials within the proposed effluent pond areas, some fill may need to be sourced from outside of the proposed effluent pond area.

8.6 Dispersion of the Pond Embankment Soils

The Emerson class number test results indicated that the soils at the site generally do not disperse in water and would be suitable for use in the embankment construction.

8.7 Construction Methodology

Dairy Australia – Effluent and Manure Management Database for the Australian Dairy Industry – December 2008 specifies that:

- Topsoil, vegetation and deleterious materials should be removed prior to construction;
- Selected fill material for the construction of the pond embankment shall be placed in layers not thicker than 250mm loose and 150mm after compaction;
- Floors and embankments must be appropriately compacted;
- Scrapers and pad foot rollers give greatest compaction rates;
- Compact soil with a moisture content of plus three percent to minus one percent (+3% to -1%) of standard optimum moisture content;
- Layers must be compacted to at least 98% of maximum dry density. This is typically achieved through eight passes of a pad foot roller;
- Compacted clay linings must be prevented from drying out; and
- The surface of the clay liner shall be covered to protect from drying out and mechanical damage with a compacted layer of sand or gravel (minimum thickness 100mm).

8.8 Cut-off Drain

A cut-off drain shall be provided upslope of the effluent and solids ponds to minimise surface water flow into the site.

8.9 Spillway Design

8.9.1 Hydrology

In accordance with ANCOLD Guidelines on Selection of Acceptable Flood Capacity for Dams, the fall-back flood capacity for a Low Consequence Category dam/pond should be a design flood for an Annual Exceedance Probability (AEP) of between 1% and 0.1% (i.e., between 1 in 100 years and 1 in 1,000 years). It is considered that due to the small size of the dams/ponds, their catchment sizes and locations, an AEP of 1% (1 in 100 years) will be appropriate.

8.9.1.1 New Effluent Pond

Using the Australian Rainfall and Runoff (ARR) Regional Flood Frequency Estimation (RFFE) model 2016 v1 (Australian Rainfall and Run-off, 2025), an AEP of 1% flow peak flow event of 2.34m³/s has been adopted.

Results of the RFFE model have been attached within Appendix D.

For a spillway having a total depth of 1.0m, including a dry freeboard of 0.4m, the calculated minimum width required is 3.0m.

The discharge velocity at the spillway crest is estimated at about 1.3m/s which is unlikely to cause erosion along the grassed spillway return channel during peak discharge.

The spillway calculations are provided in Appendix D.

8.9.2 Existing Effluent Pond

The rainfall catchment of the redeveloped existing pond will be limited to its inundation zone as the pond is of ring-tank design.

The Intensity-Frequency-Design (IFD) rainfall curve and table for the site was generated from the Bureau of Meteorology IFD data website (BOM 2016).

The design rainfall depth/intensity shall be for a five-minute duration 1% AEP event.

The five-minute duration design rainfall depth for the design AEP event is as follows:

- 1% AEP = 10.4mm

The storage quantity is calculated using the following formula:

$$Q = CDA$$

where Q is quantity in m³;

C is coefficient of runoff (taken as unity 1.0);

D is depth of the Storm in m; and

A is the area of the catchment that rainfall will runoff in m².

The proposed enlarged effluent pond has a catchment of approximately 6,500m². Therefore, the stormwater quantity and flowrate for a design event are calculated as follows:

The stormwater quantity:

$$Q_5 = 1.0 \times 10.4 / 1000 \times 6500 = 67.6\text{m}^3.$$

The event flowrate (q_5) is calculated by dividing storage quantity by the storm duration of 5 minutes, i.e., 300 seconds, and thus:

$$Q_5 = 67.6 / 300 = 0.23\text{m}^3/\text{s}$$

The calculated spillway width having a minimum total dry freeboard of 250mm and a total spillway depth of 0.5m will be less than 3m. However, a spillway width of 3.0m complies with best practice and therefore the minimum spillway width of 3.0m shall apply.

This gives a spillway peak discharge velocity of 0.15m/s which is not considered to be likely to cause erosion within the grassed return channel.

Spillway calculations are provided in Appendix D.

8.9.3 Return Channels

It is considered that the spillways will be located within natural soils. Additionally, it is recommended that berms be constructed along the edges of the spillways to ensure that discharge events are channelled away from the proposed pond embankments.

8.10 Maintenance

The pond embankments shall be kept free of trees and the internal faces of the embankment protected from wave erosion.

Cattle shall be excluded from the pond, however periodic grazing with sheep will assist in controlling the height of grass on and around the embankments. All rutting, animal tracks and animal burrows must be remediated as part of ongoing pond maintenance.

9 PRELIMINARY SITE CLASSIFICATION

In so far as it may be applicable, after allowing due consideration of the site geology, drainage and soil conditions, and the presence of fill to depths greater than 0.4m, the site has been classified as follows:

CLASS P (AS 2870)

However, if all footings are founded through the fill to found uniformly on the natural silty to gravelly clay, footings may be proportioned to a **CLASS H1**.

Foundation designs in accordance with this classification are to be subject to the overriding conditions of Section 9 below.

This classification is applicable only for ground conditions encountered at the time of this investigation. If cut or fill earthworks are carried out, then the site classification will need to be re-assessed, and possibly changed.

10 FOUNDATIONS

Particular attention should be paid to the design of footings as required by AS 2870 – 2011.

In addition to normal founding requirements arising from the above classification, particular conditions at this site dictate that the founding medium for all footings would be as follows:

Silty to Gravelly CLAY (CL/CI/CH) – low to high plasticity, brown or grey or yellow/brown

encountered beneath the topsoil and fill below 0.4m (TP01 to TP03, TP05 and TP06) to 3.1m (TP03) from the existing ground surface

An allowable bearing pressure of **100 kPa** is available for edge beams, strips, pads and bored piers founded as above.

If groundwater is encountered in site or footing excavations, it is recommended that subsoil drains are installed discharging to the stormwater system.

If rock is encountered in site or footing excavations, then it is recommended that all footings are founded uniformly to rock.

The site classification presented assumes that the current natural drainage and infiltration conditions at the site will not be markedly affected by the proposed site development work. Care should therefore be taken to ensure that surface water is not permitted to collect adjacent to the structure and that significant changes to seasonal soil moisture equilibria do not develop as a result of service trench construction or tree root action.

Attention is drawn to Appendix B of AS 2870 and CSIRO Building Technical File BTF18 “Foundation Maintenance and Footing Performance: A Homeowner’s Guide” as a guide to maintenance requirements for the proposed structure.

Although the test pit data provides an indication of subsurface conditions at the site, variations in soil conditions may occur in areas of the site not specifically covered by the field investigation. The base of all footing or beam excavations should therefore be inspected to ensure that the founding medium meets the requirements referenced herein with respect to type and strength of founding material.

The test pits were backfilled shortly after being excavated, not allowing time for groundwater seepage flows to develop. Groundwater seepages or higher groundwater levels can occur during and/or after a prolonged period of wet weather or a heavy rainfall event.

11 ENGINEERED FILL

Alternatively, if proposed fill earthworks for the site are carried out as engineered structural fill, then structures may be supported stiffened raft slab footings on the engineered fill.

The engineered fill shall be carried out in accordance with the controlled/structural fill requirements of AS3798-2007 "Guidelines on earthworks for commercial and residential developments" and signed off by an appropriately qualified person.

11.1 Earthworks Methodology

The earthworks methodology for the placement and compaction of engineered fill at the site shall be as follows:

- All organic materials, topsoil, uncontrolled fill and deleterious materials are to be removed from within the area for the placement of controlled fill and must extend at least 1m outside the footprint of any structures;
- During excavation, site visits shall be made by Geoton Pty Ltd to assess the exposed subgrade conditions during and/or after stripping of organic, fill or deleterious materials exposing natural soil;
- The exposed natural subgrade soils shall be proof rolled;
- All weak areas, which deform excessively under rolling, shall be removed and replaced with selected clean fill material;
- Areas of groundwater seepage will require a subsoil drain to be installed along the base of the subgrade to collect groundwater seepage and this should be discharged to the stormwater system. The drain will allow for placement and compaction of the initial layers without them becoming too wet and limiting compaction;
- An assessment of proposed fill shall be carried out and tested to determine if it is suitable for use as controlled fill;
- The controlled fill should be placed in compacted layers no greater than 200 mm thick;
- Earthworks for the selected fill shall be compacted to achieve a minimum density ratio of 98% standard maximum dry density; The clay should be placed at a moisture content within 2% of Optimum Moisture Content (OMC);
- All testing is to be carried out by a NATA registered laboratory with the frequency of testing required outlined in Table 2 below;
- If all the above is carried out Geoton Pty Ltd can provide a sign off report confirming all the above has been done and the fill is considered as controlled fill; and
- Geoton Pty Ltd will provide a revised site classification for the controlled fill.

Table 2: Frequency of Field Density Tests (From AS 3798-2007 Table 8.1)

Type of Earthworks	Frequency of tests (see notes)
Type 1 Large scale operations (e.g. subdivisions)	1 test per layer (see Notes) per 2500m ² ; <i>or</i> 1 test per 500m ³ distributed reasonably evenly throughout full depth and area; <i>or</i> 3 tests per lot. Whichever requires the most tests.

