WARATAH WYNYARD COUNCIL

Enquiries: Development & Regulatory Services
Phone: 03 6443 8333 – Option 3
Our Ref: 9495708 & PSA 1/2024 and SD 2191

27 August 2026

Attn: Dan Ford
Tasmanian Planning Commission
GPO Box 1691
HOBART TAS 7001

Dear Mr Ford,

Re: Tasmanian Planning Scheme - Waratah Wynyard
Draft Amendment PSA 1-2024 and Permit SD 2191

1. Tasmanian Planning Policies

A coordinated joint submission demonstrating how the proposal satisfies the Tasmanian Planning Policies (TPPs) in included as an attachment to this letter.

2. Cultural Heritage

Council's Project Engineer – Environment, Mr Rowan Sharman, has confirmed that an Aboriginal Heritage assessment was undertaken as part of Council's Inglis River Walking Track Project 5 (Golf Links Road). During the Project specific desktop assessment, no artefacts or cultural heritage values were identified, with both registered sites and recorded sites well outside the vicinity of the works area along Golf Links Road. Council's works contract included compliance with standard AHT Unanticipated Discovery Plan requirements however no discoveries were made during the construction process.

3. Hazard Code Reporting

Flood-Prone Areas Hazard Code:

The code applies only to blue area on the below aerial image (from LISTmap) which is within the yellow boundaries of the site but which is not covered by the coastal inundation area (shaded green). Areas covered in green are exempt from this code per C12.2.5 of the *Tasmanian Planning Scheme – Waratah-Wynyard* (TPS).

- Regarding C12.7.1 – Road Lot 101 is the only lot within a mapped flood-prone hazard area and is required for use by Council as part of the road reserve for Golf Links Road. Acceptable Solution A1(c) is therefore met.
- Regarding C12.6.1 – some works associated with the application (namely the installation of the shared crossover for Lot 6, 7 & 8 and associated ancillary works) is likely to be within the small section of flood prone hazard area not excluded by C12.2.5, however these works where they overlap with mapped flood-prone land will not extend more than 3m outside the existing road reserve. Each facet of these works will therefore be exempt from planning overall under one or more of Clauses 4.2.2, 4.2.4 and 4.2.5 of the TPS.

No flood hazard report is required.

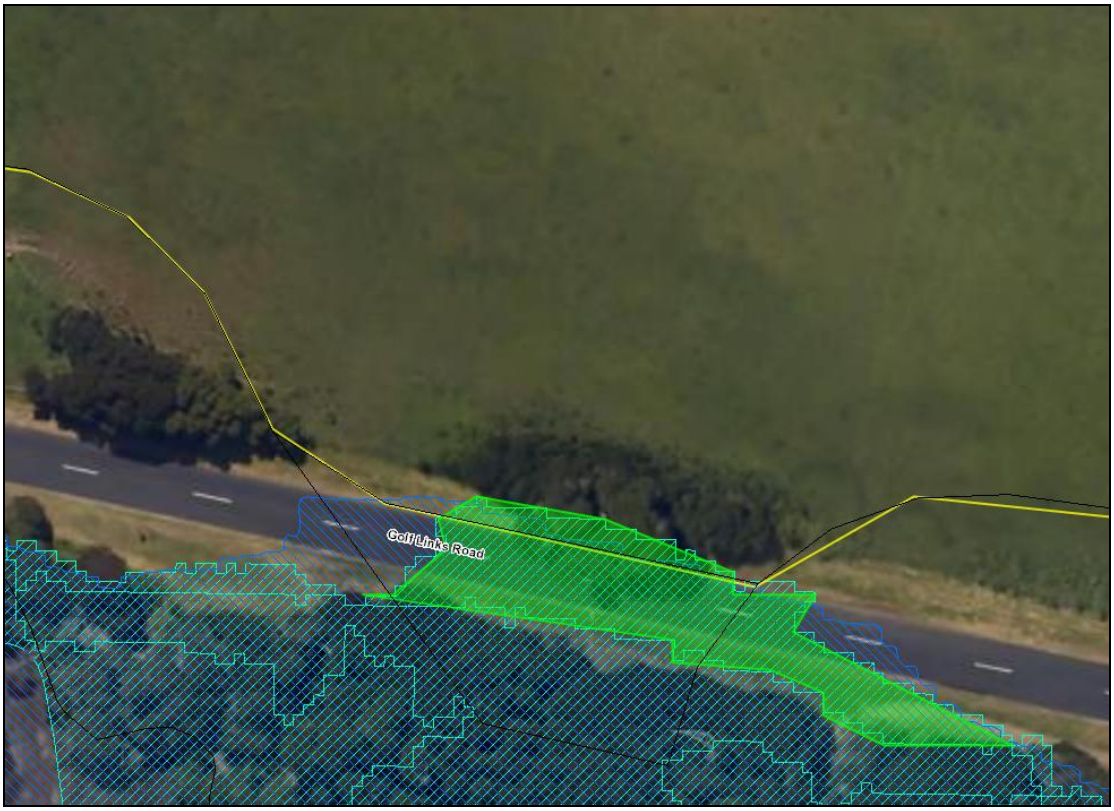


Figure 1: Flood hazard and coastal inundation overlay mapping, source: LISTmap

Coastal Inundation Hazard Code:

The code applies to the green shaded area on the below aerial image which is within the yellow boundaries of the site. As with the flood-prone areas hazard code, the nature of works which will be undertaken within the small green shaded area mean they are eligible for exemption under one or more of Clauses 4.2.2, 4.2.4 and 4.2.5 of the TPS. Also similar to the flood-prone areas hazard code, Acceptable Solution A1(c) is met for the subdivision clause – C11.7.1.

No coastal inundation hazard report is required.

Coastal Erosion Hazard Code:

Per Clause 6.2.6 of the TPS, subdivision does not need to be categorised into a use class. Should the works associated with the subdivision, in this case the internal road for Lots 1, 2 & 3, be considered 'residential use', no use standards will apply as the subdivision will be occurring on low density residential land i.e. an urban zone per Table C10.3.1, as opposed to the current non-urban (Agriculture) zone.

A small section of proposed Lot 3 is subject to a mapped coastal erosion hazard investigation area however no development required to be associated with a use category occurs in this area.

No use standards for the Coastal Erosion Hazard Code apply to the proposal.

Regarding C10.6.1 - Development Standards for Buildings and Works, P1.1 and P1.2 need to be addressed for the internal road only. Sewerage and stormwater infrastructure would be considered 'minor utilities' and therefore exempt from the code per C10.4.1(d)(v). Lots 1, 2 and

3 cannot meet Acceptable Solution A1(a) for Clause C10.7.1 and must be assessed against P1 for this standard.

An amended report from Geoton Pty Ltd was provided to Council on 13 August 2026 and is included as an attachment to this letter. An assessment against the relevant provisions of the Coastal Hazard zone is provided below.

C10.6.1 Buildings and works, excluding coastal protection works, within a coastal erosion hazard area

A1 No Acceptable Solution.	**P1.1** Buildings and works, excluding coastal protection works, within a coastal erosion hazard area must have a tolerable risk, having regard to: (a) whether any increase in the level of risk from coastal erosion requires any specific hazard reduction or protection measures; (b) any advice from a State authority, regulated entity or a council; and (c) the advice contained in a coastal erosion hazard report. **P1.2** A coastal erosion hazard report demonstrates that: (a) the building and works: (i) do not cause or contribute to any coastal erosion on the site, on adjacent land or public infrastructure; and (ii) can achieve and maintain a tolerable risk from a coastal erosion event in 2100 for the intended life of the use without requiring any specific coastal erosion protection works; (b) buildings and works are not located on actively mobile landforms, unless for engineering or remediation works to protect land, property and human life.
Planning Comments: Complies A geotechnical site investigation and associated report was submitted with the application documents. An amended report was prepared on 12 August 2026 and provided to Council on 13 August 2026. The amended report included an assessment of coastal erosion hazard for the proposed subdivision prepared by Anne Foster of GeoTon Pty Ltd. Ms Foster is an engineering geologist and is a suitably qualified person to undertake a coastal erosion hazard report. The report states that Golf Links Road, located between the subject site and the bank of	

the Inglis River, provides an artificial recession limit. The road is a council maintained asset and provides the only means of access to the Fossil Bluff General Residential area and Wynyard Golf Course. It is considered by Ms Foster to be a Resilient Artificial Shoreline likely to be to resist coastal erosion for more than 10 years, and/or to be maintained and repaired as necessary to continue resisting erosion. The report concludes that, on the basis of modelled generic coastal erosion setbacks and natural recession limits and the resilient artificial shoreline provided by Golf Links Road, the site can be considered to have an acceptable level of risk in terms of erosion susceptibility and consequently is not vulnerable to coastal erosion by 2100. The effective reclassification of the site in terms of real risk as 'acceptable' means that development within the mapped classified area can achieve tolerable risk. No hazard reduction or protection measures, or coastal protection works, are proposed or warranted. The works will not affect Golf Links Road, which serves as the artificial recession limit. The works will not contribute to coastal erosion on the site, adjacent land or public infrastructure. In this manner, the proposal satisfies both P1.1 and P1.2 for this Standard.

C10.7.1 Subdivision within a coastal erosion hazard area

A1	**P1**
Each lot, or a lot proposed in a plan of subdivision, within a coastal erosion hazard area, must: (a) be able to contain a building area, vehicle access, and services, that are wholly located outside a coastal erosion hazard area; (b) be for the creation of separate lots for existing buildings; (c) be required for public use by the Crown, a council or a State authority; or (d) be required for the provision of Utilities, and not be located on an actively mobile landform.	Each lot, or a lot proposed in a plan of subdivision, within a coastal erosion hazard area must not create an opportunity for use or development that cannot achieve and maintain a tolerable risk from coastal erosion, having regard to: (a) any increase in risk from coastal erosion for adjacent land; (b) the level of risk to use or development arising from an increased reliance on public infrastructure; the need to minimise future remediation works; (c) any loss or substantial compromise, by coastal erosion, of access to the lot on or off site; (d) the need to locate building areas outside the coastal erosion hazard area; (e) any advice from a State authority, regulated entity or a council; and (f) the advice contained in a coastal erosion hazard report, and works must not be located on actively mobile landforms unless for engineering or remediation works to protect land, property and human life.
Planning Comments: Complies	

A geotechnical site investigation and associated report was submitted with the application documents. An amended report was prepared on 12 August 2026 and provided to Council on 13 August 2026. The amended report included an assessment of coastal erosion hazard for the proposed subdivision prepared by Anne Foster of GeoTon Pty Ltd. Ms Foster is an engineering geologist and is a suitably qualified person to undertake a coastal erosion hazard report.

The report states that Golf Links Road, located between the subject site and the bank of the Inglis River, provides an artificial recession limit. The road is a council maintained asset and provides the only means of access to the Fossil Bluff General Residential area and Wynyard Golf Course. It is considered by Ms Foster to be a Resilient Artificial Shoreline likely to be to resist coastal erosion for more than 10 years, and/or to be maintained and repaired as necessary to continue resisting erosion.

The report concludes that, on the basis of modelled generic coastal erosion setbacks and natural recession limits and the resilient artificial shoreline provided by Golf Links Road, the site can be considered to have an acceptable level of risk in terms of erosion susceptibility and consequently is not vulnerable to coastal erosion by 2100.

The effective reclassification of the site in terms of real risk as 'acceptable' means that any use or development occurring within the confines of the lots mapped as being partially within a coastal erosion hazard band will be able to achieve and maintain a tolerable risk from coastal erosion, thereby satisfying P1 for this Standard.

4. Geoton Assessment

Page 42 of the amended report from Geoton Pty Ltd states that:

"Due to the size of proposed Lots 11 and 12 (i.e., 3,427m² and 3658m2), careful planning will be required to ensure that any proposed buildings do not significantly reduce the area available for the disposal of on-site wastewater. Dwellings within proposed Lots 11 and 12 shall be restricted to a maximum of 4 bedrooms"

The wording of permit condition 31 of the amended permit tendered at the hearing is to be revised to remove prohibition of a shed on Lot 12 from the Part V agreement. The restriction of dwellings on Lots 11 and 12 to four bedrooms is to be retained.

Yours faithfully

[redacted]

Alison Harriss
ACTING MANAGER DEVELOPMENT & REGULATORY SERVICES

Tasmanian Planning Policies

Applicable Tasmanian Planning Policies themes relevant to the draft amendment are as follows-

1.0 - Settlement	
1.1 - Growth	
Application	Applicable as the existing settlement along Golf Links Road is within the town boundary and was identified as having potential for future settlement growth through the Liveable Waratah-Wynyard Settlement Strategy.
Objective	Achieves the Objective to plan for settlement growth to meet the existing and future needs of the community in a sustainable pattern of development.
Strategies	Achieves the Strategies by: • assisting in delivering at least a 15 year regional supply of land that is available. • planning for growth by intensification of underutilised land within an existing settlement. • prioritise the development of land that maximises the use of available capacity within existing physical and social infrastructure networks and services.
1.2 - Liveability	
Application	Not applicable as proposes a rural residential settlement.
1.3 - Social infrastructure	
Application	Not applicable as proposes a rural residential settlement.
1.4 - Settlement types	
Application	Applicable as the existing settlement along Golf Links Road is within the town boundary and was identified as having potential for future settlement growth through the Liveable Waratah-Wynyard Settlement Strategy.
Objective	Achieves the Objective to plan for the sustainable use and development of settlements.

Strategies	Achieves the Strategies by: • land within the draft settlement boundary to ensure that growth is directed to existing settlement areas and prevents linear development along the coast. • the amount of land being allocated to rural residential use and development is minimal and does not constitute a significant increase in the immediate vicinity. • the land is not identified for future development at urban densities and does not have the potential to reach future development urban densities. • the growth opportunity maximises the efficiency of existing services and physical infrastructure. • due to the existing built form, the potential for land use conflict has been reduced.
1.5 - Housing	
Application	Applicable as the existing settlement along Golf Links Road is within the town boundary and was identified as having potential for future settlement growth through the Liveable Waratah-Wynyard Settlement Strategy.
Objective	Achieves the Objective to provide for sufficient supply of diverse housing stock that is well located and well serviced to meet the existing and future needs of Tasmanians.
Strategies	Achieves the Strategies by: • provides timely supply of land for housing in a location that can be easily connected to existing services. • Supply land for housing to assist in meeting the projected housing demand.
1.6 - Design	
Application	Not applicable as not an existing or proposed urban space.
1.7 - Development contributions	
Application	Applicable to existing and new areas of settlement growth.
Objective	Achieves the Objective to support equitable sharing of costs between developers and the wider community.

Strategies	Achieves the Strategies by: • Requiring a public open space contribution equivalent to five percent (5%) of the value of the new lots to be paid to Council.
2.0 - Environmental Values	
2.1 - Biodiversity	
Application	Applicable statewide.
Objective	Achieves the Objective to contribute to the protection and conservation of Tasmania's biodiversity.
Strategies	Achieves the Strategies by: • priority vegetation overlay is applicable to the site, with no vegetation removal proposed, promoting use and development to be located, design and sited to avoid impacts on biodiversity values. • Promotes use and development of land that prevents or minimises the spread of environmental weeds and disease.
2.2 - Waterways, wetlands and estuaries	
Application	Applicable statewide.
Objective	Achieves the Objective to protect and improves the quality of Tasmania's waterways, wetlands and estuaries.
Strategies	Achieves the Strategies by: • protecting the waterway and coastal protection area identified in the western portion of the site. There is no development proposed in this protection area. • the development which is located on land in, or around a waterway will avoid clearing of native vegetation; avoids land disturbance; and will not avoid stormwater entering the water as it must be retained and managed on the development site(s).
2.3 - Geodiversity	
Application	Applicable statewide.