Notes

It may be acceptable to test more than one layer per site visit, by excavating to the test level.

Tests in areas of uncertain compaction and re-tests of failed areas should be carried out. These are additional to the testing recommended in this table.

11.2 Obligations

To enable us to carry out the field activities, Geoton Pty Ltd request that you:

- Provide any available background information on the site including any previous geotechnical investigations/assessments and plans of the proposed fill placement;
- Make arrangements for our personnel to enter the site;
- Provide at least 48-hour notice of any required site visit;
- Provide copies of all field density tests in order to verify that the earthworks have been carried out in accordance with the geotechnical requirements of the project;
- Advise us immediately if you become aware of any matter which may change the scope or timing of the service to be provided by us for the project; and
- Advise us as soon as possible if you require additional work to be carried out.

12 WIND CLASSIFICATION

In so far as being applicable, after allowing due consideration of the region, terrain, shielding and topography, the site has been classified as follows:

WIND CLASSIFICATION N2 (AS 4055)

REGION	TERRAIN CATEGORY	SHIELDING	TOPOGRAPHY
A	TC2	NS	T0

13 LIMITATIONS

Although the test pit data provides an indication of subsurface conditions at the site, variations in soil conditions may occur in areas of the site not specifically covered by the field investigation.

The test pits were backfilled shortly after being excavated and not allowing time for groundwater seepage flows to develop. Groundwater seepages or higher groundwater levels can occur during and/or after a prolonged period of wet weather or a heavy rainfall event.

The findings contained within the report are the result of discrete/specific sampling methodologies used in accordance with normal practices and standards, with some variations as indicated in the report. To the best of our knowledge, they represent a reasonable interpretation of the general condition of the site. Under no circumstances, however, can it be considered that these findings represent the actual state of the site at all points.

14 REFERENCES

- Australian Government - Bureau of Meteorology. (2025). *Climate Data Online*. Retrieved from <http://www.bom.gov.au/climate/data/index.shtml?bookmark=136>
- Australian Rainfall and Run-off. (2025). Retrieved from Regional Flood Frequency Estimation Model: <https://rffe.arr-software.org/>
- Dairy Australia. (2008). *Effluent and Manure Management Database for the Australian Dairy Industry*.
- Fell, R., MacGregor, P., Stapledon, D., Bell, G., & Foster, M. (2015). *Geotechnical Engineering of Dams*. CRC Press.
- Intergovernmental Committee on Surveying and Mapping. (2025). *Elvis - Elevation and Depth - Foundation Spatial Data*. Retrieved from <https://elevation.fsdf.org.au/>
- Standards Australia Limited. (2007). *AS 3798: Guidelines on Earthworks for Commercial and Residential Developments*. Sydney: SAI Global Limited.
- Standards Australia Limited. (2011). *AS 2870: Residential Slabs and Footings Construction*. Sydney: SAI Global Limited.
- Standards Australia Limited. (2017). *AS 1726: Geotechnical Site Investigation*. Sydney: SAI Global Limited.
- Standards Australia Limited. (2021). *AS 4055: Wind Loads for Housing*. Sydney: SAI Global Limited.
- Tasmanian Government Land Tasmania. (2025). *Land Information System Tasmania (LIST)*. Retrieved from <https://maps.thelist.tas.gov.au/listmap/app/list/map>

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.

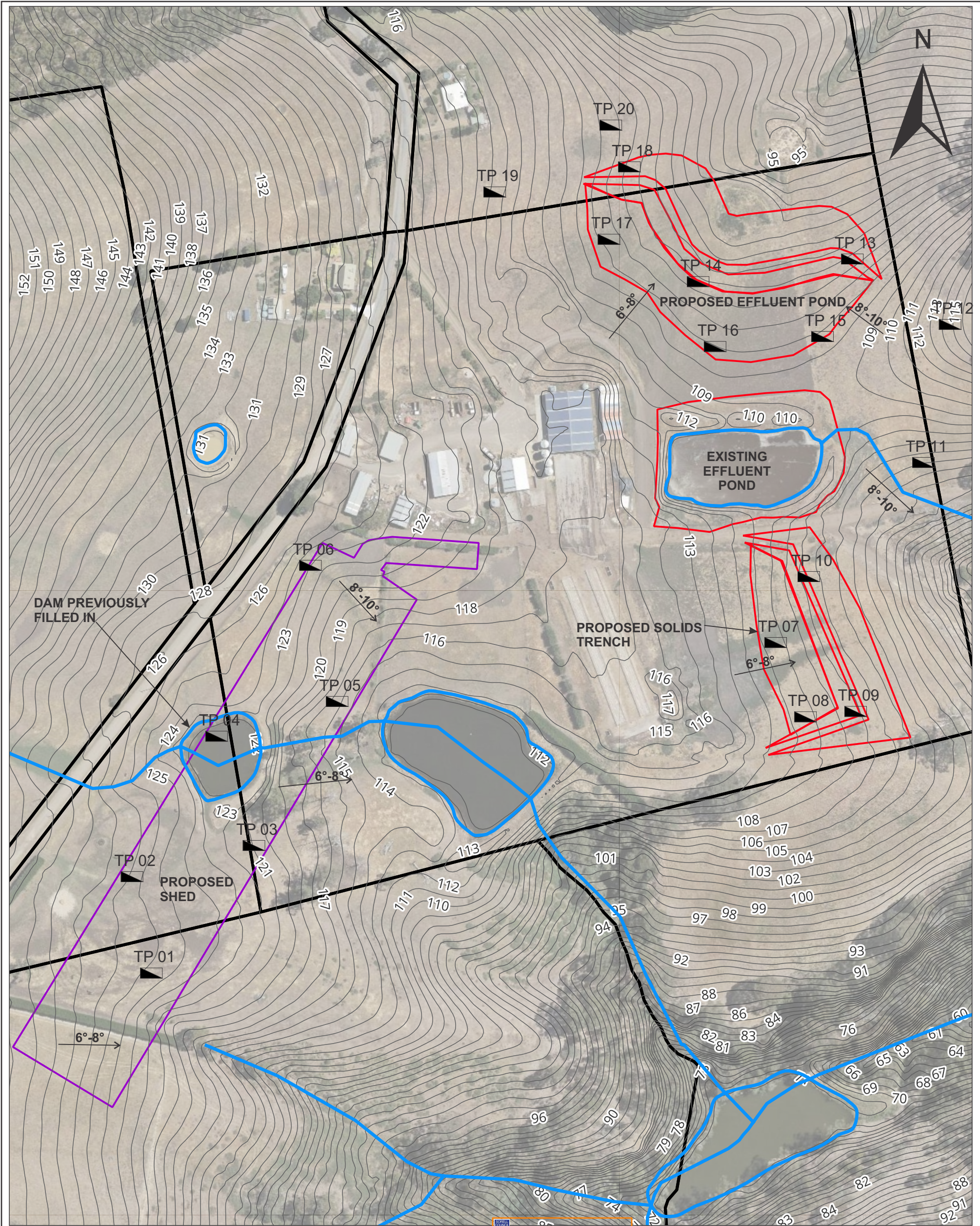
Report integrity

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.





Legend

- 5° Approximate Slope angle in Degrees
- 110 Contour in Metres (LiDAR Derived)
- TP 1 Approximate Test Pit Location
- Cadastral Parcels
- Hydrographic Lines
- Proposed/Existing Effluent Storage Facility

Sorell Council
Development Application: Development
Application - 106 Bream Creek Road, Bream
Creek - P1.pdf
Plans Reference: P1
Date Received: 27/10/2025



GEOTON Pty Ltd				Client: STROUD DAIRIES	
				Project: 106 BREAM CREEK ROAD BREAR CREEK	
Date	10/02/2025	Drawn	AF	Title: SITE PLAN	
Scale	1:2,000	Approved	TB	Project no: GL24627A	
Original size	A3	Rev		Drawing no.	1

Appendix A

Dam Consequences Category Assessment

Applicant Name	Stroud Dairies				
Stream Name	Offstream				
Estimated Capacity at FSL	25ML				
Dam ID. No. (If existing dam)					
Dam Height (metres)	M				
Location	106 Bream Creek Road, Bream Creek				
Damage and Loss	Estimate	Severity Level			
		Minor	Medium	Major	Catastroph
B1 TOTAL INFRASTRUCTURE COSTS					
Residential	<\$10M	▼ YES	.	.	.
Commercial	<\$10M	▼ YES	.	.	.
Community Infrastructure	<\$10M	▼ YES	.	.	.
Dam repair or replacement cost	<\$10M	▼ YES	.	.	.
Total Infrastructure cost severity level		MINOR			
B2 IMPACT ON DAM OWNER'S BUSINESS					
Importance of the system, need to replace the dam	Restrictions needed during peak days and peak hours	▼ .	YES	.	.
Effect on services provided by owner	Minor difficulties in replacing services	▼ YES	.	.	.
Effect on continuing credibility	Some reaction but short lived	▼ YES	.	.	.
Community reaction and political implications	Some reaction but short lived	▼ YES	.	.	.
Impact on financial viability	Able to absorb in one financial year	▼ YES	.	.	.
Value of water in the storage	Can be absorbed in one financial year	▼ YES	.	.	.
Impact on dam owner's business severity level		MEDIUM			
B3 HEALTH AND SOCIAL IMPACTS					
Human health	<100 people affected	▼ YES	.	.	.
Loss of services to the community	<100 people affected	▼ YES	.	.	.
Cost of emergency management	<1,000 person days	▼ YES	.	.	.
Dislocation of people	<100 person months	▼ YES	.	.	.
Dislocation of businesses	<20 business months	▼ YES	.	.	.
Employment affected	<100 jobs lost	▼ YES	.	.	.
Loss of heritage	Local facility	▼ YES	.	.	.
Loss of recreational facility	Local facility	▼ YES	.	.	.
Health and Social severity level		MINOR			
B4 ENVIRONMENTAL IMPACTS					
Area of impact	< 1 km2	▼ YES	.	.	.
Duration of impact	< 1 year	▼ YES	.	.	.
Stock and fauna	Discharge from dambreak would contaminate water supplies used by stock and fauna. Health impacts not expected.	▼ .	YES	.	.
Ecosystems	Discharge from dambreak would have short term impacts on ecosystems with natural recovery expected after onw wet season. Remediation possible.	▼ .	YES	.	.
Rare and endangered species	Species exist but minimal damage expected. Recovery within one year.	▼ YES	.	.	.
Environmental impacts severity level		MEDIUM			
Highest severity level					
MEDIUM					
Reasons for recommending a consequence category (refer ANCOLD Guidelines On The Consequence Categories For Dams October 2012) MUST include comments on the PAR (both permanent and itinerant), buildings, roads, other infrastructure and the natural environment downstream of the dam and the potential impacts arising from a dam break: (** Note** Provide photographs to support reasons for recommending consequence category)					
Population at Risk (PAR) <1 CONSEQUENCE CATEGORY = Low					
PAR includes all those persons who would be directly exposed to flood waters within the dam break affected zone if they took no action to evacuate					
Note 1: With a PAR in excess of 100, it is unlikely damage will be minor, similarly with a PAR in excess of 1,000 it is unlikely damage will be classified as medium					
Note 2: Change to 'High C' where there is a potential of one or more lives being lost					
Completed By	Anne Foster				
Date	10/02/2025				



Sorell Council

Development Application: Development
Application - 106 Bream Creek Road, Bream
Creek - P1.pdf
Plans Reference:P1
Date Received:27/10/2025

Appendix B

Excavation Logs

Client : Stroud Dairies
Project : Geotechnical Investigation
Location : 106 Bream Creek Rd, Bream Creek TAS 7175, Australia

Easting : 567593.00
Northing : 5259210.00
Excavator : Kobelco SK250

Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
Logged Date : 04/12/2024

Method	Drilling	Water	Samples	Testing V (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
450mm Toothed			D (%):		0.25		ML	Topsoil- Clayey SILT- low plasticity, grey brown, with cobbles , root fibres .	M	VSt	
					0.50		CH	Natural- Silty CLAY- high plasticity, grey brown, with cobbles .	M	VSt	
				130	0.75		CI	Natural- Gravelly CLAY- medium plasticity, brown, medium to coarse sized gravel, with cobbles basalt .	M	VSt	
				100	1		BA S	Extremely weathered BASALT- Boulders and Cobbles in a Gravelly Clay matrix, medium plasticity clay, brown, angular medium to coarse sized gravel.	M	MD	
					1.25			TP01 Terminate at 1.4m (near excavator refusal)			
 Sorell Council Development Application: Development Application - 106 Bream Creek Road, Bream Creek - P1.pdf Plans Reference:P1 Date Received:27/10/2025											

Client : Stroud Dairies
Project : Geotechnical Investigation
Location : 106 Bream Creek Rd, Bream Creek TAS 7175, Australia

Easting : 567581.00
Northing : 5259262.00
Excavator : Kobelco SK250

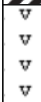
Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
Logged Date : 04/12/2024

Method	Drilling	Water	Samples	Testing V (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
450mm Toothed					0.25		ML	Topsoil- Clayey SILT- low plasticity, brown, root fibres .	M	St	w ~ PL
					0.50		CI	Natural- Silty CLAY- medium plasticity, brown mottled pale grey.	M	St	
					1.00		ML	Natural- Clayey SILT- high plasticity, yellow brown mottled grey, trace medium to coarse sized gravel, with cobbles and boulders.	M	VSt	
					1.50		BAS	Extremely weathered BASALT- Cobbles and Boulders in a Clayey Gravel matrix, angular medium to coarse sized gravel, medium plasticity clay, brown.	M	MD	
								TP02 Terminate at 1.9m (near excavator refusal)			
Sorell Council Development Application: Development Application - 106 Bream Creek Road, Bream Creek - P1.pdf Plans Reference:P1 Date Received:27/10/2025											

Client : Stroud Dairies
Project : Geotechnical Investigation
Location : 106 Bream Creek Rd, Bream Creek TAS 7175, Australia

Easting : 567648.00
Northing : 5259279.00
Excavator : Kobelco SK250

Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
Logged Date : 04/12/2024

Method	Drilling	Water	Samples	Testing	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
				V (kPa)							
450mm Toothed					0.25		ML	Topsoil- Clayey SILT- low plasticity, brown, trace cobbles and boulders .	M	VSt	
				0.50	CH		Natural- Silty CLAY- high plasticity, brown, trace fine to medium sized gravel, trace medium to coarse grained sand, trace cobbles and boulders .	M	VSt		
				0.75	CH		Becoming grey mottled orange brown, with medium to coarse sized gravel, with cobbles .	M	VSt		
				1	CH		Becoming grey mottled orange brown, with medium to coarse sized gravel, with cobbles .	M	VSt		
					1.25		BAS	Extremely weathered BASALT- Cobbles and Boulders in a Gravelly CLAY matrix, medium plasticity clay, brown, angular medium to coarse sized gravel.	M	MD	
				1.50							
 Sorell Council Development Application: Development Application - 106 Bream Creek Road, Bream Creek - P1.pdf Plans Reference:P1 Date Received:27/10/2025											

Client : Stroud Dairies
Project : Geotechnical Investigation
Location : 106 Bream Creek Rd, Bream Creek TAS 7175, Australia

Easting : 567627.00
Northing : 5259338.00
Excavator : Kobelco SK250

Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
Logged Date : 04/12/2024

Method	Drilling	Water	Samples	Testing	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
				V (kPa)							
1000mm toothed					0.25		CH	FILL - Silty CLAY - high plasticity, brown,	W	F	FILL
					0.50						
					0.75						
				44	1						
					1.25						
				50	1.50						
					1.75						
					2						
				30	2.25		CI	FILL - Gravelly CLAY- medium plasticity, fine sized gravel, black.	W	F	
					2.50						
					2.75						
					3						
							CL	Natural- Gravelly CLAY- low plasticity, yellow brown, medium sized gravel.	M-D	St	NATURAL
								TP04 Terminate at 3.2m (continual test pit collapse)			
								 Sorell Council Development Application: Development Application - 106 Bream Creek Road, Bream Creek - P1.pdf Plans Reference: P1 Date Received: 27/10/2025			

Client : Stroud Dairies
Project : Geotechnical Investigation
Location : 106 Bream Creek Rd, Bream Creek TAS 7175, Australia

Easting : 567692.00
Northing : 5259357.00
Excavator : Kobelco SK250

Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
Logged Date : 04/12/2024

Method	Drilling	Water	Samples	Testing		Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
				V (kPa)	PP (kPa)							
450mm Toothed						0.25		ML	Clayey SILT- low plasticity, brown, root fibres	M-D	VSt	
						0.50		CH	Silty CLAY- high plasticity, brown mottled grey and orange.	M	VSt	w ~ PL
						0.75						
						1		CH		M	St	
						1.25						
						1.50						
						1.75						
						2						
						2.25						

Client : Stroud Dairies
Project : Geotechnical Investigation
Location : 106 Bream Creek Rd, Bream Creek TAS 7175, Australia

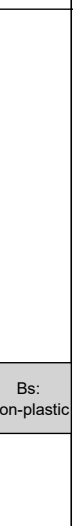
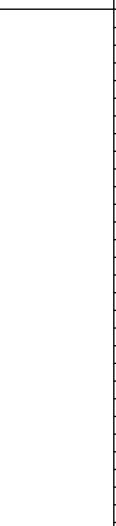
Easting : 567679.00
Northing : 5259430.00
Excavator : Kobelco SK250

Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
Logged Date : 04/12/2024

Method	Drilling	Water	Samples	Testing	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
				V (kPa)							
450mm Toothed					0.25		ML	Clayey SILT- low plasticity, brown, root fibres	D	FR	
					0.50		CH	Silty CLAY- high plasticity, yellow brown mottled pale grey.	M	St	w ~ PL
				66	0.75						
				102	1.25		CH	.	M	VSt	
				110	1.50						
					1.75						
TP06 Terminate at 2m											
 Sorell Council Development Application: Development Application - 106 Bream Creek Road, Bream Creek - P1.pdf Plans Reference:P1 Date Received:27/10/2025											