Objective	Not applicable as the site does not contain high conservation value geodiversity.
Strategies	Not applicable as the site does not contain high conservation value geodiversity.
2.4 – Landscape values	
Application	Applicable statewide.
Objective	Not applicable as the site does not contain any significant cultural, ecological, geological landscapes, scenic area or scenic corridors.
Strategies	Not applicable as the site does not contain any significant cultural, ecological, geological landscapes, scenic area or scenic corridors.
2.5 – Coasts	
Application	Applicable as the site is within 1km inland from the high-water mark.
Objective	Achieves the Objective to promote the protection, conservation and management of natural coastal values.
Strategies	Achieves the Strategies by: • the proposed site is physically buffered by Golf Links Road, the road reservation either side and substantial established vegetation belt on the southern side of Golf Links Road.
3.0 - Environmental Hazards	
3.1 – Bushfire	
Application	Applicable statewide.
Objective	Achieves the Objective to prioritise the protection of human life and to support the resilience of settlements and communities by reducing the potential impacts of bushfire on life, property and infrastructure.
Strategies	Achieves the Strategies by: • the site is identified and mapped as land that is exposed

	to bushfire hazards. • a bushfire hazard report has been prepared in support of the subdivision associated with the proposed rezoning of the site to ensure protection of human life from harm caused by bushfire.
3.2 – Landslip	
Application	Applicable statewide.
Objective	Achieves the Objective to reduce the risk of harm to human life, property and infrastructure from the adverse impacts of landslip hazards.
Strategies	Achieves the Strategies by: • the site is identified and mapped as land that is exposed to risk of landslip. • a landslip hazard report has been prepared in support of the subdivision associated with the proposed rezoning of the site which states that tolerable level of risk from landslip can be achieved for the site.
3.3 – Flooding	
Application	Applicable statewide.
Objective	Achieves the Objective to minimise the impact of flood hazards that have the potential to cause harm to human life, property and infrastructure and to reduce the cost to the community as a result of flood events.
Strategies	Achieves the Strategies by: • the site is identified and mapped as land that is vulnerable to flooding. • the subdivision associated with the proposed rezoning of the site meets the applicable requirements for not requiring a specific flood hazard report.
3.4 – Coastal hazards	
Application	Applicable as the site is within 1km inland from the high-water mark.
Objective	Achieves the Objective to minimise the risks associated with

	coastal erosion and coastal inundation caused by climate change induced sea level rise by incorporating avoidance, mitigation and adaptation strategies into land use planning to reduce the harm to human life, property and infrastructure.
Strategies	Achieves the Strategies by: • the site is identified and mapped as land that is vulnerable to both coastal inundation and coastal erosion. • the subdivision associated with the proposed rezoning of the site meets the applicable requirements for not requiring a coastal inundation report. • on the basis of modelled generic coastal erosion setbacks and natural recession limits and the resilient artificial shoreline provided by Golf Links Road, the site is considered to have an acceptable level of risk in terms of erosion susceptibility and consequently is not vulnerable to coastal erosion by 2100.
3.5 – Contaminated air and land	
Application	Applicable statewide.
Objective	Not applicable as there have not been any potentially contaminating activities on the site.
Strategies	Not applicable as there have not been any potentially contaminating activities on the site.
4.0 - Sustainable Economic Development	
4.1 – Agriculture	
Application	Applicable statewide.
Objective	The Objective is to promote a diverse and highly productive agricultural sector by protecting agricultural land and the resources on which agriculture depends, while supporting the long-term viability and growth of the agricultural sector. The proposal is somewhat at odds with this Objective in that it seeks to rezone agricultural land for residential purposes. However, agricultural assessment of this land has identified a range of significant constraints and restrictions associated with the site which severely limits current and future

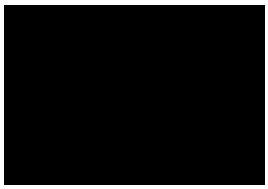
	agricultural land use potential.
Strategies	The application partially achieve some of the Strategies by: • Identifying the potential of the agricultural land through a detailed site specific agricultural assessment that identifies a range of significant constraints. • The land does not have significant agricultural capabilities and is not within an irrigation district. • The land is incapable of supporting meaningful agricultural use in accordance with the findings of the agriculture assessment. • The land is already constrained by establish residential zoning to the east and west. Were the land to be rezoned and developed in the manner proposed, the area fettered by future sensitive use overlaps with existing fettering from established single dwellings along. The potential for increase in constraint beyond that which already existing is negligible and does not extend further into the Agriculture zone north of the site. • The scale of conversion is minor in terms of the local Fossil Bluff/Table Cape area.
4.2 – Timber production	
Application	Applicable statewide.
Objective	Not applicable as it does not include timber production or land used/suited for timber production.
Strategies	Not applicable as it does not include timber production or land used/suited for timber production.
4.3 – Extractive industry	
Application	Applicable statewide.
Objective	Not applicable as it does not include extractive industry or land used/suited for extractive industry.
Strategies	Not applicable as it does not include extractive industry or land used/suited for extractive industry.
4.4 – Tourism	

Application	Applicable statewide.
Objective	Not applicable as there is no impact on the State's tourism industry.
Strategies	Not applicable as there is no impact on the State's tourism industry.
4.5 – Renewable energy	
Application	Applicable statewide.
Objective	Not applicable as there is no impact on land strategically identified for future renewable energy use.
Strategies	Not applicable as there is no impact on land strategically identified for future renewable energy use.
4.6 – Industry	
Application	Applicable statewide.
Objective	Not applicable as there is no impact on the State's industrial land supply.
Strategies	Not applicable as there is no impact on the State's industrial land supply.
4.7 – Business and commercial	
Application	Applicable statewide.
Objective	Not applicable as there is no involvement with land used/suited to business and commercial activities.
Strategies	Not applicable as there is no involvement with land used/suited to business and commercial activities.
4.8 – Innovation and research	
Application	Applicable statewide.
Objective	Not applicable as there is no involvement with land used/suited for innovation and research.
Strategies	Not applicable as there is no involvement with land

	used/suited for innovation and research.
5.0 - Physical Infrastructure	
5.1 – Provision of services	
Application	Applicable statewide.
Objective	Achieves the Objective to promote the efficient, effective, sustainable and safe delivery of services.
Strategies	Achieves the Strategies by: • the site is proposed to be developed at a density that supports the servicing infrastructure in place. • there is capacity within existing infrastructure to deliver reticulated water to each lot with the majority also serviced by reticulated sewer. • it promotes the coordinated and efficient use of existing physical infrastructure. • encourages the connection for the new lot to have telecommunication services. • Lots unable to be serviced by reticulated sewer are capable of providing for onsite wastewater disposal.
5.2 – Energy infrastructure	
Application	Applicable statewide.
Objective	Not applicable as there is no impact on electricity infrastructure.
Strategies	Not applicable as there is no impact on electricity infrastructure.
5.3 – Roads	
Application	Applicable statewide.
Objective	Not applicable as it does not include any new road.
Strategies	Not applicable as it does not include any new road.
5.4 – Passenger transport modes	

Application	Applicable statewide.
Objective	Achieves the Objective to support a safe, reliable efficient and accessible passenger transport system.
Strategies	Achieves the Strategies by: • the subdivision is within an area that encourages walking and cycling, with existing links to walking and cycling tracks in the area.
5.5 – Ports and strategic transport networks	
Application	Applicable statewide.
Objective	Not applicable as there is no impact on the freight system.
Strategies	Not applicable as there is no impact on the freight system.
6.0 – Cultural Heritage	
6.1 – Aboriginal cultural heritage	
Application	Applicable statewide.
Objective	Not applicable as Aboriginal Heritage assessments undertaken in the area have not identified any cultural heritage values. Recent works were undertaken on adjacent land, and no unanticipated discoveries were made during the construction process.
Strategies	Not applicable as Aboriginal Heritage assessments undertaken in the area have not identified any cultural heritage values. Recent works were undertaken on adjacent land, and no unanticipated discoveries were made during the construction process.
6.2 – Historic cultural heritage	
Application	Applicable statewide.
Objective	Not applicable as it does not include any places listed on State, National and world heritage registers.
Strategies	Not applicable as it does not include any places listed on

	State, National and world heritage registers.
7.0 – Planning Processes	
7.1 – Public Engagement	
Application	Applicable statewide.
Objective	Achieves the Objective to improve and promote public engagement processes to provide for the community's needs, expectations and values to be identified and considered in land use planning.
Strategies	Achieves the Strategies by: • the application process promotes public engagement through the statutory public exhibition process. • the application process promotes public engagement through any subsequent hearing to be held through the statutory process.
7.2 – Strategic Planning	
Application	Applicable statewide.
Objective	Achieves the Objective to encourage the strategic consideration of land use planning issues by promoting integrated and coordinated responses that balance competing social, economic, environmental and inter-generational interests to provide for the long-term sustainable use and development of land.
Strategies	Achieves the Strategies by: • the planning scheme amendment process supports the application of the precautionary principle where the implications of planning decisions on the environment, now and into the future, is not fully known or understood. • The planning scheme amendment process supports the use of scientific-based evidence to make decisions

Prepared by:	**Reviewed:**
 Jasmin Briggs **Town Planner – Waratah Wynyard Council**	Allan Brooks obo applicant  **Senior Planner – PDA Surveyors**

PLANNING PERMIT (DISCRETIONARY)

Permit Number	**SD 2191**
Applicant Name	**PDA Surveyors**
Property Number	**PID 2758376 & PID 2758413**
Property Address	**LOT 2 GOLF LINKS ROAD (CT 148923/2) & 8 INGLISDALE DRIVE WYNYARD**

Pursuant to a decision of Council, in accordance with Section 51 and Section 57 of the *Land Use Planning and Approvals Act 1993* and the *Tasmanian Planning Scheme - Waratah-Wynyard* grant approval for a 12 Lot Subdivision at Lot 2 Golf Links Road (CT 148923/2) & 8 Inglisdale Drive WYNYARD and Council Footway (CT142423/33) subject to the following conditions: -

PART A CONDITIONS:

(1) The development is to be substantially in accordance with the application as submitted and endorsed documents as listed:

a. Subdivision plans with Job Number 49895AB-PA-05 Revision B as prepared by PDA Surveyors, Engineers and Planners and dated 25 November 2025.

Noting: Sealed accesses not to exceed 15°

b. Subdivision plans with Job Number 49895-C-CP1 through CP12 inclusive as prepared by PDA Surveyors, Engineers and Planners and dated 10 December 2025.

c. Bushfire Hazard Assessment Report and Bushfire Hazard Management Plan – Lot 2 Golf Links Road, Wynyard, Job Number RGA-B2345 Version 3 by Rebecca Green and Associates and dated 17 December 2025.

d. Recommendations contained on page 34 of the Traffic Impact Assessment – Lot 2 Golf Links Road, Wynyard by Traffic and Civil Services and dated December 2025.

e. Geotechnical investigation, karst assessment and landslide risk assessment, Project No. GL24537Ab_Rev1 by Geoton Pty Ltd and dated 10 July 2025.

(2) Stormwater from the development is to be connected and discharged into Council's stormwater drainage network in accordance with the *Urban Drainage Act 2013*.

(3) All costs associated with the proposed development including those related to infrastructure extensions or upgrades to Council assets are to be met by the Developer.

(4) Relevant engineering plans, specifications, calculations, and computations are to be prepared or certified by a Chartered Professional Engineer and submitted to the Director Infrastructure & Development Services for approval. No work is to commence until a Construction Certificate has been issued by the Director Infrastructure & Development Services.

(5) Construction of civil engineering work associated with the development is to comply with the requirements of Council's Policy PR003 – Standard requirements for the construction of new infrastructure assets and the replacement of existing infrastructure assets.

(6) On completion of work covered by a Construction Certificate a Chartered Professional Engineer is to certify by declaration that all work has been carried out fully in accordance with the approved plans, specifications, calculations and computations. "Works as Constructed" drawings that comply with the requirements of Council's "Submission of digital-as-constructed information" template are to be supplied.

(7) Before sealing of the Final Plan, the northern portion of proposed Lot 12 is to be built up by the placement of granular fill to a minimum 9m AHD and a drain be constructed near the northern site boundary to capture stormwater runoff in accordance with the requirements of part 10.3 of the Geotechnical investigation, karst assessment and landslide risk assessment, Project No. GL24537Ab_Rev1 by Geoton Pty Ltd and dated 10 July 2025.

(8) In the course of undertaking the development/use there is to be no damage caused to any Council owned infrastructure or property.

(9) A Final Survey Plan submitted for sealing by the Council is to show all easements required for powerlines, sewerage, water, drainage purposes and legal access.

(10) A twelve (12) month maintenance period is to apply to all works within the development which are to become Council infrastructure.

(11) A maintenance bond of 5% of the cost of the civil works as approved by the Director Infrastructure & Development Services is to be lodged with Council prior to:

a. the issue of the Maintenance Period Commencement document; or

b. prior to the sealing of the Final Survey Plan.

(12) Before sealing of the Final Plan, all disturbed surfaces on the land except those set aside for roadways, footways and driveways are to be covered with topsoil and seeded and, where appropriate, re-vegetated and stabilized to the reasonable requirements of the Director Infrastructure & Development Services.

(13) If the development requires work within a road reservation of Golf Links Road, the applicant is to obtain from Council a "Activity in Road Reservation Permit" before any site work commences. The Permit conditions may require lodgement of a bond as surety against damage to Council's infrastructure.

(14) A property access is to be constructed for each right of way, in accordance with Tasmanian Standard Drawing TSD-R03-v3, Rural Roads Typical Property Access, and the conditions in a "Activity in Road Reservation Permit".

(15) A sealed driveway entrance is to be constructed for each right of way, between the edge of the seal and the property boundary in accordance with Tasmanian Standard Drawing TSD-R03-v3, Rural Roads Typical Property Access,

(16) A driveway with a sealed surface is to be constructed for lots 1, 2, 3, 4, 5, 6,7, 8 and 12 from the edge of the bitumen surfaced pavement of the right of way to the property boundary in accordance with Tasmanian Standard Drawing TSD-R03-v3, Rural Roads Typical Property Access & TSD-R04-v3, Rural Roads Typical Driveway Profile and the

conditions in a “Activity in Road Reservation Permit”.

(17) All new vehicular accesses are to be located in accordance with Tasmanian Standard Drawing TSD-RF01-v3, Guide to Intersection and Domestic Access Sight Distance Requirements and be approved by the Director Infrastructure & Development Services.

(18) Property access, including shared internal driveways, are to comply with the requirements of the submitted Bushfire Hazard Assessment Report and Bushfire Hazard Management Plan – Lot 2 Golf Links Road, Wynyard, Job Number RGA-B2345 Version 3 by Rebecca Green and Associates and dated 17 December 2025 and are to be constructed prior to the to the sealing of the Final Survey Plan.

(19) A reticulated stormwater drainage system is to be provided with individual lot connections, road drainage and method of discharge in accordance with the reasonable requirements of the Director Infrastructure & Development Services. The design return interval for the reticulation network is to be 1 in 10-year ARI for property only, 1 in 20 Year ARI for road drainage and provision is to be made to contain a 1 in 100-year ARI major overland flow-path.

(20) A new 150Ø stormwater connection point including an accessible inspection opening at ground level is to be constructed at the lowest point of lots 1 to 8 and 11 -12, to permit connection to Council’s stormwater drainage reticulation network. The connection point is to be inspected and approved by the Director Infrastructure & Development Services before backfilling.

(21) Before site disturbance or construction commences an environmental management plan is to be prepared and submitted for approval by the Director Infrastructure & Development Services. The plan is to outline proposed practices in relation to:

a. Temporary run-off and erosion controls, which are to be installed before the development commences. Controls are to include, but are not limited to:

i. Minimisation of site disturbance and vegetation removal.

ii. Diversion of up-slope run-off around cleared and/or disturbed areas, areas to be cleared and/or disturbed or filled providing such diverted run-off does not cause erosion and is directed to a legal discharge point.

iii. Installation of sediment retention traps (e.g. sediment fences, etc.) at the down slope perimeter of a disturbed area or stockpile to prevent unwanted sediment and other debris escaping from the land.

iv. Rehabilitation of all disturbed areas as soon as possible.

b. Weed management.

c. Storage facilities for fuels, oils, greases, chemicals, and the like

d. Litter management.

(22) Erosion and sediment control measures that meet the reasonable requirements of the Director Infrastructure & Development Services are to be implemented and maintained during the course of development to minimise downstream sediment transfer, particularly with respect to watercourses, stormwater outlets and disturbed ground.

(23) Vehicular access during development is to be confined to the areas designated on the endorsed or approved plans.

(24) Erosion control measures are to be maintained at full operational capacity until the land is effectively rehabilitated and stabilised after completion of the development.

(25) Underground/overhead power is to be provided to each lot in the development in accordance with the requirements of TasNetworks and LGAT - Tasmanian Standard Drawings and Specifications.

(26) Before site disturbance or construction commences, a plan of management is to be prepared and submitted for approval by the Director Infrastructure & Development Services. The plan is to provide relevant project management information and outline proposed construction practices, including, but not limited to:

a. Contact details for principal, consultants and contractors including after-hours numbers;

b. Traffic management plan including road works signage;

c. Proposed hours of work (including volume and timing of heavy vehicles entering and leaving the site, and works undertaken on site);

d. Identification of potentially noisy construction phases, such as operation of rock-breakers, explosives or pile drivers, and proposed means to minimise impact on the amenity of neighbouring buildings;

e. Site facilities to be provided; and

f. Procedures for washing down vehicles to prevent soil and debris being carried onto the street.

(27) Prior to sealing the Final Plan of Survey, the developer must complete all infrastructure services works and provide the Council with evidence of completed works, including as-constructed drawings, to the satisfaction of the Director Infrastructure and Development Services or their delegate or delegated representative.

(28) Road Lots 101 and 102 must be transferred to Council for a nominal sum of $1.00 and must be accompanied by a Memorandum of Transfer to Waratah-Wynyard Council, all documentation in relation to discharges of any Mortgages, withdrawal of caveats, and all other relevant registrable dealings. This Transfer must be executed by the vendor, identifying the lot(s) to be transferred. The landowner is responsible for all Lands Titles Office fees and charges and duty in relation to the documentation to be lodged with the Land Titles Office.

(29) Before a final survey plan may be sealed, the developer is to provide a contribution in lieu of providing public open space in the development. The contribution is to be equivalent to five percent (5%) of the value of the new lots that are zoned Low Density Residential and the principles of the Waratah Wynyard Council Public Open Space Contribution Policy adhered to in the application of this provision.

(30) The developer is to seek a private land valuation of the new lots that are zoned Low Density Residential. A copy of the valuation is to be submitted to Council before or at the time of payment of the public open space contribution.

(31) Prior to sealing of the Final Plan of Survey, a Part V Agreement under Section 71 of the *Land Use Planning and Approvals Act 1993* is to be registered on the land for Lots 11 and 12 restricting future residential development to four bedrooms.

PART B CONDITION:

(1) The person responsible for the activity must comply with the conditions contained in Schedule 2 of Permit Part B which the Regulated Entity (trading as TasWater) has required the planning authority to include in the permit, pursuant to *section 56Q* of the *Water and Sewerage Industry Act 2008*, reference TWDA 2024/00419-WWC (attached).

Notes: -

The following is provided for information only and does not constitute condition(s) of permit.

- An “Activity in Road Reservation” permit must be obtained from Council for all activity within the Road Reservation.
- This project must be substantially commenced within two years of the issue of this permit.
- The applicant is advised to consult with a building surveyor to ensure the development is constructed in accordance with *Building Act 2016.*
- This permit is based on information and particulars set out in Development Application SD 2191. Any variation requires an application for further planning approval of Council.
- This development/use is not to result in the generation of environmental harm or nuisance as defined in the *Environmental Management and Pollution Control Act 1994.*
- Attention is drawn to existing or proposed electricity infrastructure. Please be sure to contact TasNetworks on 1300 137 008 to ensure these works do not impede on existing electricity easements and are at a safe distance from powerlines. Failure to do so could result in the relocation of electricity assets at your cost.
- A further fee is required for the signing and sealing of Final and Strata Plans. Please refer to Council’s website for current Planning fees.
- Prior to Sealing of the Final Plan of Survey, the developer must obtain a Consent to Register a Legal Document from TasWater and the certificate must be submitted to Council as evidence of compliance with the Part B Conditions of the Planning Permit. The application form for this consent document can be obtained from the TasWater website http://www.taswater.com.au/Development/Forms.
- A permit is required to proceed with any activity that may impact aboriginal heritage. Please liase directly Aboriginal Heritage Tasmania prior to commencing works.