Sheet : 1 OF 1
 Easting : 567931.00 Job No : GL24627A
 Northing : 5259389.00 Logged : AF
 Excavator : Kobelco SK250 Logged Date : 04/12/2024

Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
00 Logged Date : 04/12/2024

Method	Drilling	Water	Samples	Testing	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
450mm Toothed					0.25		ML	Topsoil- Clayey SILT- low plasticity, dark brown, root fibres .	M	F	w ~ PL
					0.50		CH	Natural- Silty CLAY- high plasticity, brown.	M	St	
					0.75		CL	Natural- Sandy CLAY- low plasticity, pale brown mottled orange brown, fine grained sand.	M	St	
					1		SM		M	MD	
					1.25		SS T	Natural- Silty SAND- fine grained, trace fine to coarse sized gravel, non-plastic silt, brown mottled pale grey, trace cobbles .	M	MD	
							Extremely weathered SANDSTONE- Cobbles in a Clayey SAND matrix, fine grained, with medium to coarse sized gravel, pale brown. TP07 refusal at 1.5m (excavator refusal on inferred highly weathered sandstone)				

**Sorell Council**

Development Application: Development Application - 106 Bream Creek Road, Bream Creek - P1.pdf
Plans Reference:P1
Date Received:27/10/2025

Client : Stroud Dairies
Project : Geotechnical Investigation
Location : 106 Bream Creek Rd, Bream Creek TAS 7175, Australia

Easting : 567951.00
Northing : 5259356.00
Excavator : Kobelco SK250

Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
Logged Date : 04/12/2024

Method	Drilling	Water	Samples	Testing	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
450mm Toothed			Bs: LL=49%, PL=20%, PI=29%, LS=13.0 %		0.25		SC	Topsoil- Clayey SAND- fine grained, medium plasticity clay, dark brown.	D	L	w ~ PL
					0.50		CI	Natural- Silty CLAY- medium plasticity, brown, trace fine grained sand.	M	St	
					1.25		CI	Natural- Sandy CLAY- medium plasticity, pale grey mottled orange brown and brown, fine grained sand.	M	St	
					1.50		SP	Natural- SAND- fine grained, trace medium plasticity clay, pale grey mottled orange brown.	M	MD	
								TP08 Terminate at 1.7m			
Sorell Council Development Application: Development Application - 106 Bream Creek Road, Bream Creek - P1.pdf Plans Reference:P1 Date Received:27/10/2025											

Client : Stroud Dairies
Project : Geotechnical Investigation
Location : 106 Bream Creek Rd, Bream Creek TAS 7175, Australia

Easting : 567971.00
Northing : 5259353.00
Excavator : Kobelco SK250
Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
Logged Date : 04/12/2024

Method	Drilling	Water	Samples	Testing	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
				PP (kPa)							
450mm Toothed				120	0.25		SM	FILL- Silty SAND, fine grained, dark grey.	M	L	FILL
					0.50		ML	Natural- Clayey SILT- low plasticity, brown.	M	St	NATURAL
					0.75		CH	Natural- Silty CLAY- high plasticity, brown mottled pale grey, with fine grained sand.	M	St	w ~ PL
					1.00		SP	Natural- SAND- fine grained, trace low plasticity clay, orange.	M	MD	
					1.25		SS T	Extremely weathered SANDSTONE- SAND soil properties- fine grained, trace low plasticity clay, orange brown, with cobbles .	M	D	
					1.50		SS T	Extremely weathered, rock-COBLES in a SAND matrix- fine grained, trace low plasticity clay, orange brown.	M	D	
								TP09 refusal at 1.7m (excavator refusal on highly weathered sandstone)			
 Sorell Council Development Application: Development Application - 106 Bream Creek Road, Bream Creek - P1.pdf Plans Reference:P1 Date Received:27/10/2025											

Client : Stroud Dairies
Project : Geotechnical Investigation
Location : 106 Bream Creek Rd, Bream Creek TAS 7175, Australia

Easting : 567946.00
Northing : 5259426.00
Excavator : Kobelco SK250

Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
Logged Date : 04/12/2024

Method	Drilling	Water	Samples	Testing	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
450mm Toothed					0.25		ML	Topsoil- Clayey SILT- low plasticity, dark brown, root fibres .	M-D	St	w ~ PL
					0.50		ML	Natural- Clayey SILT- high plasticity, dark brown.	M-D	VSt	
					0.75		CH	Natural- Silty CLAY- high plasticity, brown.	M	St	
					1.00		SP	Natural- SAND- fine grained, with low plasticity clay, orange brown.	M	MD	
					1.50		SS T	Extremely weathered SANDSTONE- SAND soil properties- fine grained, trace medium to coarse sized gravel, orange brown mottled pale grey, with cobbles .	M	D	
								TP10 refusal at 2m (excavator refusal on highly weathered sandstone)			
 Sorell Council Development Application: Development Application - 106 Bream Creek Road, Bream Creek - P1.pdf Plans Reference:P1 Date Received:27/10/2025											

Easting : 568009.00 Sheet : 1 OF 1
 Northing : 5259485.00 Job No : GL24627A
 Excavator : Kobelco SK250 Logged : AF
 Logged Date : 04/12/2024

Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
0 Logged Date : 04/12/2024

Page 1 of 1

Client : Stroud Dairies
Project : Geotechnical Investigation
Location : 106 Bream Creek Rd, Bream Creek TAS 7175, Australia

Easting : 568027.00
Northing : 5259559.00
Excavator : Kobelco SK250

Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
Logged Date : 04/12/2024

Method	Drilling	Water	Samples	Testing	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
450mm Toothed					0.25		CI	Topsoil- Silty CLAY- medium plasticity, dark brown, root fibres .	M-D	St	
					0.50		CH	Natural- Silty CLAY- high plasticity, brown.	M	St	
					1.00		BAS	Extremely weathered BASALT- Clayey GRAVEL soil properties- angular medium to coarse sized, medium plasticity clay, brown.	M-D	MD	
					1.50		BAS	Trace cobbles and boulders .	M-D	MD	
								TP12 Terminate at 2m			

 **Sorell Council**
Development Application: Development
Application - 106 Bream Creek Road, Bream
Creek - P1.pdf
Plans Reference:P1
Date Received:27/10/2025

Sheet : 1 OF 1
 Easting : 567973.00 Job No : GL24627A
 Northing : 5259597.00 Logged : AF
 Excavator : Kobelco SK250 Logged Date : 04/12/2024

Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
0 Logged Date : 04/12/2024

Client : Stroud Dairies
Project : Geotechnical Investigation
Location : 106 Bream Creek Rd, Bream Creek TAS 7175, Australia

Easting : 567889.00
Northing : 5259585.00
Excavator : Kobelco SK250
Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
Logged Date : 04/12/2024

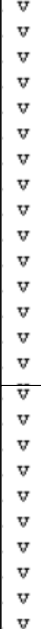
Method	Drilling	Water	Samples	Testing	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
				PP (kPa)							
450mm Toothed					0.25		ML	Topsoil- Clayey SILT- high plasticity, dark brown, organics.	M	St	
					0.50		CH	Natural- Silty CLAY- high plasticity, brown.	M	St	
		Bs:	140	0.75							
				1							
					1.25		ML	Natural- Clayey to silty SILT- low plasticity, yellow brown, with medium to coarse sized gravel.	M-D	St	
					1.50						
					1.75		BA S	Extremely weathered BASALT- Silty GRAVEL soil properties- angular medium to coarse sized, yellow brown, trace cobbles .	M-D	MD	
					2						
					2.25						
					2.50						
	Bs:			2.75							
				3							
				3.25							
				3.50							
				3.75							
								TP14 Terminate at 3.8m			

 **Sorell Council**
Development Application: Development Application - 106 Bream Creek Road, Bream Creek - P1.pdf
Plans Reference: P1
Date Received: 27/10/2025

Client : Stroud Dairies
Project : Geotechnical Investigation
Location : 106 Bream Creek Rd, Bream Creek TAS 7175, Australia

Easting : 567954.00
Northing : 5259555.00
Excavator : Kobelco SK250

Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
Logged Date : 04/12/2024

Method	Drilling	Water	Samples	Testing	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
450mm Toothed					0.25		CI	Topsoil- Silty CLAY- medium plasticity, dark brown, organics.	M-D	St	
					0.50		CH	Natural- Silty CLAY- high plasticity, brown.	M	St	
					1.00		BA S	Extremely weathered BASALT-GRAVEL soil properties- angular medium to coarse sized, trace medium plasticity clay, yellow brown, with cobbles .	M-D	MD	
					1.25						
					1.50						
					1.75						
					2.00						
					2.25		BA S	Extremely weathered BASALT-Gravelly SAND soil properties- medium to coarse grained, fine to coarse sized gravel, trace medium plasticity clay, yellow brown.	M-D	MD	
					2.50						
					2.75						
								TP15 Terminate at 2.8m			
 Sorell Council Development Application: Development Application - 106 Bream Creek Road, Bream Creek - P1.pdf Plans Reference: P1 Date Received: 27/10/2025											

Client : Stroud Dairies
Project : Geotechnical Investigation
Location : 106 Bream Creek Rd, Bream Creek TAS 7175, Australia

Easting : 567896.00
Northing : 5259550.00
Excavator : Kobelco SK250

Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
Logged Date : 04/12/2024

Method	Drilling	Water	Samples	Testing	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
450mm Toothed					0.25		ML	Topsoil- Clayey SILT- high plasticity, dark brown.	M-D	St	
					0.50		CH	Natural- Silty CLAY- high plasticity, brown.	M	St	
					1.00		BAS	Extremely weathered BASALT- Gravelly SAND soil properties- medium to coarse grained, fine to coarse sized gravel, with low plasticity silt, brown.	M-D	MD	
					2.00		BAS	Trace cobbles .	M-D	MD	
								TP16 Terminate at 2.8m			

 **Sorell Council**
Development Application: Development
Application - 106 Bream Creek Road, Bream
Creek - P1.pdf
Plans Reference: P1
Date Received: 27/10/2025

Client : Stroud Dairies
Project : Geotechnical Investigation
Location : 106 Bream Creek Rd, Bream Creek TAS 7175, Australia

Easting : 567839.00
Northing : 5259606.00
Excavator : Kobelco SK250

Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
Logged Date : 04/12/2024

Method	Drilling	Water	Samples	Testing	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
450mm Toothed				PP (kPa)			ML	Topsoil- Clayey SILT- high plasticity, dark brown, root fibres .	M-D	St	
					0.25						
				160	0.50		CH	Natural- Silty CLAY- high plasticity, grey mottled orange brown.	M	St	
					0.75						
					1						
					1.25						
			Bs: LL=54%, PL=19%, PI=35%, LS=15.0 %		1.50						
					1.75						
					2						
					2.25						
					2.50		CH	Trace fine grained sand.	M	VSt	
					2.75						
				240	3						
					3.25						
					3.50		CI	Natural- Sandy CLAY- medium plasticity, orange brown mottled pale grey, fine grained sand.	M	St	
					3.75		CH	Natural- Silty CLAY- high plasticity, pale grey mottled orange brown, with orange brown clayey silt lenses.	M	St-V St	
				200	4						
					4.25		CH	Trace coarse sized gravel, trace quartzite cobbles.	M	St-V St	



TP17 Terminate at 4.3m

Client : Stroud Dairies
Project : Geotechnical Investigation
Location : 106 Bream Creek Rd, Bream Creek TAS 7175, Australia

Easting : 567851.00
Northing : 5259646.00
Excavator : Kobelco SK250

Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
Logged Date : 04/12/2024

Method	Drilling	Water	Samples	Testing	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
				PP (kPa)							
450mm Toothed					0.25		ML	Topsoil- Clayey SILT- low plasticity, dark brown, root fibres .	M-D	St	
				160	0.50		CH	Natural- Silty CLAY- high plasticity, grey mottled yellow brown.	M	St	w ~ PL
					0.75						
				160	1						
					1.25						
					1.50						
					1.75						
					2						
					2.25		CH	Becoming pale grey mottled red.	M	VSt	
				360	2.50						
					2.75						
					3						
					3.25						
					3.50						
								TP18 Terminate at 3.6m			

Client : Stroud Dairies
Project : Geotechnical Investigation
Location : 106 Bream Creek Rd, Bream Creek TAS 7175, Australia

Easting : 567778.00
Northing : 5259633.00
Excavator : Kobelco SK250

Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
Logged Date : 04/12/2024

Method	Drilling	Water	Samples	Testing	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
450mm Toothed					0.25		CI	Topsoil- Silty CLAY- medium plasticity, dark brown, root fibres .	M-D	St	
					0.50		CH	Natural- Silty CLAY- high plasticity, grey mottled brown.	M	St	w ~ PL
					0.75						
					1						
					1.25						
					1.50						
					1.75						
					2		CH	Becoming grey mottled red, trace fine sized gravel, trace medium to coarse grained sand, red lenses are sandy clay .	M	St	
					2.25						
					2.50		CH	Natural- Sandy CLAY- high plasticity, grey mottled red, fine grained sand.	M	St	
					2.75						
								TP19 Terminate at 3m			
 Sorell Council Development Application: Development Application - 106 Bream Creek Road, Bream Creek - P1.pdf Plans Reference:P1 Date Received:27/10/2025											

Client : Stroud Dairies
Project : Geotechnical Investigation
Location : 106 Bream Creek Rd, Bream Creek TAS 7175, Australia

Easting : 567841.00
Northing : 5259670.00
Excavator : Kobelco SK250

Sheet : 1 OF 1
Job No : GL24627A
Logged : AF
Logged Date : 04/12/2024

Method	Drilling	Water	Samples	Testing	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
450mm Toothed					0.25		ML	Topsoil- Clayey SILT- low plasticity, dark brown.	D	FR	
					0.50		CH	Natural- Silty CLAY- high plasticity, grey mottled yellow brown.	M	St	w ~ PL
					2.25		CH	Becoming grey mottled red, trace medium to coarse grained sand, red sandy clay lenses.	M	St	
								TP20 Terminate at 3.2m			
								 Sorell Council Development Application: Development Application - 106 Bream Creek Road, Bream Creek - P1.pdf Plans Reference:P1 Date Received:27/10/2025			

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
HT	Hand Tools

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
U ₈₁	Undisturbed sample 81 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 – Material cannot be penetrated
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

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 – $w \approx PL$

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 - $w \approx LL$

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.

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.						

• LL – Liquid Limit.

COMMON DEFECTS IN SOILS

TERM	DEFINITION	DIAGRAM	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.		SOFTENED ZONE	A zone in clayey soil, usually adjacent to a defect in which the soil has a higher moisture content than elsewhere.	
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.		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.	
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.		TUBE CAST	An infilled tube. The infill may be uncemented or weakly cemented soil or have rock properties.	
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.		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 C

Laboratory Results

Material Test Report

Report Number: RE24/239-158
Issue Number: 1
Date Issued: 19/12/2024
Client: Geoton Pty Ltd
25, 16-18 Goodman Court, Invermay TAS 7248
Contact: Anne Foster
Project Number: RE24/239
Project Name: Material Evaluation
Project Location: Bream Creek
Client Reference: GL24627A
Work Request: 2310
Sample Number: S2310A
Date Sampled: 06/12/2024
Dates Tested: 06/12/2024 - 16/12/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Preparation Method: In accordance with the test method
Sample Location: TP 05, Depth: 0.6-0.8m
Material: Brown Silty Clay

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	51		
Plastic Limit (%)	21		
Plasticity Index (%)	30		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	14.5		
Cracking Crumbling Curling	Cracking & Curling		



Rare Earth CMT Laboratories Pty Ltd
Launceston Laboratory
23/16 - 18 Goodman Court Invermay Tasmania 7248
Phone: 0439 351 452
Email: arlen@rareearthcmt.com.au



Accredited for compliance with ISO/IEC 17025 - Testing


Approved Signatory: Brett Cuthbertson
Laboratory Manager
NATA Accredited Laboratory Number: 20328

**Sorell Council**

Development Application: Development
Application - 106 Bream Creek Road, Bream
Creek - P1.pdf
Plans Reference:P1
Date Received:27/10/2025

Material Test Report

Report Number: RE24/239-158
Issue Number: 1
Date Issued: 19/12/2024
Client: Geoton Pty Ltd
25, 16-18 Goodman Court, Invermay TAS 7248
Contact: Anne Foster
Project Number: RE24/239
Project Name: Material Evaluation
Project Location: Bream Creek
Client Reference: GL24627A
Work Request: 2310
Sample Number: S2310B
Date Sampled: 06/12/2024
Dates Tested: 06/12/2024 - 19/12/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Preparation Method: In accordance with the test method
Sample Location: TP 17, Depth: 1.6-1.8m
Material: Brown Silty Clay

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	54		
Plastic Limit (%)	19		
Plasticity Index (%)	35		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	15.0		
Cracking Crumbling Curling	Cracking & Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	6		
Soil Description	Brown Silty Clay		
Nature of Water	Distilled		
Temperature of Water (°C)	16		

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Launceston Laboratory

23/16 - 18 Goodman Court Invermay Tasmania 7248

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Brett Cuthbertson

Approved Signatory: Brett Cuthbertson
Laboratory Manager

NATA Accredited Laboratory Number: 20328



Sorell Council

Development Application: Development
Application - 106 Bream Creek Road, Bream
Creek - P1.pdf

Plans Reference: P1
Date Received: 27/10/2025

Material Test Report

Report Number: RE24/239-158
Issue Number: 1
Date Issued: 19/12/2024
Client: Geoton Pty Ltd
25, 16-18 Goodman Court, Invermay TAS 7248
Contact: Anne Foster
Project Number: RE24/239
Project Name: Material Evaluation
Project Location: Bream Creek
Client Reference: GL24627A
Work Request: 2310
Sample Number: S2310C
Date Sampled: 06/12/2024
Dates Tested: 06/12/2024 - 19/12/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Preparation Method: In accordance with the test method
Sample Location: TP 11, Depth: 1.3-1.5m
Material: Brown Silty Clay

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	44		
Plastic Limit (%)	23		
Plasticity Index (%)	21		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	12.0		
Cracking Crumbling Curling	Cracking		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	4		
Soil Description	Brown Silty Clay		
Nature of Water	Distilled		
Temperature of Water (°C)	16		

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Launceston Laboratory

23/16 - 18 Goodman Court Invermay Tasmania 7248

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Brett Cuthbertson

Approved Signatory: Brett Cuthbertson
Laboratory Manager

NATA Accredited Laboratory Number: 20328

**Sorell Council**
Development Application: Development
Application - 106 Bream Creek Road, Bream
Creek - P1.pdf
Plans Reference: P1
Date Received: 27/10/2025

Material Test Report

Report Number: RE24/239-158
Issue Number: 1
Date Issued: 19/12/2024
Client: Geoton Pty Ltd
25, 16-18 Goodman Court, Invermay TAS 7248
Contact: Anne Foster
Project Number: RE24/239
Project Name: Material Evaluation
Project Location: Bream Creek
Client Reference: GL24627A
Work Request: 2310
Sample Number: S2310D
Date Sampled: 06/12/2024
Dates Tested: 06/12/2024 - 19/12/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Preparation Method: In accordance with the test method
Sample Location: TP 13, Depth: 2.5-3.0m
Material: Dark Brown Clayey Gravel

rareearth.