GEOTON Pty Ltd
Geotechnical Consultants

GEOTECHNICAL INVESTIGATION

Bluff Developments Estate Pty Ltd

Lot 2 Golf Links Road, Wynyard (PID 2758376)

GL24537Ac
12 August 2026

GEOTON Pty Ltd
Geotechnical Consultants

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

12 August 2026

Reference No. GL24537Ac

Bluff Developments Estate Pty Ltd
[redacted]

Attention: Alistair Carter

RE: Geotechnical Investigation
Lot 2 Golf Links Road, Wynyard (PID 2758376)

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 [redacted].

For and on behalf of

Geoton Pty Ltd

[redacted]

Tony Barriera

Director – Principal Geotechnical Engineer

Document History and Status

Rev	Date	Written By	Reviewed By	Revision Details
0	11 December 2024	A Foster	T Barriera	Original
1	10 July 2025	A Foster	T Barriera	Update subdivision plan and provide preliminary on-site wastewater site evaluation for proposed Lots 11 and 12
2	12 August 2026	A Foster	T Barriera	Update subdivision plan and preliminary on-site wastewater site evaluation and provide coastal hazards assessment

File Name:	GL24537Ac
Author:	A Foster
Client:	Bluff Developments Estate Pty Ltd
Project:	Lot 2 Golf Links Road, Wynyard (PID 2758376)
Subject:	Geotechnical Investigation
Document	Report
Document Version	2
Job No.	GL24537Ac

CONTENTS

Plates

Tables

Drawings

Appendices

1 INTRODUCTION

At the request of Mr Allan Brooks of PDA Surveyors, Engineers & Planners on behalf of Bluff Developments Estate Pty Ltd, Geoton Pty Ltd has carried out a geotechnical investigation for a proposed residential subdivision at Lot 2 Golf Links Road, Wynyard (PID 2758376).

It is understood the Council has indicated that the site is partially located within an area of doubtful slope stability, and as such a landslide risk assessment is required to satisfy the Landslide Hazard Code of the Tasmanian Planning Scheme – Waratah-Wynyard (Section C15.6.1 - Building and works within a landslip hazard area & Section C15.7.1 - Subdivision within a landslip hazard area).

Examination of the Land Information System Tasmania (LIST) website indicates that part of the site is within the mapped Wynyard Karst formation.

Examination of the LIST Coastal Erosion Hazard Bands overlay indicates that part of the site is within an area potentially susceptible to coastal erosion. As such, a coastal hazards assessment is required to satisfy the Coastal Erosion and Inundation Hazard Codes of the Tasmanian Planning Scheme – Waratah-Wynyard (Section C10.6.1 - Building and works, excluding coastal protection works, within a coastal erosion hazard area, Section C10.7.1 - Subdivision within a coastal erosion hazard area, Section C11.6.1 - Building and works, excluding coastal protection works, within a coastal inundation hazard area & Section C11.7.1 - Subdivision within a coastal inundation hazard area).

The investigation has been conducted to provide the following:

- A landslide risk assessment;
- An assessment of the potential adverse impacts of the proposed development on the high Integrated Conservation Value of the Wynyard Karst formation, and if any karst related geohazards may affect the integrity of the proposed development in the future;
- A coastal hazards assessment;
- An assessment of the subsurface conditions at the site and provide recommendations for subdivision development and geotechnical parameters for pavement design; and
- An assessment to determine if the proposed new Lots 11 and 12 can support on-site wastewater disposal systems (in accordance with AS/NZS 1547:2012 “On-site domestic-wastewater management”) for the purposes of subdivision approval.

1.1 Proposed Development

A subdivision plan was provided, prepared by PDA Surveyors, Engineers & Planners, Job/Drawing No. 49895AB-PA-05, Revision B, dated 25 November 2025. We understand that it is proposed to subdivide the existing site into 10 residential lots of 1,970m² to 1.74 hectares in size, and 2 road lots with sizes of 288m² and 305m². All weather sealed access roads will service the 8 lots within the eastern portion of the site.

A locality plan is provided as Figure 1, below, with a subdivision plan attached as Drawing 1.

Figure 1: Locality Plan (TasMap 1:25,000 Scale).

2 BACKGROUND

2.1 Geology

The Mineral Resources Tasmania (MRT) Tasmanian Landslide Map Series, Wynyard – Geology Map, 1:25,000 Scale, indicates that the south-western portion of the site is mapped as being underlain by Quaternary period sediments comprising older sand, gravel and clay on coastal plains. A small area within the northeastern portion of the site is mapped as being underlain by Paleogene-Neogene period predominantly deeply weathered basalt. The remainder of the site is mapped as being underlain by Paleogene-Neogene period sedimentary rocks comprising calcareous sandstone and calcarenite with Lower Miocene/Upper Oligocene marine fossils (Table Cape Group). This was generally confirmed by our field investigation.

An extract of the Geology Map is provided as Figure 2, below.

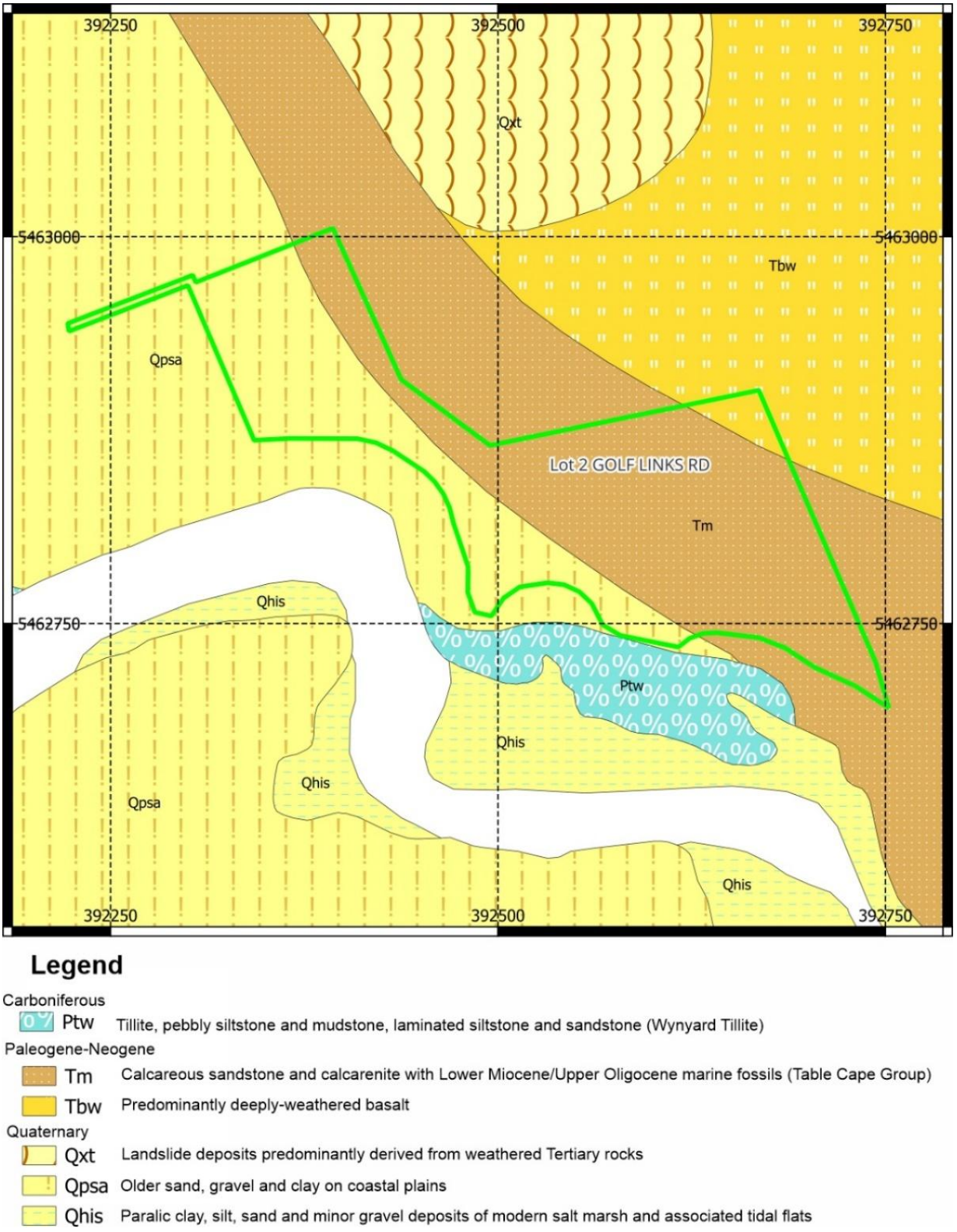


Figure 2: MRT 1:25,000 Scale Digital Geology Map Extract.

2.2 Landslide Susceptibility

2.2.1 LIST Landslide Hazard Bands

Examination of the LIST Landslide Planning Map – Hazard Bands Overlay, indicates that several steeper areas within the eastern portion of the site are within mapped low landslide hazard bands. The remainder of the site is not within a mapped landslide hazard band. The landslide hazard bands are shown on Drawings 1 and 2, attached.

2.2.2 MRT Landslide Inventory

Examination of the MRT Tasmanian Landslide Map Series, Wynyard – Landslide Inventory Map, indicates that there are no known mapped landslide features within the site. A recent or active rock or soil slide (Landslide I.D. No. 179) is located approximately 140m to the northeast of the site. Two recent or active earth or debris flows are located between 360m and 450m to the northeast of the site (Landslide I.D. Nos. 180 and 3120). Several rock or soil slides with unknown activity (Landslide I.D. Nos. 3109 to 3119, 3121 and 3122) are located to the north, east and west of the site, and extending many kilometres to the west of the site. The location of the landslides corresponds with mapped deeply weathered basalt and the Wynyard Tillite unit.

An extract of the Landslide Inventory Map is provided as Figure 3, below.

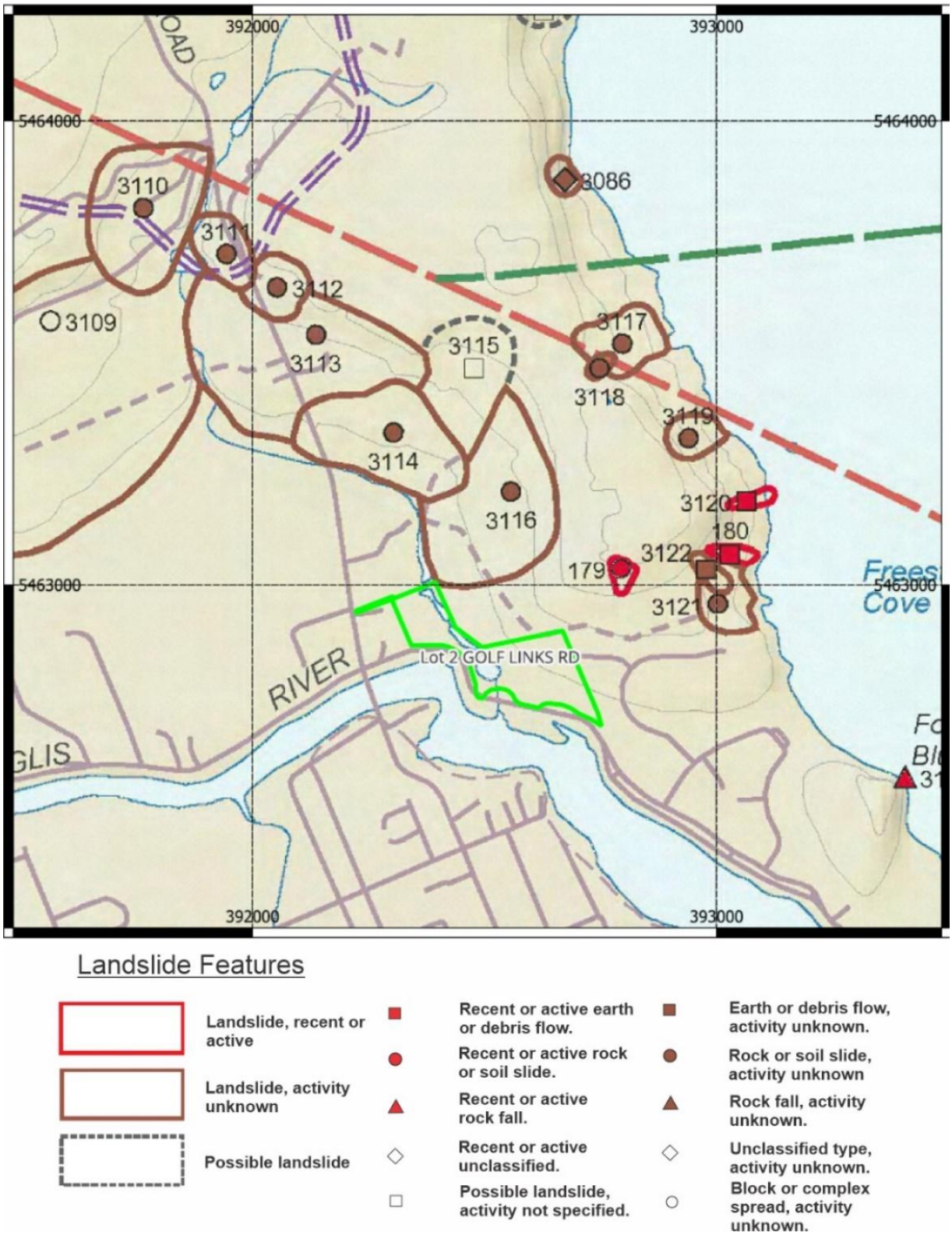


Figure 3: MRT Wynyard 1:25,000 Scale Landslide Inventory Map Extract.

2.2.3 MRT Geomorphology

Examination of the MRT Tasmanian Landslide Map Series, Wynyard – Geomorphology Map, 1:25,000 scale, indicates that the low-lying western portion of the site is mapped as having slopes of 0° to 7°. The elevated eastern portion of the site is mapped as having slopes of 7° to 35°. The western portion of the site is mapped as a marine terrace, and the eastern portion of the site is mapped as an abandoned coastal cliff.

An extract of the Geomorphology Map is provided as Figure 4, below.

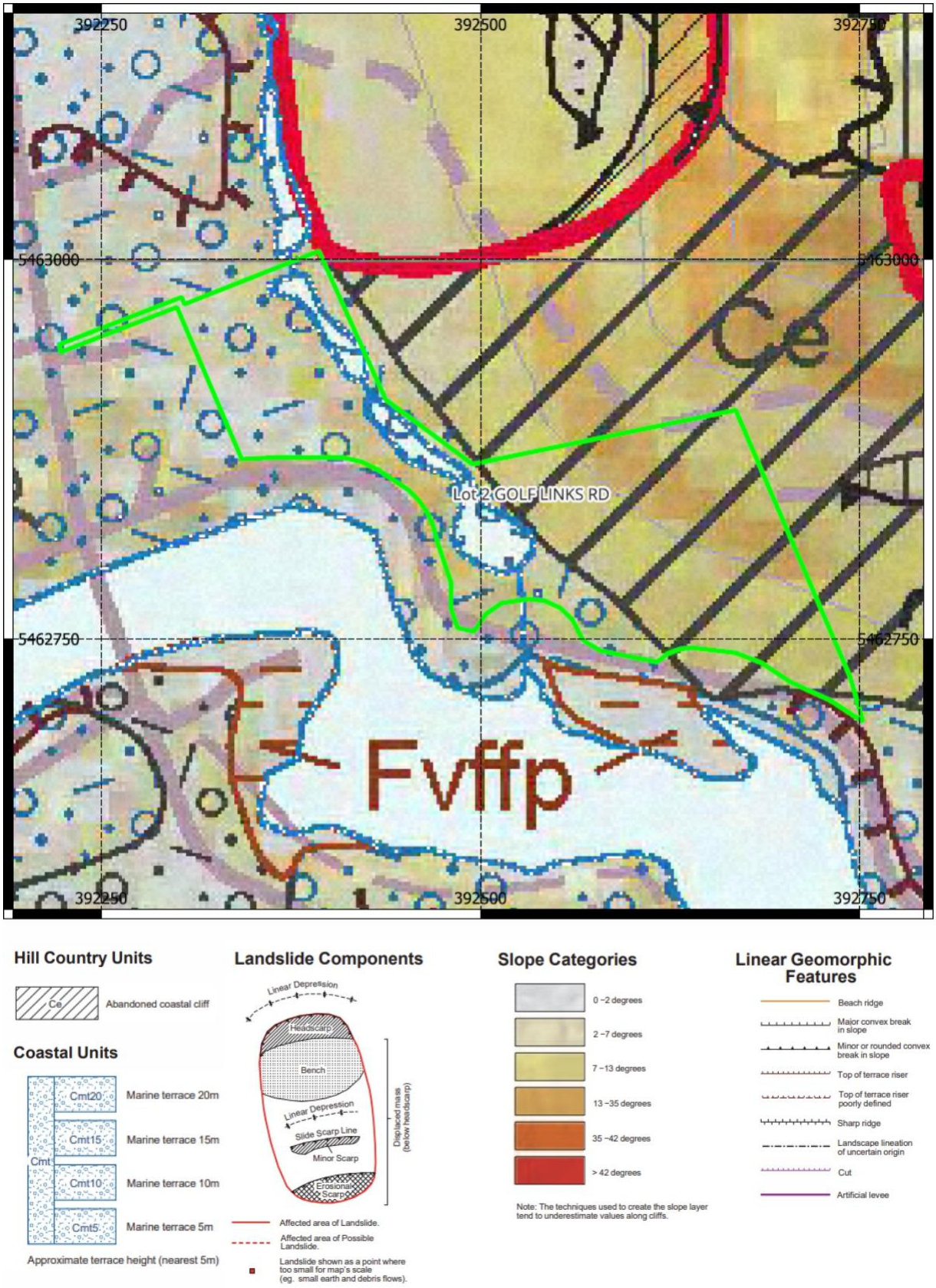
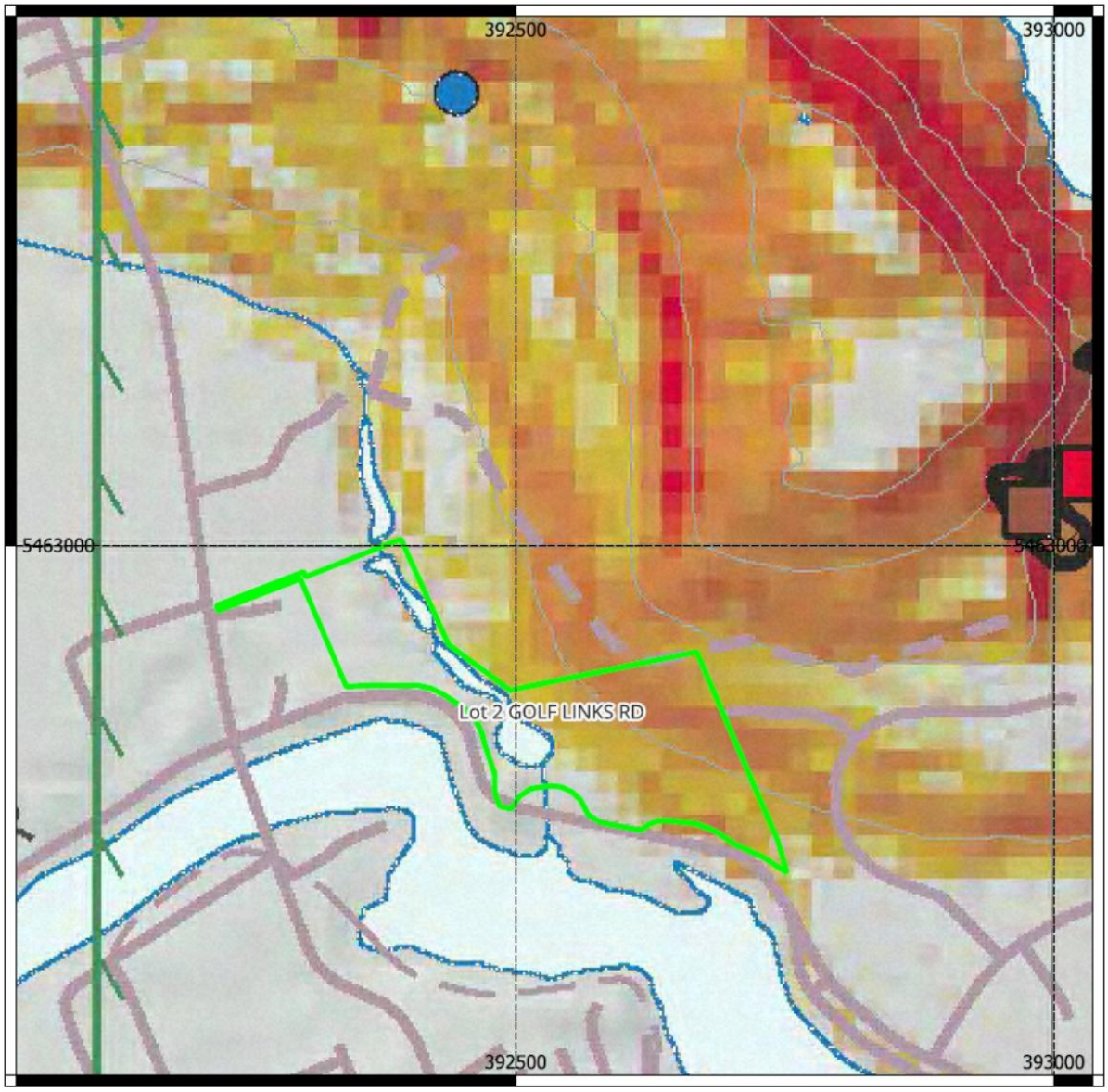