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Launceston Laboratory

23/16 - 18 Goodman Court Invermay Tasmania 7248

Phone: 0439 351 452

Email: arlen@rareearthcmt.com.au

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Brett Cuthbertson

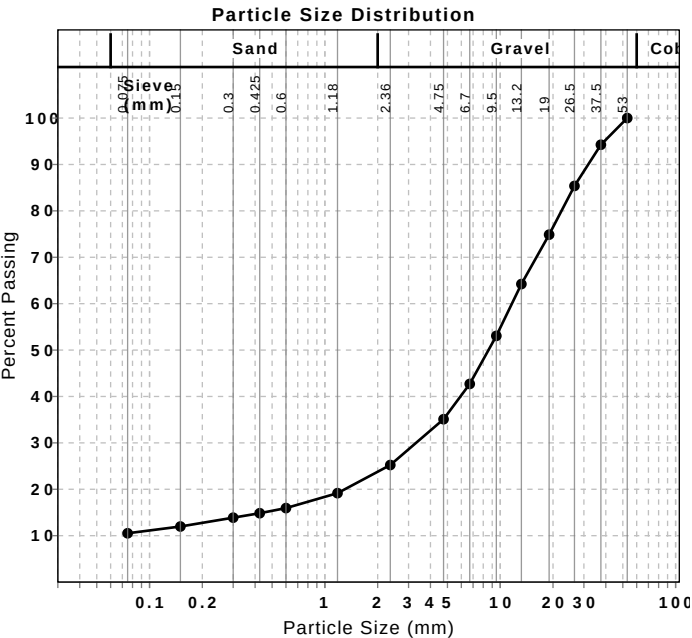
Approved Signatory: Brett Cuthbertson
Laboratory Manager
NATA Accredited Laboratory Number: 20328

Particle Size Distribution (AS1289 3.6.1)		
Sieve	Passed %	Passing Limits
53 mm	100	
37.5 mm	94	
26.5 mm	85	
19 mm	75	
13.2 mm	64	
9.5 mm	53	
6.7 mm	43	
4.75 mm	35	
2.36 mm	25	
1.18 mm	19	
0.6 mm	16	
0.425 mm	15	
0.3 mm	14	
0.15 mm	12	
0.075 mm	11	

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	60		
Plastic Limit (%)	40		
Plasticity Index (%)	20		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	10.0		
Cracking Crumbling Curling	None		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	5		
Soil Description	Dark Brown Clayey Gravel		
Nature of Water	Distilled		
Temperature of Water (°C)	16		



Sorell Council

Development Application: Development Application - 106 Bream Creek Road, Bream Creek - P1.pdf
Plans Reference: P1
Date Received: 27/10/2025

Material Test Report

Report Number: RE24/239-158
Issue Number: 1
Date Issued: 19/12/2024
Client: Geoton Pty Ltd
25, 16-18 Goodman Court, Invermay TAS 7248
Contact: Anne Foster
Project Number: RE24/239
Project Name: Material Evaluation
Project Location: Bream Creek
Client Reference: GL24627A
Work Request: 2310
Sample Number: S2310E
Date Sampled: 06/12/2024
Dates Tested: 06/12/2024 - 19/12/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Preparation Method: In accordance with the test method
Sample Location: TP 07, Depth: 1.0-1.2m
Material: Light Brown Clayey Sand/Gravel



Rare Earth CMT Laboratories Pty Ltd

Launceston Laboratory

23/16 - 18 Goodman Court Invermay Tasmania 7248

Phone: 0439 351 452

Email: arlen@rareearthcmt.com.au

Accredited for compliance with ISO/IEC 17025 - Testing



Brett Cuthbertson

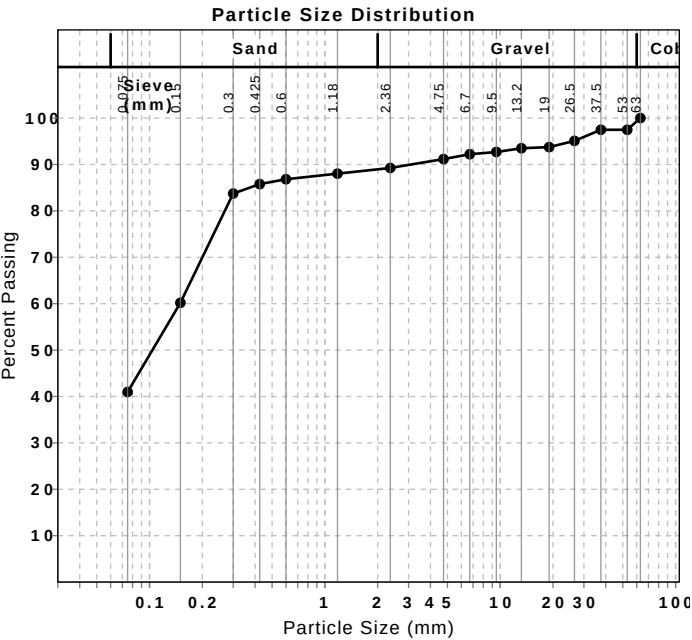
Approved Signatory: Brett Cuthbertson
Laboratory Manager

NATA Accredited Laboratory Number: 20328

Particle Size Distribution (AS1289 3.6.1)		
Sieve	Passed %	Passing Limits
63 mm	100	
53 mm	97	
37.5 mm	97	
26.5 mm	95	
19 mm	94	
13.2 mm	93	
9.5 mm	93	
6.7 mm	92	
4.75 mm	91	
2.36 mm	89	
1.18 mm	88	
0.6 mm	87	
0.425 mm	86	
0.3 mm	84	
0.15 mm	60	
0.075 mm	41	

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	Not Obtainable		
Plastic Limit (%)	Not Obtainable		
Plasticity Index (%)	Non Plastic		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	5		
Soil Description	Light Brown Clayey Sand/Gravel		
Nature of Water	Distilled		
Temperature of Water (°C)	16		



Sorell Council

Development Application: Development
Application - 106 Bream Creek Road, Bream
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Plans Reference: P1
Date Received: 27/10/2025

Material Test Report

Report Number: RE24/239-158
Issue Number: 1
Date Issued: 19/12/2024
Client: Geoton Pty Ltd
 25, 16-18 Goodman Court, Invermay TAS 7248
Contact: Anne Foster
Project Number: RE24/239
Project Name: Material Evaluation
Project Location: Bream Creek
Client Reference: GL24627A
Work Request: 2310
Sample Number: S2310F
Date Sampled: 06/12/2024
Dates Tested: 06/12/2024 - 19/12/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Preparation Method: In accordance with the test method
Sample Location: TP 08, Depth: 0.5-0.7m
Material: Brown Silty Clay

Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
9.5 mm	100		
6.7 mm	100		
4.75 mm	100		
2.36 mm	100		
1.18 mm	100		
0.6 mm	100		
0.425 mm	100		
0.3 mm	100		
0.15 mm	95		
0.075 mm	74		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	49		
Plastic Limit (%)	20		
Plasticity Index (%)	29		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	13.0		
Cracking Crumbling Curling	Cracking & Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	6		
Soil Description	Brown Silty Clay		
Nature of Water	Distilled		
Temperature of Water (°C)	16		

rareearth.