Figure 4: MRT Wynyard Geomorphology 1:25,000 Scale Map Extract.

2.2.4 MRT Shallow Slide and Flow Susceptibility

Examination of the MRT Tasmanian Landslide Map Series, Wynyard – Shallow Slide and Flow Susceptibility Map, indicates that the steeper eastern portion of the site is mapped within a low to moderate susceptibility source area for shallow landslides. The western portion of the site is not mapped within a susceptibility source area.

An extract of the Shallow Slide and Flow Susceptibility Map is provided as Figure 5, below.



Susceptibility Zones

- High susceptibility source area
- Moderate susceptibility source area
- Low susceptibility source area
- Flow runout area

Source area: An area of hillside with the potential to form a slope failure, identified largely on the basis of slope angle and geology

Runout area: An area down-slope of a source area where the moving earth, debris or rock can potentially travel

Shallow Slide or Flow Features

- Shallow slide or flow affected area
- Shallow slide, recent or active
- Shallow slide, activity unknown
- Earth or debris flow, recent or active
- Earth or debris flow, activity unknown
- Unclassified shallow slides or flows
- Spring or seep - which have a known association with landslides in many cases

Figure 5: MRT Wynyard 1:25,000 Scale Shallow Slide and Flow Susceptibility Map Extract.

2.2.5 MRT Deep Seated Landslide Susceptibility

Examination of the MRT Tasmanian Landslide Map Series, Wynyard – Deep Seated Landslide Susceptibility Map, indicates that the majority of the site is not mapped within a susceptibility area for first time failures. The steepest slopes within Lots 1 to 5 and Lot 8 are mapped within a source area for first time failures, i.e., an area of hillside with the potential to form a slope failure, identified largely on the basis of slope angle and geology. Runout areas are mapped immediately downslope of the source areas, i.e., areas down-slope of a source area where the moving earth, debris or rock can potentially travel.

An extract of the Deep-Seated Landslide Susceptibility Map is provided as Figure 6, below.

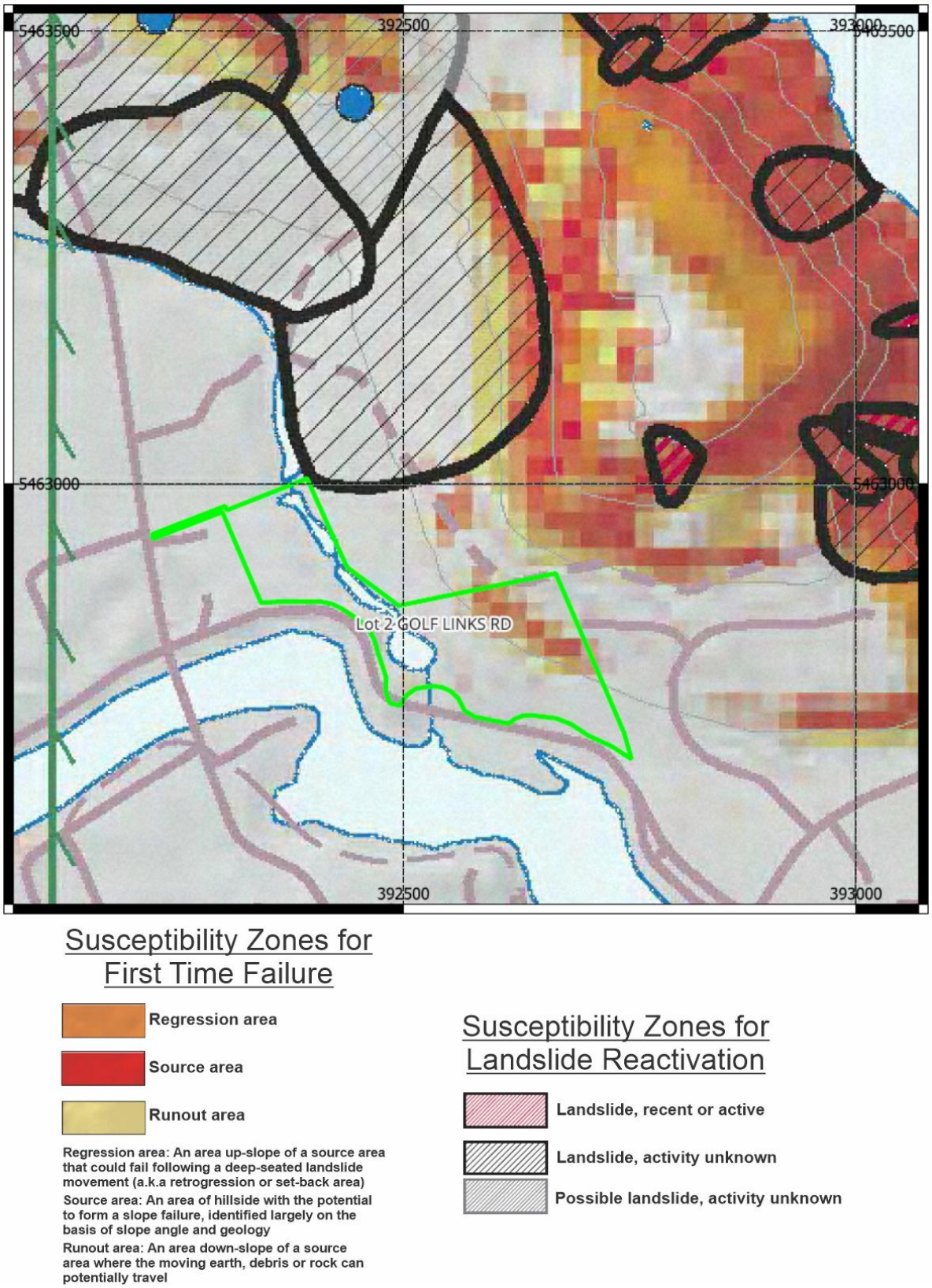


Figure 6: MRT Wynyard 1:25,000 Scale Deep Seated Landslide Susceptibility Map Extract.

2.3 MRT Reports

No reports relating to the subject site were found on the MRT database. However, several reports on landslides in other areas of Wynyard and Burnie, with similar geology and geomorphology, were reviewed, in addition to a general paper on landslides in Burnie, and on the geology of Burnie. The reports provide a good historical background to the area in addition to their technical content. Data and findings of the reports relevant to this study are summarised in point form below:

- Elmer determined that minor landslide movement in slopes greater than 15° had occurred in soils underlain by calcareous siltstone, limestone and tillite, particularly where the toe of the slopes are being undercut by wave action. It was determined that the geological unit should be suitable for building on provided that buildings are situated away from the steeper slopes. The second site investigated was located on basalt bedrock with a thin mantle of soil and determined to be stable despite the steep slopes (Elmer, 1971).
- Old slips and recent movements were mapped near Shorewell Creek in Burnie, in Tertiary basalt which contained a bed of quartz grit. The recent movements took place on a slope of around 10° (Matthews, 1964).
- Jennings describes a large landslip near the Bass Highway in Parklands that occurred within talus consisting of blocks of basalt, dolerite, and sandstone, set in an abundant clay matrix. The material in the slide was found to be soft brown clay, and the slip surface was found to dip at 65°. The water table is high, and normal groundwater is considerably augmented by water entering the talus from the hills behind, partly as runoff and partly by conduction through the basalt. Jennings concluded that geologically the same problems which led to the Parklands landslips persist over much of the steep land within the town of Burnie. That is, the most desirable and expensive building sites are located on steep talus slopes which flank the basalt plateau south of Burnie (Jennings, 1962).
- Jennings (TR8) “In addition to the identifiable slides, both ancient and modern, there are areas where unusual topographic features have been noted. On the geological map they are indicated as breaks in topography. They may simply be due to the effects of differential erosion on basalt flows of varying competence or they could represent the heels of ancient landslides”. Also… “A feature of basalt country is that the bedrock is thoroughly shattered by a series of closely spaced joints. This allows ready access for water to percolate through the rocks thus leading to the formation of springs and seepages in favourable localities, where this water emerges at the surface along the side of steep hillside conditions that are favourable for the formation of landslides”. Also “a number of beds of sand gravel and clay have been mapped interbedded between basalt flows. Some of these units are highly permeable and may act as aquifers which locally control the groundwater flow. Where such a bed intersects the side of a steep hillside covered with talus it tends to promote landslides” (Jennings, 1964).
- Matthews stated that the proposed subdivision south of View Road envisages a drainage scheme and extensive road building activities. Drainage may well improve

the stability in the long term, but earthworks of any kind are likely to have a detrimental effect. As the most recent movement appears to have taken place on a slope of little more than 10° it must be appreciated that steepening the existing slopes to any extent is fraught with danger (Matthews, 1969).

2.4 Karst

Karst landscapes can form unique landforms due to particular rock types, commonly limestone and dolomite, having the potential to be dissolved by natural waters. Through the process of dissolution, surface waters are allowed to be diverted underground, and this can be evident within the karst landscape by the presence of dry valleys, sinkholes and springs, for example.

When fully expressed and developed, karst landscapes form a complex and highly efficient network of underground drainage. The developed drainage systems often provide underground flow paths that do not correlate to the surface topography. It is within well-developed karst areas that large cavities and caves can form as drainage conduits.

Karst landscapes can present unique geomorphic hazards such as easily erodible soils (including soil piping), risk of sudden ground collapse, flooding, and efficient drainage allowing for contamination of aquifers, which can be some distance from the pollution source.

Karst hazards are often difficult to identify. Subsidence, collapse, and associated mass movements are natural processes within karst landscapes, which can be greatly accelerated through changes to local hydrology and land surface features.

Karst areas present many unique engineering challenges, such as, construction within unstable terrain, and remediation of any subsidence and associated mass movement that may occur.

It is estimated that around 4.4% of the Tasmanian landscape is underlain by karst, which is an area of approximately 277,000 hectares (Tasmanian Government - Department of Natural Resources and Environment Tasmania, 2026).

The site is partially located within the Wynyard Karst.

2.5 Conservation of Freshwater Ecosystem Values (CFEV) – Integrated Conservation Value

Examination of the LIST CFEV Integrated Conservation Value layer indicates that the majority of the site is located within a High Integrated Conservation Value area as shown in Figure 7, below.

Figure 7: LIST CFEV Karst – Integrated Conservation Value Overlay.

2.6 Tasmanian Planning Commission – Tasmanian Planning Scheme

Neither the Tasmanian Planning Commission – Tasmanian Planning Scheme nor the Waratah-Wynyard Local Provisions Schedule make reference to karst. However, the Meander Valley Local Provisions Schedule MEA-S5.0, Karst Management addresses karst and is considered applicable.

Planning conditions applied by the Meander Valley Council for use and development within High Sensitivity Karst Areas include no damage to sites of scientific significance or karst features, minimisation of erosion and prevention of sediment and pollution entering the Karst system, not increasing the potential for ground surface or land instability, not increasing the subterranean water flow, or significantly altering the surface hydrology.

2.7 An Atlas of Tasmanian Karst

The most comprehensive information on karst areas in Tasmania can be found within Kiernan's (1995*) An Atlas of Tasmanian Karst.*

A review of the Karst Atlas indicates that the site is located within an area mapped as NW 37 (Wynyard) which is mapped as Category C (possibly karstified) as shown in Figure 8 and described in Figure 9, below.

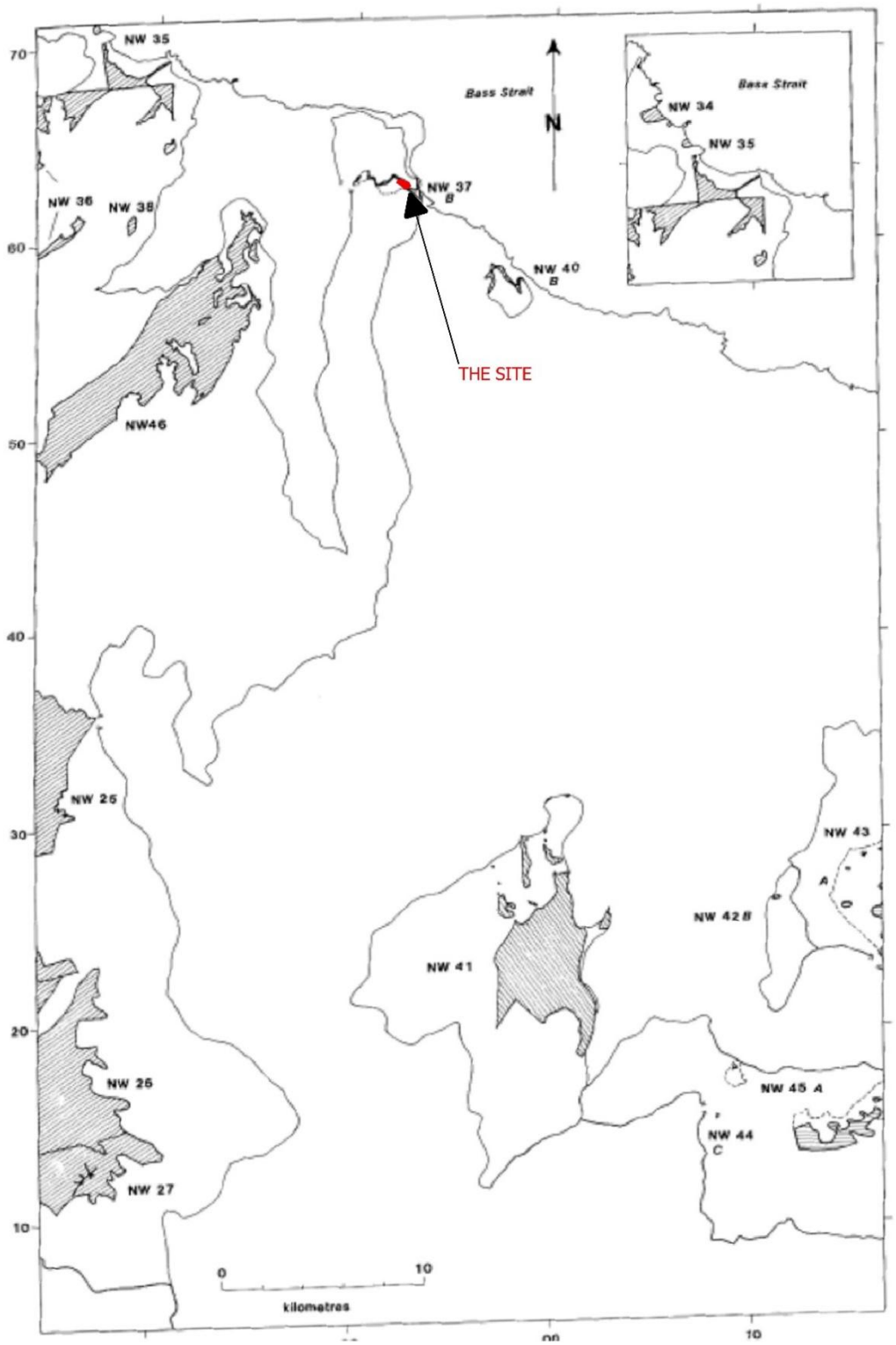


Figure 8: An Atlas of Tasmanian Karst – Inglis Sheet, 1:250,000 Scale.

WYNYARD NW 37

Topographic sheet: 1: 100 000	Inglis (at 928 633)
Topographic sheet: 1: 25 000	Wynyard
Geological sheet:	Table Cape 1:63 360

SYSTEM CONTEXT

Lithological system/subsystems:	Tertiary calcareous sandstone and calcarenite
Structural system/subsystems:	faulted
Climato-geomorphic systems-	
Contemporary:	coastal
Annual rainfall/station:	1045 mm at Wynyard, 1 km to S
Palaeoclimatic	flank
Solvent system/s:	fresh, marine and brackish
Denudation system:	mixed allogenic and autogenic
Topographic system -	
Contemporary:	coastal
Altitudinal range:	150 m (~0-150 m a.s.l.)
Extent of outcrop:	~ 2 km²
Past variation:	-
Exposure style system:	caprock retreat and downstream stripping

KARST EXTENT & INVESTIGATIONS

Karst development:	surface solution forms and sea caves
Documentation:	poor
Number of investigation trips:	numerous
Investigators:	local residents, geologists
Visited during Atlas compilation:	yes
Potential for further discoveries-	
Surface karst landforms:	possible
Caves:	unlikely
Land tenure:	private and Crown
Management issues:	geological significance
Category:	C

FURTHER INFORMATION

Tertiary limestone crops out along the northern bank of the Inglis River to the coast and ~1 km westwards along the coast from the river mouth. It disconformably overlies the Permian age Wynyard Tillite. There is little evidence of the limestone on the slopes that flank the Inglis River estuary, but small cliffs up to 5-8 m high occur along the coast.

At the eastern end of the coastal outcrop, broad shore platforms have been cut in the tillite and some small sea caves have formed, primarily in the tillite, at the interface between the Permian rock and the overlying limestone. Limestone shore platforms up to 5 m wide occur further westwards at ~1.5 m above low sea level, with some minor solution pans. Smoothed notches up to 1.5 m deep and 1 m high are prominent at present sea level. Ledges that mimic the attitude of the shore platforms occur at up to 8 m above present sea level but tend to be narrower, seldom more than 3 m wide, and are interpreted as being controlled by bedding planes. Cave entrances have been cut in the limestone at sea level (Figure 2.4b). At least one of these caves contains ribs of carbonate and rudimentary stalactites up to 30 cm long.

In addition to the geomorphological significance of this area as perhaps Tasmania's best developed coastal karst in Tertiary marine limestone and a good example of cave development being focussed at the interface between carbonate rocks and non-carbonate rocks, Eastoe (1974) also regards it as a significant geological site for its exposure of the Tertiary marine rocks and Carboniferous glacial sediments.

Figure 9: An Atlas of Tasmanian Karst – Wynyard Karst.

2.8 Borehole Database

2.8.1 MRT Borehole Database

Four boreholes are currently recorded on the MRT database approximately 4km to the southeast of the site, all of which had borehole logs available for inspection, and none of which encountered limestone or cavities.

2.8.2 Department of Natural Resources and Environment Tasmania Groundwater Bore Database

Information of twenty groundwater bores with depths of 9.1m to 103.6m are currently recorded on the NRE – Groundwater Information Access Portal within approximately 3.1km of the site.

The boreholes encountered the following lithologies as shown in Table 1:

Table 1: Details of Groundwater Bores.

Borehole I.D.	Distance from site	Lithologies encountered
641	1.5km	Unknown
644	2.3km	Mudstone
663	1.1km	Basalt underlain by sand
664	1.1km	Weathered basalt
666	1.5km	Tillite? and quartz
674	2.6km	Gravel and river wash
701	1.9km	Basalt
4759	980m	Basalt
16986	2km	Mudstone
31367	2km	Basalt underlain by mudstone
31513	3.1km	Mudstone
31514	3.1km	Mudstone
31515	3.1km	Mudstone
40258	1.9km	Mudstone
40281	580m	Basalt underlain by mudstone
40282	400m	Clay with shells underlain by mudstone
40766	1.8km	Basalt
41755	130m	Mudstone
42618	2.1km	Mudstone underlain by shingle and gravel
42714	2.3km	Mudstone underlain by sand, shingle and gravel

None of the boreholes encountered limestone or cavities indicative of karstified rocks. Detailed information of the relevant groundwater bores is provided in Appendix A.

2.9 Tasmania Topographic Maps

The LIST digital 1:25 000 series Tasmania TasMap topographic maps were accessed and examined to establish if there are any features that have been identified and interpreted as karst features, such as sinkholes. There were no karst features mapped within 10km of the site.

2.10 Aerial Photography and Satellite Imagery

A review of historical aerial photographs and satellite imagery covering the site and immediate surrounds was conducted using the Land Tasmania Aerial Photo Viewer and Google Earth. Historical images from 1969 up to 2024 were available for review. The review of the images was primarily to look at any recent spring and landslide activities and to identify if there are any karst or landslide features that will require inspection during a site visit, in addition to gaining a general understanding of the recent history of the site.

Generally, no recent spring or landslide activities were observed. No features within or near the development site were identified as potentially karstified. Additionally, no significant changes to the site were identifiable at the site over this period.

2.11 LiDAR – Spatial Data

Hillshade images, generated from publicly available LiDAR data, shows that the ground surface within the site and surrounds have no features indicative of sinkholes that require further investigation. A small feature located within the eastern portion of the site was investigated and is not a landslide or sinkhole.

Hillshade images based on LiDAR are provided as Figures 10 and 11, below.

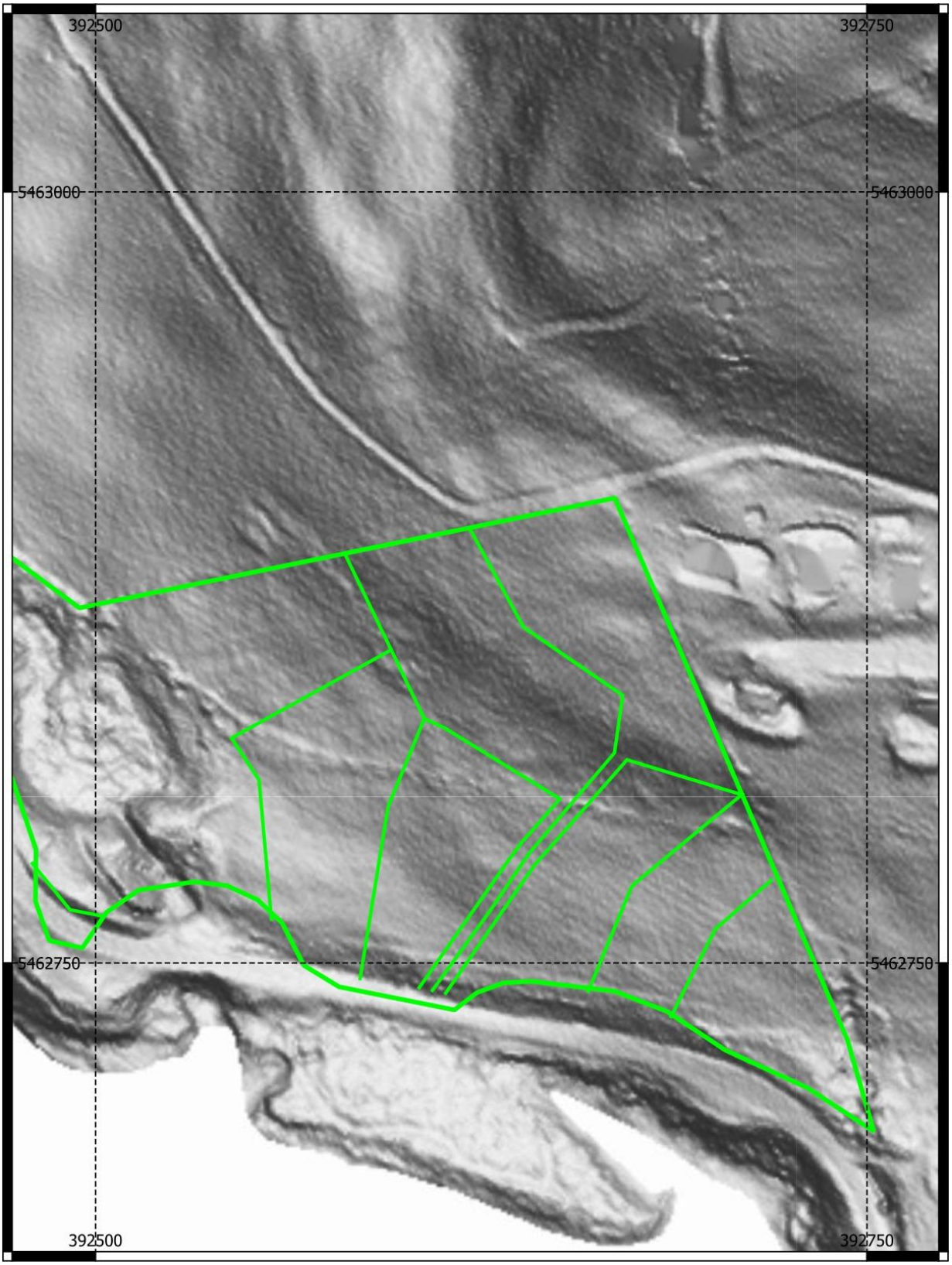


Figure 10: Hillshade Image – Eastern Portion of Site.

Figure 11: Hillshade Image – Western Portion of Site.

2.12 Coastal Hazard – Sea Level Rise, Storm Events and Coastal Inundation

Examination of the LISTMap Coastal Vulnerability – Coastal Inundation Hazard Bands, indicates that the site is located outside the coastal inundation hazard bands, i.e., the site is not vulnerable to a 1% annual exceedance probability (AEP) storm event in the year 2100. The coastal inundation hazard bands are shown on Figure 12, below.

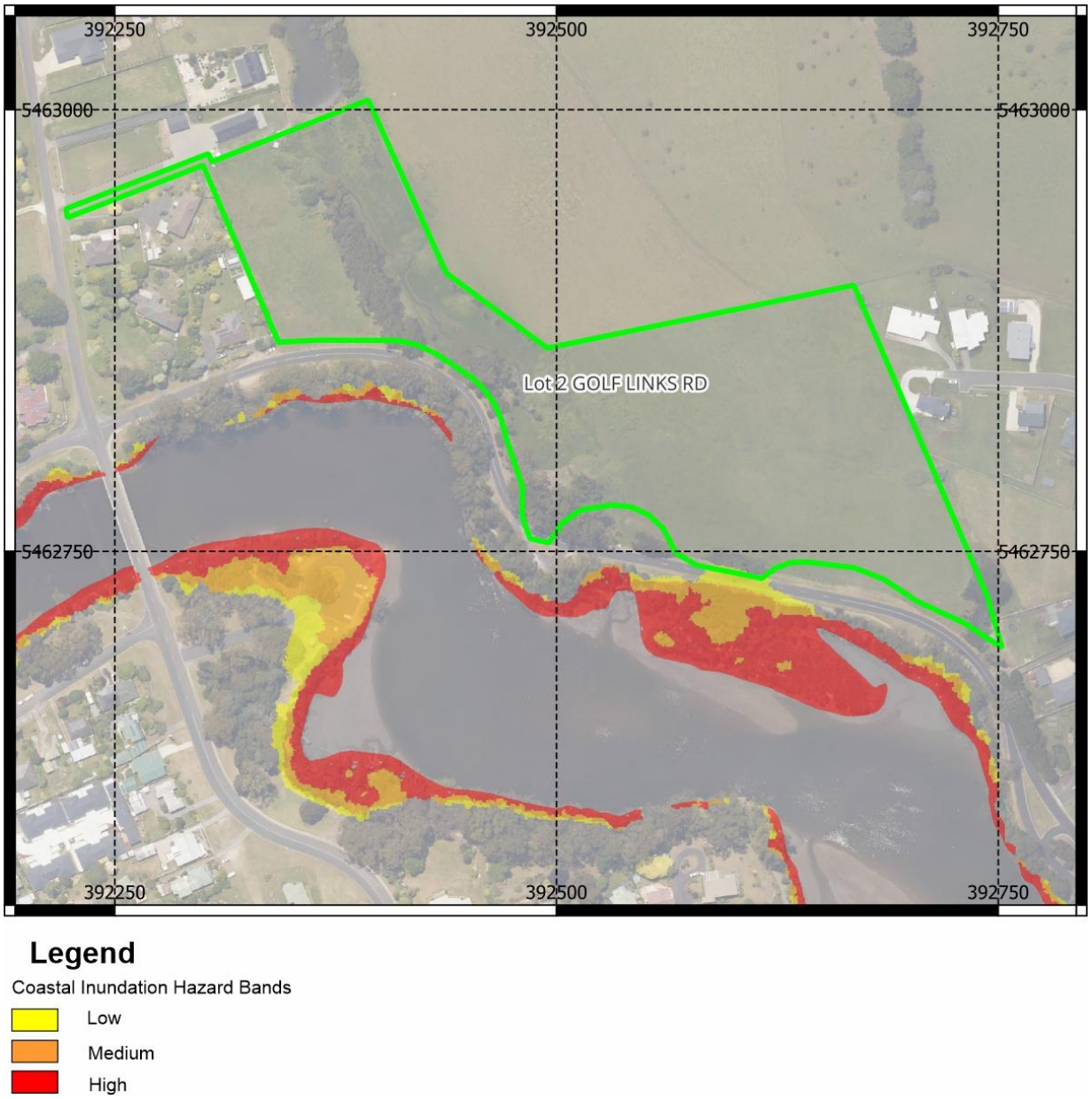


Figure 12: LIST Coastal Inundation Hazard Bands.

2.13 Coastal Hazard – Coastal Erosion

Examination of the LISTMap Coastal Vulnerability – Soft Shores, Clayey Sores, Rocky Shores and Unclassified Shores mapping indicates that the site has not been mapped with respect to erosion vulnerability or otherwise.

Examination of the LISTMap Coastal Vulnerability – Coastal Erosion Component overlay indicates that the south-eastern portion of the site is mapped as a low potential recession hazard zone within a longer-term potential recession hazard zone (normal soft rocks) of 63m from the shoreline by year 2100. The remainder of the site is either within a mapped acceptable hazard zone or outside the mapped hazard areas. The LIST Coastal Erosion Component overlay is provided as Figure 13, below.

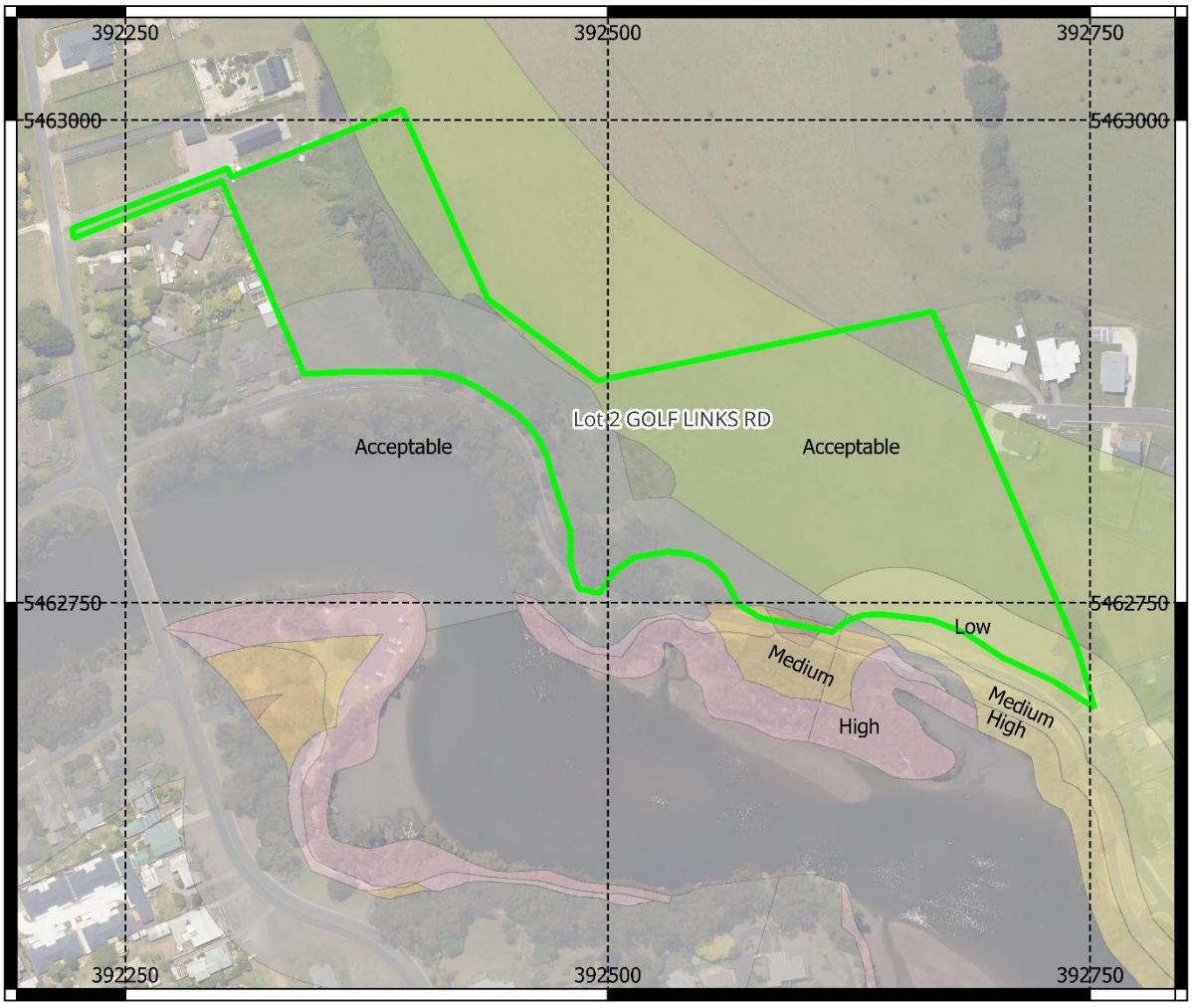


Figure 13: LIST Coastal Erosion Component Overlay.