Rare Earth CMT Laboratories Pty Ltd

Launceston Laboratory

23/16 - 18 Goodman Court Invermay Tasmania 7248

Phone: 0439 351 452

Email: arlen@rareearthcmt.com.au

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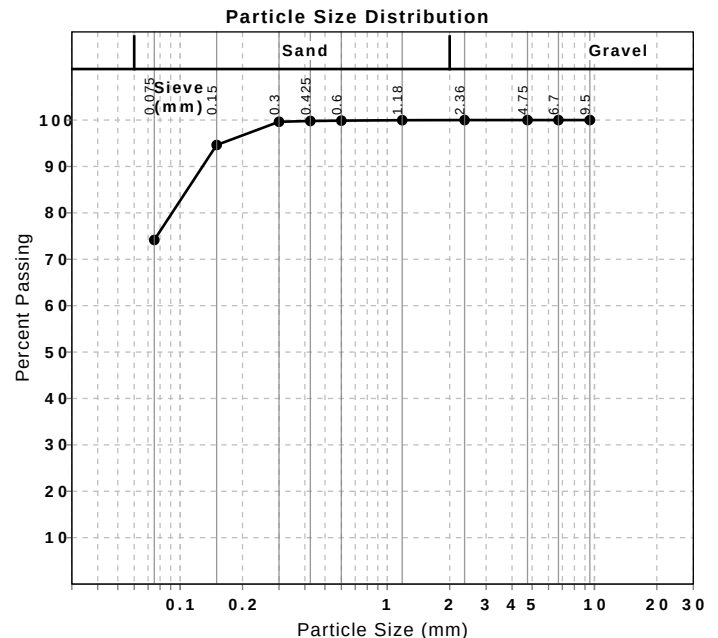


Brett Cuthbertson

Approved Signatory: Brett Cuthbertson

Laboratory Manager

NATA Accredited Laboratory Number: 20328



Sorell Council

Development Application: Development Application - 106 Bream Creek Road, Bream Creek - P1.pdf

Plans Reference: P1

Date Received: 27/10/2025

Material Test Report



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Approved Signatory: Brett Cuthbertson
Laboratory Manager

NATA Accredited Laboratory Number: 20328

Report Number: RE24/239-158
Issue Number: 1
Date Issued: 19/12/2024
Client: Geoton Pty Ltd
25, 16-18 Goodman Court, Invermay TAS 7248
Contact: Anne Foster
Project Number: RE24/239
Project Name: Material Evaluation
Project Location: Bream Creek
Client Reference: GL24627A
Work Request: 2310
Dates Tested: 06/12/2024 - 10/12/2024

Moisture Content AS 1289 2.1.1			
Sample Number	Sample Location	Moisture Content (%)	Material
S2310B	TP 17, Depth: 1.6-1.8m	29.6 %	Brown Silty Clay
S2310C	TP 11, Depth: 1.3-1.5m	21.5 %	Brown Silty Clay
S2310D	TP 13, Depth: 2.5-3.0m	20.7 %	Dark Brown Clayey Gravel
S2310E	TP 07, Depth: 1.0-1.2m	15.2 %	Light Brown Clayey Sand/Gravel
S2310F	TP 08, Depth: 0.5-0.7m	32.9 %	Brown Silty Clay



Sorell Council

Development Application: Development
Application - 106 Bream Creek Road, Bream
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Plans Reference: P1
Date Received: 27/10/2025

client	Geoton	date tested	13/1/25	18/1/25
project	GL24627A	job no	RE24/239	
location	Bream Creek	report no	RE24/239/WR2310	
sampled by:	Client - Tested as Received	date received	6/12/24	

Sample Identification	Sample Description	coefficient of permeability m/sec	initial dry density t/m ³	field moisture content %
S2310B	Light Brown Silty Clay TP # 17 1.6-1.8m Maximum Dry Density 1.47 t/m ³ Optimum Moisture Content 27.6%	1.3×10^{-10}	1.40	30.0
S2310C	Light Brown Silty Clay TP # 11 1.3-1.5m Maximum Dry Density 1.57 t/m ³ Optimum Moisture Content 23.8%	2.7×10^{-10}	1.49	22.3
S2310D	Light Brown Silty Clay TP # 13 2.5-3.0m Maximum Dry Density 1.59 t/m ³ Optimum Moisture Content 24.3%	2.1×10^{-09}	1.52	24.7
S2310E	Light Brown Silty Sandy Clay TP # 07 1.0-1.2m Maximum Dry Density 1.79 t/m ³ Optimum Moisture Content 14.8%	1.4×10^{-09}	1.71	16.2
S2310F	Brown Silty Clay TP # 08 0.5-0.7m Maximum Dry Density 1.41 t/m ³ Optimum Moisture Content 30.7%	1.2×10^{-10}	1.33	34.3

Note:

- 1 Launceston tap water used. Mean temperature 17^o C.
- 2 Specimen remoulded to a target density of 95% Standard Compaction.
- 3 Specimen saturated 4 days prior to test under a head equivalent to 1.5m.

Appendix D

Hydrology & Spillway Calculations



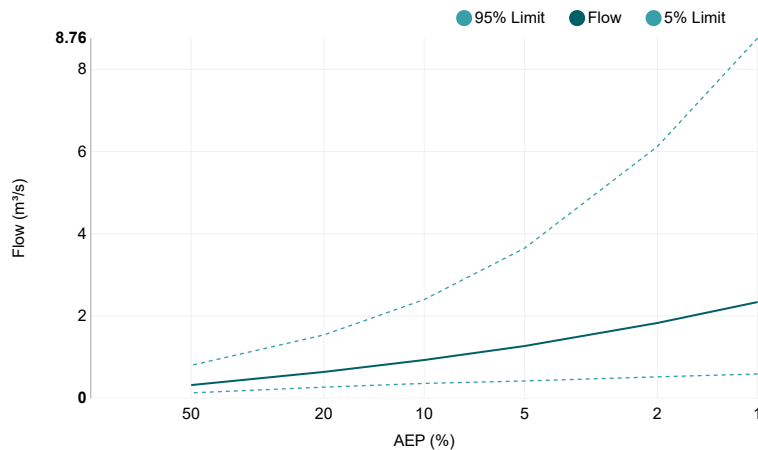
Sorell Council

Development Application: Development
Application - 106 Bream Creek Road, Bream
Creek - P1.pdf

Plans Reference:P1

Date Received:27/10/2025

Results | Regional Flood Frequency Estimation Model



AEP (%)	Discharge (m³/s)	Lower Confidence Limit (5%) (m³/s)	Upper Confidence Limit (95%) (m³/s)
50	0.320	0.130	0.800
20	0.640	0.270	1.54
10	0.930	0.360	2.40
5	1.27	0.420	3.65
2	1.83	0.520	6.12
1	2.34	0.590	8.76

Statistics

Variable	Value	Standard Dev
Mean	-1.230	0.553
Standard Dev	0.889	0.337
Skew	0.171	0.151

Note: These statistics come from the nearest gauged catchment. Details.

Correlation

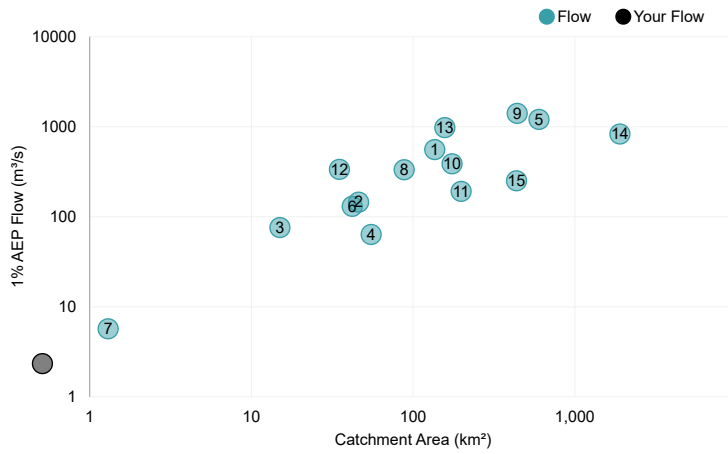
1.000		
-0.330	1.000	
0.150	-0.440	1.000

Note: These statistics are common to each region. Details.

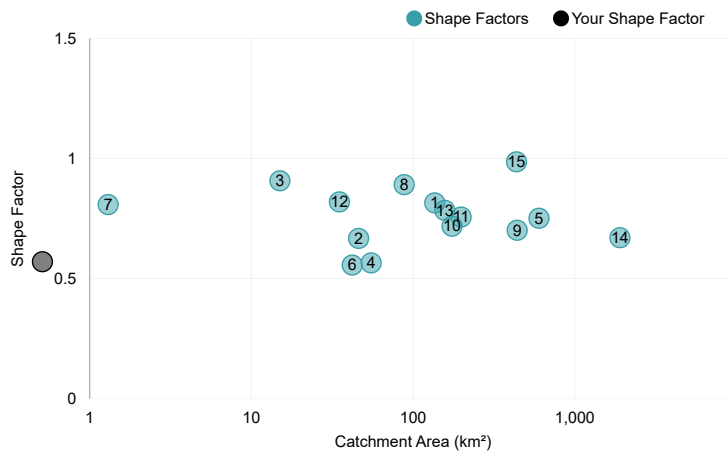
1% AEP Flow vs Catchment Area

**Sorell Council**

Development Application: Development
Application - 106 Bream Creek Road, Bream
Creek - P1.pdf
Plans Reference:P1
Date Received:27/10/2025