Examination of the LISTMap Coastal Vulnerability - Coastal Erosion Hazard Bands indicates that a narrow zone within the south-eastern portion of the site is mapped within a low coastal erosion hazard band, i.e., a longer-term potential recession hazard zone (normal soft rocks) to 63m from the shoreline by year 2100. The remainder of the site is located outside the mapped coastal erosion hazard bands.

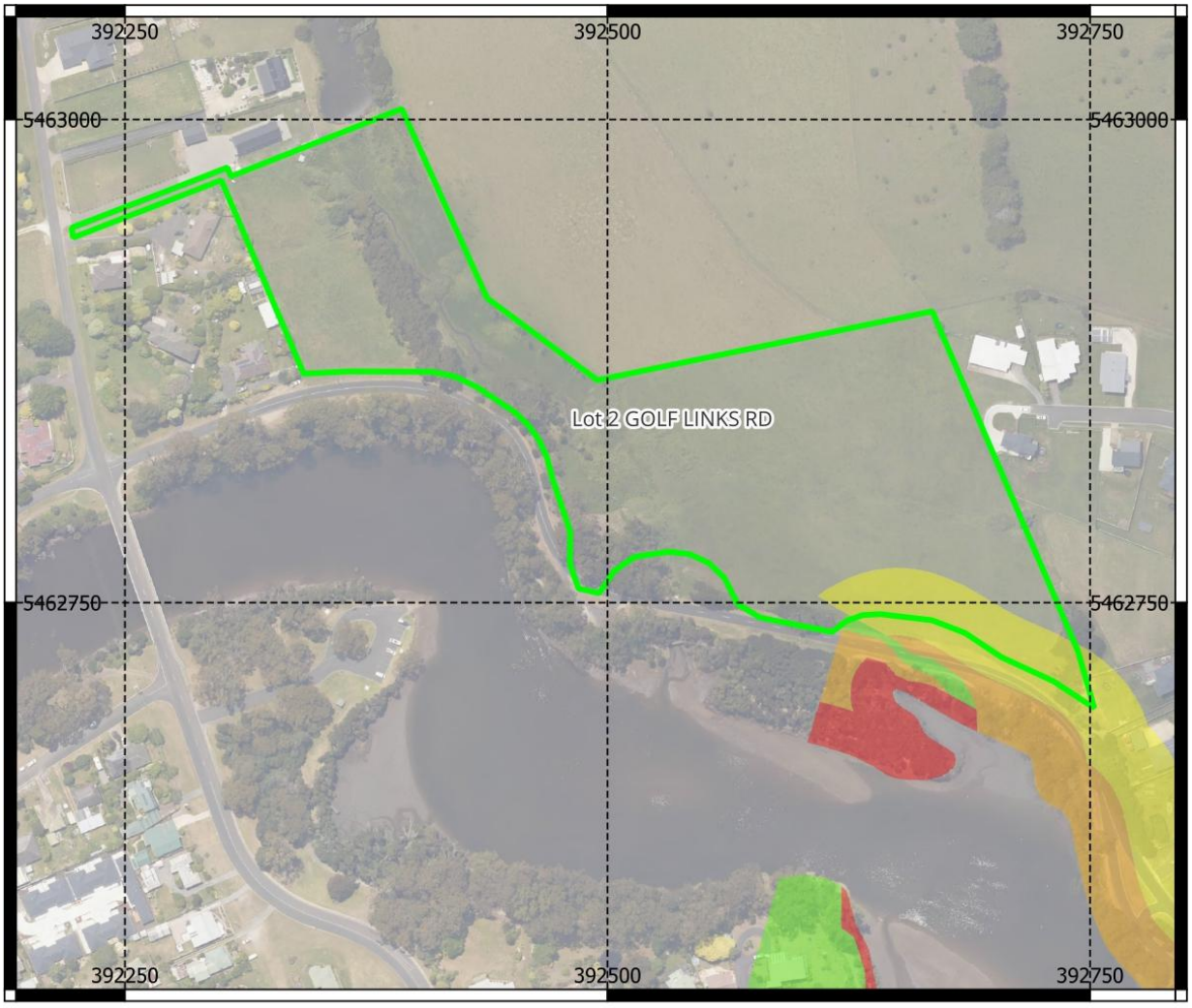


Figure 14: LIST Coastal Erosion Hazard Bands overlay.

3 FIELD INVESTIGATION

The field investigation was conducted on 05, 06 and 11 November 2024 and involved the following:

- Underground service location of Telstra and NBN cables;
- Site walk-over and geomorphology mapping of the site and surrounds;
- Drilling of 19 boreholes by 4WD mounted auger rig to depths of 1.5m to 5.4m;
- Carrying out insitu vane shear strength tests and pocket penetrometer readings at regular intervals during the investigation;
- Obtaining samples of soils for subsequent laboratory characterisation;
- Carrying out Dynamic Cone Penetrometer (DCP) testing at 3 locations; and
- The installation and monitoring of two groundwater monitoring wells.

The results of the field tests are shown on the borehole logs. The borehole logs are included in Appendix B and their locations are shown on Drawings 2 and 3, attached. The results of the laboratory testing are shown in Section 4.3, and Tables 2 and 3, below.

4 SITE CONDITIONS

4.1 Surface Conditions

The site is 4.69 hectares in size and is located to the north of the Inglis River and Golf Links Road. The site is currently undeveloped. An unnamed tributary of the Inglis River flows from northwest to southeast through proposed Lot 3, dividing the site into two different topologies and geologies (Plate 1).

Plate 1: Unnamed tributary of the Inglis River looking southwest.

The ground surface to the east of the unnamed tributary rises from Golf Links Road towards the northeast, initially at approximately 4° to 11° before becoming steeper mid-property, with slope angles up to approximately 27°. The uphill north-eastern portion of the slope has slope angles of approximately 10° to 12° (Plates 2 and 3).

Plate 2: Eastern portion of the site looking northwest.

Plate 3: Eastern portion of the site looking south.

The ground surface to the west of the unnamed tributary falls very gently towards the northeast from Golf Links Road towards the eastern boundaries of proposed Lots 11 and 12, from where the ground surface falls at approximately 10° to 12° towards the creek (Plate 4). The northern portion of proposed Lot 12 has been subject to standing water during recent times.

Plate 4: Western portion of the site looking northwest.

Vegetation across the proposed residential lots (Lots 1 to 8, 11 and 12) comprises a moderate to tall cover of grass. Trees and shrubs are present along the southern site boundary and adjoining the creek. The ground surface over the majority of the site was puggy, indicating that the underlying clays have been soft and saturated during the wetter months.

The slopes across the site and surrounding area were observed to comprise generally smooth convex slopes, with no features indicative of recent landslide movement observed (no longitudinal surface cracking, slumping etc).

Furthermore, no springs or seeps were observed on the site.

No evidence of sinkholes or karst processes were observed within the site or surrounds.

Observation of dwellings to the east and west, along Golf Links Road, generally found no clear evidence of settlement or landslide movement with all dwellings being in satisfactory condition.

4.2 Subsurface Conditions

The investigation indicated that the soil profile varied across the site. Three distinct geological units were encountered during the subsurface investigation:

- **Unit 1** – Paleogene-Neogene period sedimentary rocks comprising calcareous sandstone and calcarenite (**limestone**) with Lower Miocene/Upper Oligocene marine

fossils (Table Cape Group) generally comprising clayey silt topsoil, overlying **residual** silty clay and clayey silt, underlain by extremely weathered limestone (rock weathered to such an extent that it has soil properties while retaining a rock fabric) and inferred highly weathered limestone;

- **Unit 2** – Paleogene-Neogene period predominantly deeply weathered **basalt** generally comprising clayey silt topsoil overlying **residual** clayey silt, underlain by extremely weathered basalt and inferred highly weathered basalt; and
- **Unit 3** – Quaternary period **sediments** comprising older sand, gravel and clay on coastal plains, with the encountered materials generally comprising topsoil, overlying sand, underlain by clay.

Unit 1 was encountered in Boreholes BH01 to BH06 and BH08 to BH16. Generally, clayey silt topsoil was encountered to depths of 0.2mto 0.3m, overlying natural silty clay and clayey silt to depths of 1.3m to 3.9m, underlain by extremely weathered limestone to the auger refusal or investigated depths of 1.5m to 5.4m. The exceptions were:

- Boreholes BH02 to BH04, BH09, BH12 and BH14 to BH16 did not encounter extremely weathered limestone.

Unit 2 was encountered in Borehole BH07. Clayey silt topsoil was encountered to a depth of 0.3m, overlying silt clay to a depth of 3.2m, underlain by extremely weathered basalt to the auger refusal depth of 4.9m.

Unit 3 was encountered in Boreholes BH17 to BH19. Generally, silty sand topsoil was encountered to depths of 0.1m, overlying silty sand to depths of 0.4m to 0.5m, underlain by gravelly to sandy to silty clay to the investigated depths of 1.5m.

Auger refusal in Boreholes BH04 to BH06, BH08 to BH11, BH13 and BH14 was inferred to be on highly weathered limestone, and in Borehole BH07 auger refusal was inferred to be on highly weathered basalt.

The moisture content of the residual silty clay and clayey silt was typically greater than the plastic limit and less than the liquid limit of the soil.

The residual silty clay and clayey silt soils were typically stiff to very stiff, however they were firm within the road alignment.

The boreholes did not encounter any soils interpreted to be landslide talus/deposits, with the natural soils interpreted as being residual limestone and basalt soils and non-colluvial sediments.

Groundwater monitoring wells were installed in Boreholes BH07 and BH09.

Groundwater seepage was encountered in Borehole BH09 (drilled on 06 November 2024), with the groundwater level measured at a depth of 1.1m on 11 November 2024. The groundwater monitoring well installed in Borehole BH07 (drilled on 06 November 2024) remained dry on 11 November 2024. The configurations of the installed groundwater monitoring wells installed in Boreholes BH07 and BH09 are shown on Drawing 4, attached.

Full details of soil conditions encountered are presented on the borehole logs.

4.3 Laboratory Testing

The laboratory test results are summarised below with the test certificates provided in Appendix C:

Table 2: Summary of Laboratory Test Results.

Sample	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)	Moisture Content (%)	Classification
BH04 0.8-1.0m	78	30	48	16.0	53.5	CH
BH07 1.4-1.6m	62	34	28	15.0	44.9	MH
BH08 0.8-1.0m	75	42	33	15.5	56.5	MH
BH09 3.4-3.6m	67	39	28	11.5	81.5	MH

Table 3: Summary of Laboratory Test Results.

Sample	4-Day Soaked CBR (%)	Maximum Dry Density (t/m^3)	Optimum Moisture Content (%)	Field Moisture Content (%)
BH01 0.3m-0.7m	1.5	1.47	44.0	48.8
BH02 0.2m-0.6m	2.5	1.25	26.5	33.2

An assessment of the plasticity characteristics of the materials encountered indicates that the clay soils at this site possess a high shrink/swell potential.

Published correlations between Plastic Index and angle of internal friction indicated that the laboratory tested high plasticity silty clay soils would have peak strength angle of internal friction values of between approximately 24° to 28° and residual values of about 7° to 10°.

5 INFERRED GEOLOGICAL MODEL

The general geological model for the site has been interpreted as consisting of shallow residual basalt and limestone soils overlying Paleogene-Neogene period sedimentary rocks comprising calcareous sandstone and calcarenite (limestone) and basalt within the eastern portion of the site. Quaternary period sediments are located within the western portion of the site. The site did not display any distinct landslide or karst features. A localised groundwater table was encountered in Borehole BH09 at a depth of 1.1m during the investigation.

The geological model for the site is provided as Drawings 5 to 7, attached.

6 LANDSLIDE RISK

6.1 Assessment Methodology

The landslide risk assessment has been conducted in accordance with AS1726:2017 - Geotechnical Site Investigations, and the Australian Geomechanics Society 2007 - Guidelines on Landslide Risk Management.

As per the AGS “Guideline for Landslide Susceptibility, Hazard and Risk Zoning for Land Use Planning” (2007a), a landslide risk assessment:

> ***“…** takes the outcomes of hazard mapping and assesses the potential damage to persons (annual probability the person most at risk loses his or her life) and to property (annual value of property loss) for the elements at risk, accounting for probability and vulnerability.”*

Therefore, the methodology adopted for this assessment was to:

- Develop a landslide inventory for the site, employing the publicly available landslide mapping carried out by the Mineral Resources Tasmania (MRT), in conjunction with aerial photograph interpretation employing current and historical photos, and ground truthing;
- Undertake assessments of the landslides relating to the site in terms of historical likelihood; and
- Undertake risk assessments, in terms of both risk-to-property and risk-to-life for critical structures within the site and relevant surrounding areas.

6.2 Landslide Risk Assessment

Based on the desk study, geological and geomorphological settings of the site, the following possible landslide scenarios are identified for the site.

- Shallow/small-scale landslide occurs within the soil derived from Paleogene-Neogene period sedimentary rocks affecting the steeper slopes of the proposed subdivision development;
- Shallow/small-scale landslide occurs within the soil derived from Paleogene-Neogene period basalt affecting the steeper slopes of the proposed subdivision development; and
- Runout failure from deep-seated landslide occurring upslope within Paleogene-Neogene period basalt affecting the proposed subdivision development.

The qualitative likelihood, consequence and risk terms used in this report for risk to property are given in Appendix D. The risk terms are defined by a matrix that brings together different combinations of likelihood and consequence. Risk matrices help to communicate the results of risk assessment, rank risks, set priorities and develop transparent approaches to decision making. The notes attached to the tables, terms and the comments on response to risk in Appendix D are intended to help explain the risk assessment and management process.

The site did not display any distinct landslide features. As such, the qualitative values associated with the likelihood of occurrence are based on the broader geological and geomorphic understanding of the region.

In light of the findings of this investigation (topography, shallow depth to bedrock, stiff/very stiff soils, residual soils, setback of site from steeper basalt slopes to the northeast), the likelihood of small-scale and runout failures occurring on the site affecting the proposed development is considered RARE.

Accordingly, the likelihoods estimated for the possible landslide scenarios are summarised in Table 4 as follows:

Table 4: Summary of Landslide Hazards

Possible Landslide Scenarios	Indicative Annual Probability (pa)	Indicative Recurrence Interval (yrs)	Descriptor (AGS 2007c)
Shallow/small-scale landslide occurs within the soil derived from Paleogene-Neogene period sedimentary rocks affecting the steeper slopes of the proposed subdivision development	10^{-5}	100,000	Rare
Shallow/small-scale landslide occurs within the soil derived from Paleogene-Neogene period basalt affecting the steeper slopes of the proposed subdivision development	10^{-5}	100,000	Rare
Runout failure from deep-seated landslide occurring upslope within Paleogene-Neogene period basalt affecting the proposed subdivision development	10^{-5}	100,000	Rare

6.3 Incremental Landslide Hazards

The alterations to the site as a result of the proposed subdivision development can generally be classified into two categories:

- Disturbance to the site due to the proposed development; and
- Introduction of additional water into the ground affecting the groundwater regime.

It is considered that the proposed subdivision development would not adversely impact on the site and immediate surroundings nor significantly increase the pre-existing landslide hazard, provided that the development adheres to the principles of good hillside practice and the recommendations provided in Section 7 below.

Geoton Pty Ltd understands that the eastern portion of the subdivision (steeper slopes) is to be fully serviced, and that stormwater is to be discharged to the unnamed tributary.

6.4 Landslide Consequences

Developments within the proposed lots are considered as the elements at risk in this assessment.

The landslide consequences for different scenarios are summarised in Table 5 as follows:

Table 5: Summary of Consequences for Different Landslide Scenarios

Possible Landslide Scenarios	Assessed Landslide Consequences	Descriptor (AGS 2007c)
Shallow/small-scale landslide occurs within the soil derived from Paleogene-Neogene period sedimentary rocks affecting the steeper slopes of the proposed subdivision development	The landslide may displace the footing system of structures within the proposed lots causing minor damage	Minor
Shallow/small-scale landslide occurs within the soil derived from Paleogene-Neogene period basalt affecting the steeper slopes of the proposed subdivision development	The landslide may displace the footing system of structures within the proposed lots causing minor damage	Minor
Runout failure from deep-seated landslide occurring upslope within Paleogene-Neogene period basalt affecting the proposed subdivision development	The landslide may displace the footing system of structures within the proposed lots causing minor damage	Minor

6.5 Landslide Risk to Property

Based on the outcomes of the landslide hazards and landslide consequences assessments detailed above. The assessed landslide risks to property (being the proposed house sites) are summarised in Table 6 as follows.

Table 6: Summary of Assessed Landslide Risks to Property (AGS 2007c)

Possible Landslide Scenarios	Assessed Landslide Hazards	Assessed Landslide Consequences	Qualitative Landslide Risk to Property
Shallow/small-scale landslide occurs within the soil derived from Paleogene-Neogene period sedimentary rocks affecting the steeper slopes of the proposed subdivision development	Rare	Minor	**Very Low**
Shallow/small-scale landslide occurs within the soil derived from Paleogene-Neogene period basalt affecting the steeper slopes of the proposed subdivision development	Rare	Minor	**Very Low**
Runout failure from deep-seated landslide occurring upslope within Paleogene-Neogene period basalt affecting the proposed subdivision development	Rare	Minor	**Very Low**

According to Table C10 of AGS 2007d, the acceptable qualitative risk to property criteria suggested by AGS is LOW, given that the importance level of the elements at risk is determined according to Appendix A, AGS 2007c.

6.6 Landslide Risk to Life

The person most at risk is considered to be the resident living in each of the dwellings that will be constructed within the proposed building envelopes.

The landslide risk to life for the identified person most at risk is calculated in Table 7 as follows.