Shape Factor vs Catchment Area



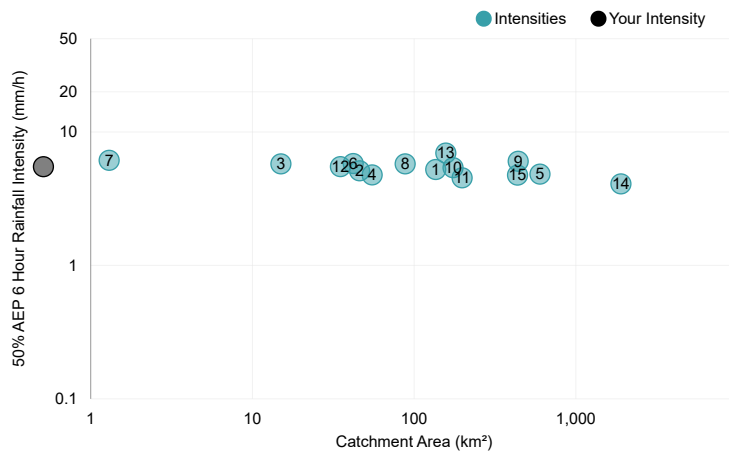
Intensity vs Catchment Area



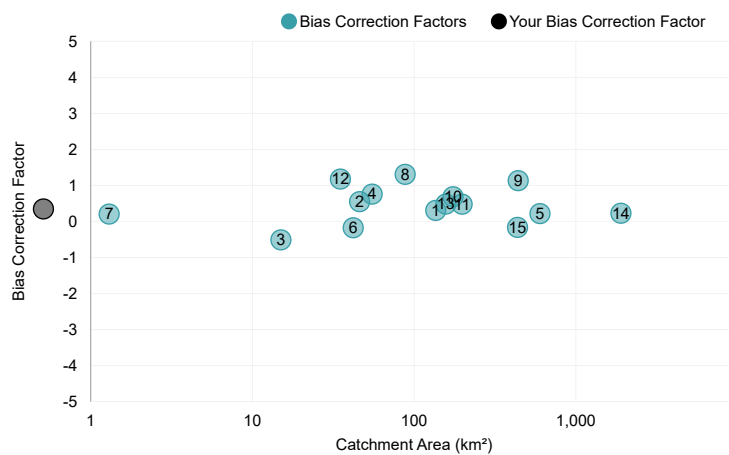
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Development Application: Development
 Application - 106 Bream Creek Road, Bream
 Creek - P1.pdf

Plans Reference: P1
 Date Received: 27/10/2025



Bias Correction Factor vs Catchment Area



Download

TXT

Nearby

JSON

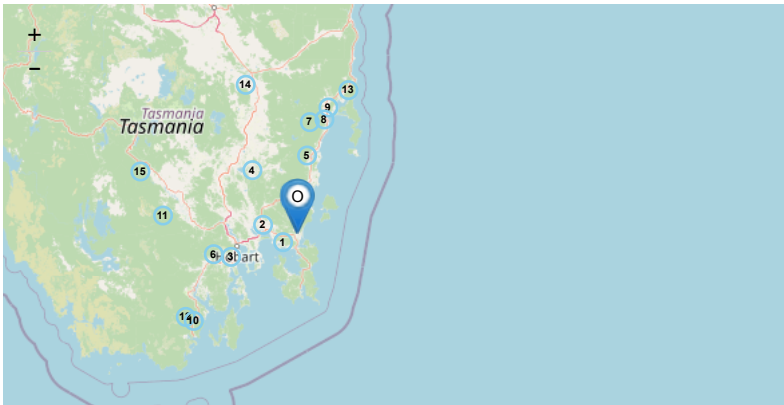
Input Data

**Sorell Council**

Development Application: Development
Application - 106 Bream Creek Road, Bream
Creek - P1.pdf
Plans Reference:P1
Date Received:27/10/2025

Input Data

Catchment Name	Catchment1
Latitude (Outlet)	-42.815
Longitude (Outlet)	147.831
Latitude (Centroid)	-42.815
Longitude (Centroid)	147.826
Catchment Area (km ²)	0.51
Distance to Nearest Gauged Catchment (km)	12.31
50% AEP 6 Hour Rainfall Intensity (mm/h)	5.492963
2% AEP 6 Hour Rainfall Intensity (mm/h)	11.337073
Rainfall Intensity Source (User/Auto)	Auto
Region	Tasmania
Region Version	RFFE Model 2016 v1
Region Source (User/Auto)	Auto
Shape Factor	0.57
Interpolation Method	Natural Neighbour
Bias Correction Value	0.348



Leaflet (<http://leafletjs.com>) | © OpenStreetMap (<http://osm.org/copyright>) contributors

Method by Dr Ataur Rahman and Dr Khaled Haddad from Western Sydney University for the Australian Rainfall and Runoff Project. Full description of the project can be found at the project page (<http://arr.gva.gov.au/revision-projects/project-list/projects/project-5>) on the ARR website. Send any questions regarding the method or project here (<mailto:admin@arr-software.org>).




Sorell Council

Development Application: Development
 Application - 106 Bream Creek Road, Bream
 Creek - P1.pdf
 Plans Reference:P1
 Date Received:27/10/2025

Spillway Calculation

Assessment Committee for Dam Construction

Client: Stroud Dairies

Site: 106 Bream Creek Road, Bream Creek
New effluent pond and solids trench

Annual Exceedance Probability (AEP)	100 years
Calculated Peak Flow Rate (From RFFE Model)	2.34 m ³ /s

Spillway Depth	1 m
Freeboard	0.4 m
Spillway Discharge Height	0.6 m
Broad Crested Weir Discharge Coefficient (from Fig 7-10 Ref 1)	0.385

Spillway Width using Eq7.2 Ref 1	3.0 m
----------------------------------	-------

Spillway Width (NRE) $L = Q / (1.704 \times H^{1.5})$	3.0 m
---	-------

Adopted Spillway Width	3.0 m
------------------------	-------

If spillway width is less than 3.0 m use minimum width of 3.0 m
“Notes and Specification for Dams Built of Earth Fill”,
Rivers and Water Supply Commission – June 1976

Ref 1: Hydraulic Engineering - Roberson J A, Cassidy J J & Chaudhry M H.
2nd Ed, 1998

Spillway Peak Discharge Velocity	1.30 m/s
----------------------------------	----------



Sorell Council

Development Application: Development
Application - 106 Bream Creek Road, Bream
Creek - P1.pdf

Plans Reference: P1

Date Received: 27/10/2025

Spillway Calculation	
Assessment Committee for Dam Construction	
Client: Stroud Dairies	
Site: 106 Bream Creek Road, Bream Creek Redeveloped existing effluent pond	
Annual Exceedance Probability (AEP)	100 years
Calculated Peak Flow Rate (From RFFE Model)	0.23 m ³ /s
Spillway Depth	0.5 m
Freeboard	0.25 m
Spillway Discharge Height	0.25 m
Broad Crested Weir Discharge Coefficient (from Fig 7-10 Ref 1)	0.385
Spillway Width using Eq7.2 Ref 1	1.1 m
Spillway Width (NRE) $L = Q/(1.704 \times H^{1.5})$	1.1 m
Adopted Spillway Width	3.0 m
If spillway width is less than 3.0 m use minimum width of 3.0 m “Notes and Specification for Dams Built of Earth Fill”, Rivers and Water Supply Commission – June 1976	
Ref 1: Hydraulic Engineering - Roberson J A, Cassidy J J & Chaudhry M H. 2nd Ed, 1998	
Spillway Peak Discharge Velocity	0.31 m/s

Appendix E

Certificate Forms

**Sorell Council**
Development Application: Development
Application - 106 Bream Creek Road, Bream
Creek - P1.pdf
Plans Reference:P1
Date Received:27/10/2025

CERTIFICATE OF QUALIFIED PERSON – ASSESSABLE ITEM

Section 321

To: Owner /Agent
 Address
 Suburb/postcode

Form **55**

Qualified person details:

Qualified person:
Address: Phone No:
 Fax No:
Licence No: Email address:

Qualifications and Insurance details: (description from Column 3 of the Director's Determination - Certificates by Qualified Persons for Assessable Items)

Speciality area of expertise: (description from Column 4 of the Director's Determination - Certificates by Qualified Persons for Assessable Items)

Details of work:

Address: Lot No:
 Certificate of title No:
The assessable item related to this certificate: (description of the assessable item being certified)
Assessable item includes –

- a material;
- a design
- a form of construction
- a document
- testing of a component, building system or plumbing system
- an inspection, or assessment, performed

Certificate details:

Certificate type: (description from Column 1 of Schedule 1 of the Director's Determination - Certificates by Qualified Persons for Assessable Items n)

This certificate is in relation to the above assessable item, at any stage, as part of - (tick one)

building work, plumbing work or plumbing installation or demolition work: ☐

or

a building, temporary structure or plumbing installation: ☒



In issuing this certificate the following matters are relevant –

Documents:	Geoton Pty Ltd, Report Reference No. GL24627Ab, dated 10/02/2025
Relevant calculations:	Refer to report
References:	AS 2870 – 2011 Residential Slabs and Footings Construction AS 4055 – 2021 Wind Loads for Housing CSIRO Building Technical File 18

Substance of Certificate: (what it is that is being certified)

Site Classification in accordance with AS2870 - 2011
Wind Loading in accordance with AS 4055 - 2021
Findings and recommendations of report

Scope and/or Limitations

The classification applies to the site as investigated at the time and does not account for any future alteration to foundation conditions resulting from earthworks, drainage condition changes or site maintenance variations.



I certify the matters described in this certificate.

	<i>Signed:</i>	<i>Certificate No:</i>	<i>Date:</i>
Qualified person:		GL24627Ab	10/02/2025