Table 7: Landslide Risk to Life for Person Most at Risk

Possible Landslide Scenarios	Adopted Annual Landslide Probability, P(H)	Spatial Probability of Landslide Impacting Buildings at Risk, P(S:H)	Temporal Spatial Probability of Person Most at Risk at Buildings at Risk, P(T:S)	Vulnerability of Person Most at Risk, V(D:T)	Risk to Life, R(LoL)
Shallow/small-scale landslide occurs within the soil derived from Paleogene-Neogene period sedimentary rocks affecting the steeper slopes of the proposed subdivision development	10^{-5}	0.5	0.67 (16hrs/day)	0.005 (Building suffers minor damage but is highly unlikely to collapse, may cause injury but death is highly unlikely)	1.7×10^{-8}
Shallow/small-scale landslide occurs within the soil derived from Paleogene-Neogene period basalt affecting the steeper slopes of the proposed subdivision development	10^{-5}	0.1		0.005 (Building suffers minor damage but is highly unlikely to collapse, may cause injury but death is highly unlikely)	3.3×10^{-9}
Runout failure from deep-seated landslide occurring upslope within Paleogene-Neogene period basalt affecting the proposed subdivision development	10^{-5}	0.05		0.005 (Building suffers minor damage but is highly unlikely to collapse, may cause injury but death is highly unlikely)	1.7×10^{-9}
					Total: 2.2×10^{-8}

According to Table 1 of AGS 2007c, the **tolerable** risk to life criteria for the person most at risk suggested by AGS is $\mathbf{10^{-5}}$. Acceptable risks are usually considered to be one order of magnitude lower than the tolerable risks, which in this case is 10^{-6}. However, AGS suggests that, for most development in existing urban areas, criteria based on Tolerable Risk Level is applicable.

Therefore, subject to compliance with the recommendations within Section 7 of this report, the corresponding quantitative risk posed by landslide to life by the proposed subdivision development is assessed as **ACCEPTABLE**.

7 LANDSLIDE DISCUSSION AND RECOMMENDATIONS

7.1 General

The outcomes of the assessments for landslide risk to property (Section 6.5) and landslide risk to life (Section 6.6) only apply if the principles of good hillside practice and the recommendations provided herein are adhered to.

An information sheet entitled “Some Guidelines for Hillside Construction” adapted from the Journal of the Australian Geomechanics Society, volume 42, Number 1, dated March 2007, is presented in Appendix E.

Therefore, provided the development of the site is in accordance with the recommendations within our report, we consider that an acceptable level of risk can be achieved for the development of each lot in accordance with section C15.7.1 (Subdivision within a landslip hazard area) and C15.6.1 (Building and works within a landslip hazard area) of the Landslide Hazard Code of the Tasmanian Planning Scheme – Waratah-Wynyard. An Engineering Certificate addressing the Landslide Hazard Code is provided in Appendix F.

7.2 Buildings

- Individual geotechnical assessments and Site Classifications should be undertaken for each lot.

7.3 Cuts and Fills

- Fills across the steeper portions of the site should be minimised and should be limited to less than 1.5m in height and battered at slope angles no steeper than 1 vertical to 3 horizontal (1V:3H) or alternatively should be retained;
- Cuts across the steeper portions of the site should be minimised and should be limited to less than 1.5m in height and battered at slope angles no steeper than 1 vertical to 2.5 horizontal (1V:2.5H) or alternatively should be retained;
- Any proposed cuts and fills greater than 1.5m should be reviewed by an experienced geotechnical practitioner;
- Cuts and fills greater than 1.5m in height should be retained with retaining walls designed by a suitably qualified engineer;

- Surface water cut-off drains should be provided uphill of any structures (retaining walls and/or the cut/fill batters) to direct surface water runoff from these slopes. The collected water should be piped to the natural watercourse, the council stormwater system or the street drainage system; and
- Excavations for the construction of retaining walls may result in a temporary reduction in the stability of the adjacent area particularly during wet weather until the wall is complete. This increased risk can be managed or reduced by appropriate construction planning, using temporary support, staged excavation and control of drainage.

7.4 Drainage

- All stormwater, including stormwater from cut-off drains, should be piped to the natural watercourse, the council stormwater system or the street drainage system;
- Should any seepage or groundwater be encountered during site excavations, it is recommended that subsoil drainage be provided to discharge to the stormwater system; and
- No uncontrolled discharge of water onto the ground surface or through absorption trenches is permitted without a further geotechnical assessment within the eastern portion of the site.

7.5 Vegetation and Erosion Control

- Maintain vegetation on the surrounding slopes.

7.6 Proposed Development Review

- It is recommended that the drawings for the area of the subdivision within the low landslide hazard band be reviewed by an experienced geotechnical practitioner to ensure that they are in keeping with good hillside practices and the recommendations provided within this report.

8 KARST ASSESSMENT

It is evident that calcareous sediments (limestone) exist within the site; however, the desktop study and field investigation revealed no evidence of karst formations or systems within the site or surrounds.

It is considered that the proposed development will not cause damage to sites of scientific significance or karst features, will minimise of erosion and prevent sediment and pollution entering the Karst system. It will not increase the potential for ground surface or land instability, subterranean water flow, or significantly alter the surface hydrology.

Therefore, the site is considered to have an ACCEPTABLE level of risk with regard to the Wynyard Karst.

9 COASTAL HAZARDS ASSESSMENT

From Section 2.12, above, the site is not vulnerable to coastal inundation by year 2100.

From Section 2.13, above, a narrow zone within the south-eastern portion of the site is mapped within a low coastal erosion hazard band, i.e., having longer-term potential recession (normal soft rocks) to 63m from the shoreline by year 2100. The remainder of the site is located outside the mapped coastal erosion hazard bands.

9.1 Artificial Recession Limit

During the field investigation and the verification of the desktop study, it was identified that Golf Links Road provides an artificial recession limit. Golf Links Road is a Local Access Road class road and provides access to a number of properties and recreational areas, and as such, should be maintained.

It is considered that the road meets the definition of a Resilient Artificial Shoreline i.e., “likely to resist coastal erosion for more than 10 years, and/or to be maintained and repaired as necessary to continue resisting erosion” (Sharples, Walford, & Roberts, 2013). On the basis of modelled generic coastal erosion setbacks and natural recession limits, the susceptibility zones for Resilient Artificial Shorelines have been identified (Tasmanian Government Department of Premier and Cabinet, 2016). An extract of Resilient Artificial Shoreline susceptibility zones derived from Table 7 of this report is presented in Table 8, below.

Table 8: Coastal Erosion Susceptibility Zones – Resilient Artificial Shores.

Erosion Susceptibility Zone	Susceptibility Zone
Storm Bite and consequent reduced foundation stability zone	Low Hazard Zone
Potential Shoreline Recession to 2050	Acceptable Hazard Zone
Potential Shoreline Recession to 2100	Acceptable Hazard Zone
Acceptable. Landwards from maximum area that would have been zoned susceptible to erosion in the absence of artificial protection.	Acceptable Hazard Zone

Therefore, the site is considered to be in an acceptable hazard zone and **not** vulnerable to coastal erosion by 2100.

9.2 Discussion

The field investigation and desktop study has identified that Golf Links Road contributes by definition as a Resilient Artificial Shore.

The site has been identified as having an **ACCEPTABLE** risk from coastal erosion hazards. The presence of the road alignment has allowed for redefining the shoreline erosion hazard to a Resilient Artificial Shore.

The site is outside areas identified for projected permanent inundation and storm events by 2100. Therefore, the proposed development is identified as having an **ACCEPTABLE** risk from sea rise and permanent inundation.

It is considered that the proposed development does not require any mitigation or other control measures as no damage is likely to occur or will be manageable in the normal course of events if it does.

10 PAVEMENT SUBGRADE INVESTIGATION

10.1 Subgrade Evaluation

A published correlation between in-situ California Bearing Ratio (CBR) values and DCP test results is sourced from the Austroads Guide to Pavement Technology – Part 2: Pavement Structural Design. This correlation indicates that the natural subgrade materials within the boreholes along the proposed all weather access roads generally have minimum in-situ CBR values of approximately 2.5% to 8%.

The laboratory 4-day soaked CBR tests on the collected natural silty clay samples from Boreholes BH01 and BH02 returned CBR values of 1.5% to 2.5%.

Based on the findings of the investigation, a **design CBR value of 1.5%** for the natural silty clay can be used for road pavement design.

10.2 Construction

Should any area of the road or exposed subgrade deflect excessively during proof rolling, it is recommended that these areas be either ripped dried and compacted or alternatively be excavated and replaced with quarry rock run, compacted crushed rock fill or a quarry road base material as appropriate.

Variations in the exposed subgrade may occur across the site. It is therefore recommended that a visual inspection be carried out during the pavement preparation earthworks to ensure the exposed subgrade soils are uniform across the proposed paved area. Where variations in subgrade conditions are encountered it is recommended that additional CBR tests be carried out and the pavement design adjusted accordingly.

Adequate surface and subsurface drainage should be provided beneath and to the sides of the road discharging to the natural watercourse or stormwater system.

The exposed subgrade shall be compacted to at least 98% standard compaction.

It is recommended that a geotextile such as Triax be used to mechanically stabilise the subgrade, thereby allowing a reduction of the high pavement thickness required by the low CBR value of 1.5%.

Pavement materials should be compacted to a density ratio of at least 98% standard compaction in layers not exceeding 200mm compacted thickness and a moisture content within 2% of optimum.

11 DRAINAGE WITHIN PROPOSED LOT 12

The northern portion of proposed Lot 12 is subject to standing water during wet weather. It is recommended that the low-lying portion of the site be built up by the placement of granular fill, and that a drain be constructed near the northern site boundary as shown on Drawing 3 to capture stormwater runoff and create suitable building and on-site wastewater disposal areas, and access for the property.

12 ON-SITE WASTEWATER DISPOSAL LOTS 11 AND 12

It is noted that this is a preliminary assessment for subdivision approval and that site-specific assessments for the proposed lots will be required by the developers/owners once the actual location and size of the residential development is known.

12.1 Permeability of Soil and Soil Classification

Based on the findings of the borehole investigation, the soil has been classified as follows:

- Texture – Heavy clay (Table E1 from AS1547-2012);
- Structure – Massive (Table E4 from AS/NZS1547-2012); and
- Category – 6 (Table E1 from AS/NZS1547:2012).

For massive Category 6 soils the indicative permeability from AS1547 Table L1 is <0.06m/day.

- Adopted Permeability – 0.02m/day.

12.2 Disposal and Treatment Method

The soil within the proposed effluent disposal area is assessed as having sufficient depth and clay content to provide an adequate attenuation period for the breakdown of pathogens within the treated effluent.

As the site contains Category 6 soils that have a very low permeability primary treated effluent (eg septic tank and absorption trenches) is not suitable for disposal within these soils.

Therefore, based on the findings of the investigation and provided the setback distances are adhered to, this site assessment indicates that proposed Lots 11 and 12 are suitable for the disposal of secondary treated effluent by way of a Secondary Treatment System (STS) and sub-surface irrigation.

12.3 Setbacks

The area of previous standing water within proposed Lot 12 is unsuitable for the disposal of effluent without earthworks to raise the surface level of the ground to at least 9m AHD (Australian Height Datum).

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

- 27.0m from downslope sensitive features such as watercourses;
- 4.5m from downslope property boundaries;
- 1.5m from cross slope or upslope property boundaries;
- 3.8m from downslope buildings;
- 3.0m from upslope or cross-slope buildings; and
- 50.0m from groundwater bores.

The closest groundwater bore mapped on the LIST is more than 130m from the site.

12.4 Example of Minimum System Requirements

About 900m^2 (450m^2 for the effluent disposal area and 450m^2 as a backup area) would be required for an STS and sub-surface irrigation system to support a standard 4-bedroom dwelling on reticulated water within the assessed area of proposed Lots 11 and 12.

12.5 On-site Wastewater Disposal Conclusions

The results of the investigation indicate that proposed Lots 11 and 12 have adequate area available for the disposal of domestic effluent by way of secondary treated wastewater via a STS and subsurface irrigation, including sufficient reserve area.

Due to the size of proposed Lots 11 and 12 (i.e., 3,427m² and 3658m^2), careful planning will be required to ensure that any proposed buildings do not significantly reduce the area available for the disposal of on-site wastewater. Dwellings within proposed Lots 11 and 12 shall be restricted to a maximum of 4 bedrooms.

13 LIMITATIONS

Although the borehole 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 findings contained in 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 at the locations where boreholes were drilled. Under no

circumstances, however, can it be considered that these findings represent the actual state of the site at all points within the site.

14 REFERENCES

Australian Geomechanics Society. (2007). Practice note guidelines for landslide risk management. *Australian Geomechanics Journal, 42*(1), 115-158.

Austroads. (2019). *Guide to Pavement Technology Part 2: Pavement Structural Design.*

Department of Justice. (2017). *Building Act 2016 Director's Guidelines for On-site Wastewater Management Systems v2.0.* Consumer, Building and Occupational Services.

Department of Justice. (2021). *Building Act 2016: Director's Determination - Coastal Inundation Hazard Areas.* Consumer, Building and Occupational Services.

Department of Justice. (2021). *Building Act 2016: Director's Determination - Landslip Hazard Areas.* Consumer, Building and Occupational Services.

Department of Justice. (2021). *Building Act 2016: Director's Determination - Coastal Erosion Hazard Areas.* Consumer, Building and Occupational Services.

Department of Natural Resources and Environment Tasmania. (2024). *Groundwater Information Access Portal*. Retrieved from https://wrt.tas.gov.au/groundwater-info/

Elmer, S. (1971). *Slope stability of two areas near Wynyard, UR1971_01.* MRT.

Intergovernmental Committee on Surveying and Mapping. (2026). *Elvis - Elevation and Depth - Foundation Spatial Data*. Retrieved from https://elevation.fsdf.org.au/

Jennings, I. B. (1962). *Landslips at Parklands, Burnie, TR7_93_98.* MRT.

Jennings, I. B. (1964). *Landslides in the Burnie District, TR8_107_112.* MRT.

Matthews, W. L. (1964). *Geology of the Burnie Area, TR8_103_107.* MRT.

Matthews, W. L. (1969). *Examination of Proposed Subdivision, Burnie, TR14_64_65.* MRT.

Mineral Resources Tasmania. (2026). Retrieved from MRT TIGER Database: https://www.stategrowth.tas.gov.au/mrt/products/database_searches/documents_and_reports

Mineral Resources Tasmania. (2026). *MRT Boreholes*. Retrieved from https://maps.stategrowth.tas.gov.au/portal/apps/webappviewer/index.html?id=a944e36a6e7e40b6b81d4ce8ad7aa7cc&extent=15577770.0362%2C-5489073.5977%2C17143200.3755%2C-4724091.8187%2C102100&showLayers=Boreholes_and_Traces_760%3BBoreholes_and_Traces_760_0%3BBo

Sharples, C., Walford, H., & Roberts, L. (2013). *Coastal Erosion Susceptibility Zone Mapping for Hazard Band Definition in Tasmania, Report to DPAC.*

Standards Australia Limited. (2012). *AS/NZS 1547 On-site Domestic Wastewater Management.* Sydney: SAI Global Limited.

Standards Australia Limited. (2017). *AS 1726: Geotechnical Site Investigation.* Sydney: SAI Global Limited.

Tasmanian Government - Department of Natural Resources and Environment Tasmania. (2026). *Geoconservation - Karst*. Retrieved from https://nre.tas.gov.au/conservation/geoconservation/karst

Tasmanian Government Department of Premier and Cabinet. (2016). *Mitigating Natural Hazards through Land Use Planning and Building Control - Coastal Hazards in Tasmania - Summary Report - Consultation Draft.*

Tasmanian Government Department of Premier and Cabinet. (2016). *Mitigating Natural Hazards through Land Use Planning and Building Control - Coastal Hazards Technical Report.*

Tasmanian Government Land Tasmania. (2026). *Aerial Photo Viewer*. Retrieved from https://dpipwe-au.maps.arcgis.com/apps/webappviewer/index.html?id=01018d8cffe449ba8ac4c569a40bf5fb

Tasmanian Government Land Tasmania. (2026). *Land Information System Tasmania (LIST)*. Retrieved from https://maps.thelist.tas.gov.au/listmap/app/list/map

Tasmanina Planning Commission. (2026). *Tasmanian Planning Scheme*. Retrieved from https://www.planning.tas.gov.au/__data/assets/pdf_file/0011/711002/State-Planning-Provisions-effective-24-January-2024.PDF

GEOTON Pty Ltd

Geotechnical Consultants - Limitations of report

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

Project specific criteria

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

Subsurface variations with time

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

Interpretation of factual data

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

Report Recommendations

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

Specific purposes

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

Interpretation by others

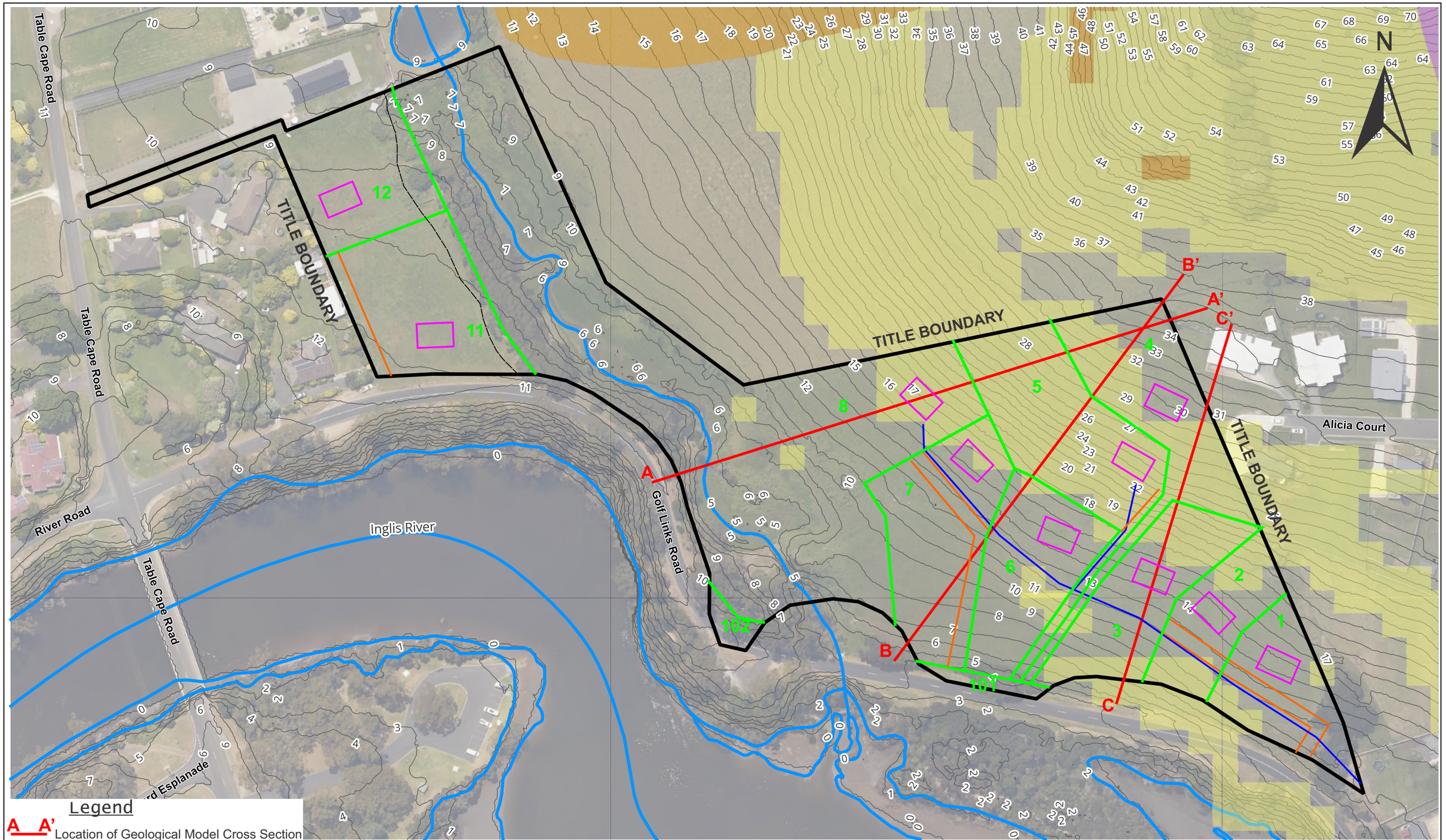
Geoton will not be responsible for interpretations of site data or the report findings by others involved in the design and construction process. Where any confusion exists, clarification should be sought from Geoton.

Report integrity

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

Geoenvironmental issues

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



Legend

- A A' — Location of Geological Model Cross Section
- 1 — Proposed Lot and Number
- 10 — Contour in Metres (LiDAR Derived)
- Watercourse
- Low Landslide Hazard Band (LIST)
- Medium Landslide Hazard Band (LIST)
- Right of Way
- Proposed Sewer
- Indicative Build Area

Approximate Scale

50 0 50 100 m

GEOTON Pty Ltd

Date	12/08/2026	Drawn	AF
Scale	1:1,500	Approved	TB
Original size	A3	Rev	2

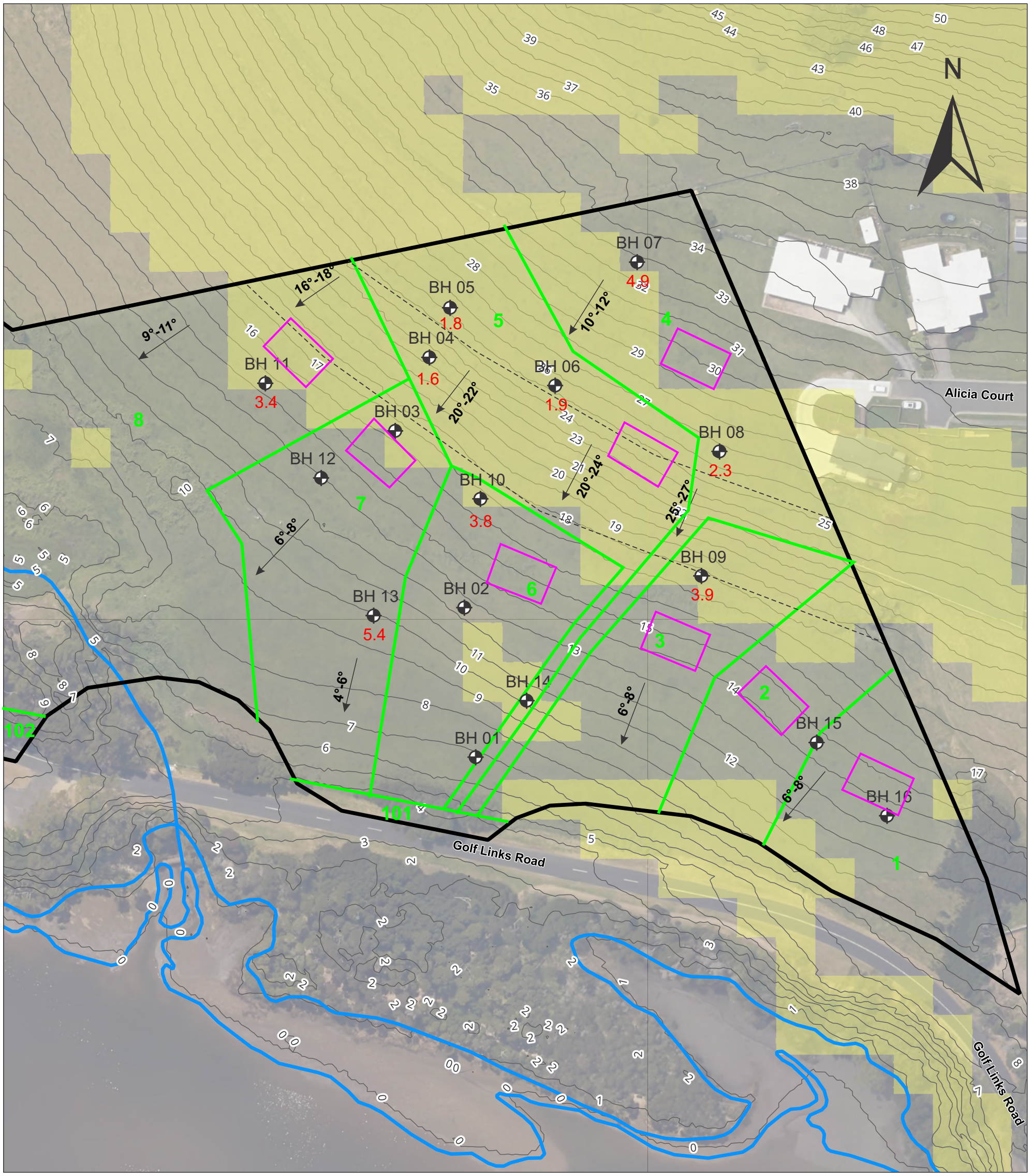
Client: BLUFF DEVELOPMENTS ESTATE PTY LTD

Project: LOT 2 GOLF LINKS ROAD WYNYARD

Title: SUBDIVISION LAYOUT

Project no: GL24537A

Drawing no. 1



Legend

BH 1 — Approximate Borehole Location

3.9 — Depth of Auger Refusal

5° — Approximate Slope angle in Degrees

10 — Contour in Metres (LiDAR Derived)

1 — Proposed Lots and Numbers

Watercourse

Approximate Change in Slope

Low Landslide Hazard Band (LIST)

Indicative Building Area

25 0 25 50 m

Approximate Scale

GEOTON Pty Ltd

Date	12/08/2026	Drawn	AF
Scale	1:1,000	Approved	TB
Original size	A3	Rev	2

Client: BLUFF DEVELOPMENTS ESTATE PTY LTD

Project: LOT 2 GOLF LINKS ROAD WYNYARD

Title: SITE PLAN EAST

Project no: GL24537A

Drawing no. 2

AREA WHERE WATER HAS BEEN LYING DURING WETTER MONTHS

PROPOSED DRAIN

TITLE BOUNDARY

TITLE BOUNDARY

TITLE BOUNDARY

1°-2°

2°-4°

10°-12°

1°-3°

BH 19

BH 18

BH 17

12

11

8

Golf Links Road

Inglis River

Table Cape Road

N

Legend

BH 1 — Approximate Borehole Location

5° — Approximate Slope angle in Degrees

10 — Contour in Metres (LiDAR Derived)

1 — Proposed Lots and Numbers

Watercourse

Approximate Change in Slope

Indicative Building Area

Area Available for the Disposal of Wastewater

Required Setback from Watercourse for Wastewater Disposal

25 0 25 50 m

Approximate Scale

GEOTON Pty Ltd

Date	12/08/2026	Drawn	AF
Scale	1:1,000	Approved	TB
Original size	A3	Rev	2

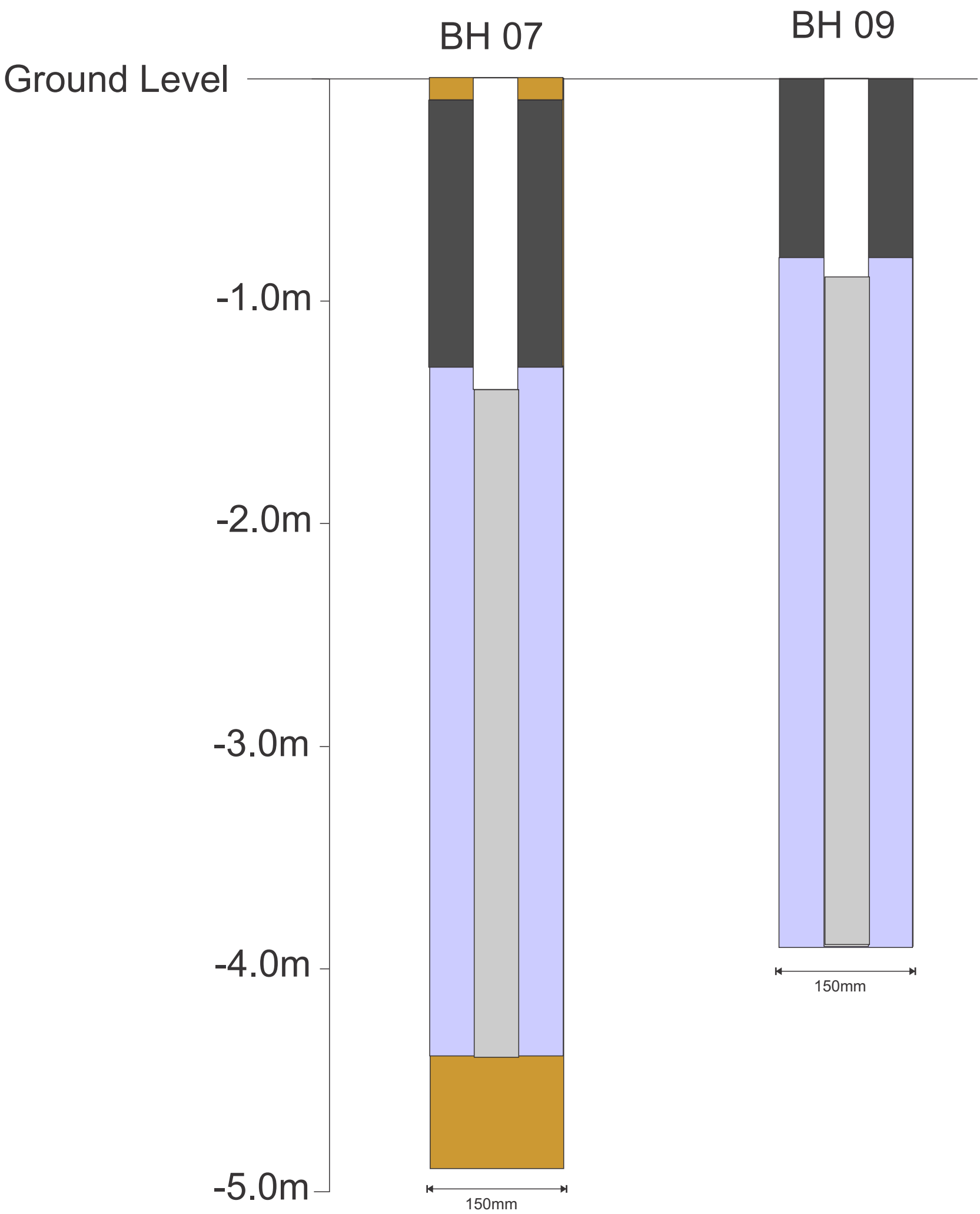
Client: BLUFF DEVELOPMENTS ESTATE PTY LTD

Project: LOT 2 GOLF LINKS ROAD WYNYARD

Title: SITE PLAN WEST

Project no: GL24537A

Drawing no. 3



Legend

- Solid 50mm Diameter PCV Pipe
- Slotted 50mm Diameter PVC Pipe
- Bentonite
- Gravel
- Cave In/Backfill

GEOTON Pty Ltd

Date	12/08/2026	Drawn	AF
Scale	As Shown	Approved	TB
Original size	A3	Rev	2

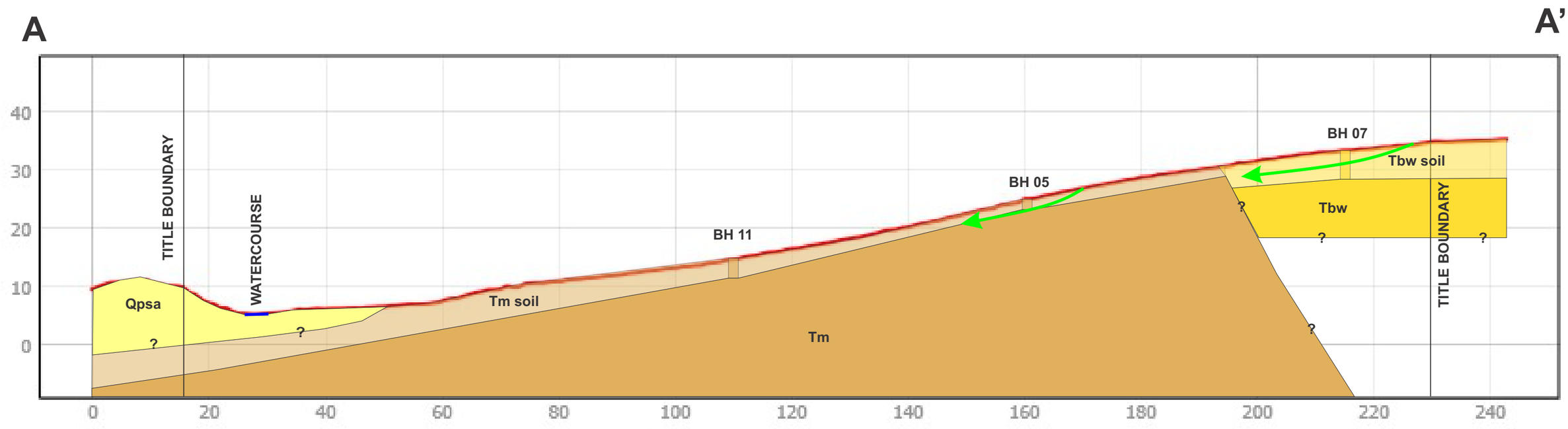
Client: BLUFF DEVELOPMENTS ESTATE PTY LTD

Project: LOT 2 GOLF LINKS ROAD WYNYARD

Title: GROUNDWATER MONITORING WELL CONFIGURATIONS

Project no: GL24537A

Drawing no. 4



Legend

Paleogene-Neogene

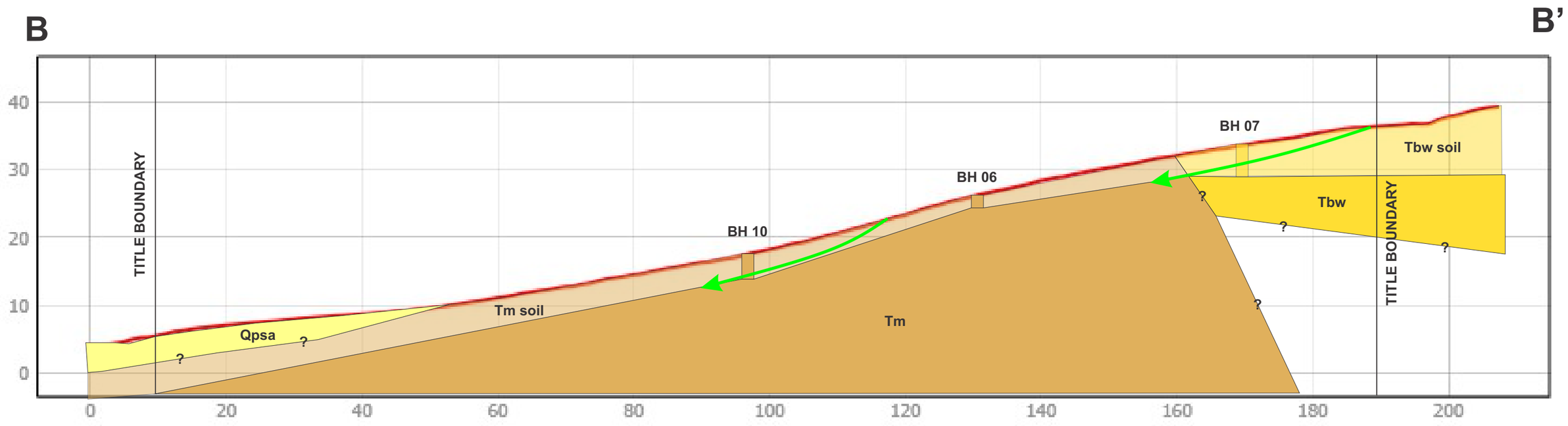
- Tm — Calcareous sandstone and calcarenite with Lower Miocene/Upper Oligocene marine fossils (Table Cape Group)
- Tbw — Predominantly deeply-weathered basalt

Quaternary

- Qpsa — Older sand, gravel and clay on coastal plains

Possible Landslide Scenario

GEOTON Pty Ltd				Client:	BLUFF DEVELOPMENTS ESTATE PTY LTD
				Project:	LOT 2 GOLF LINKS ROAD WYNYARD
Date	12/08/2026	Drawn	TB		
Scale	As Shown	Approved	AF	Title:	GEOLOGICAL MODEL A-A’
Original size	A3	Rev	2	Project no: GL24537A	Drawing no. 5



Legend

Paleogene-Neogene

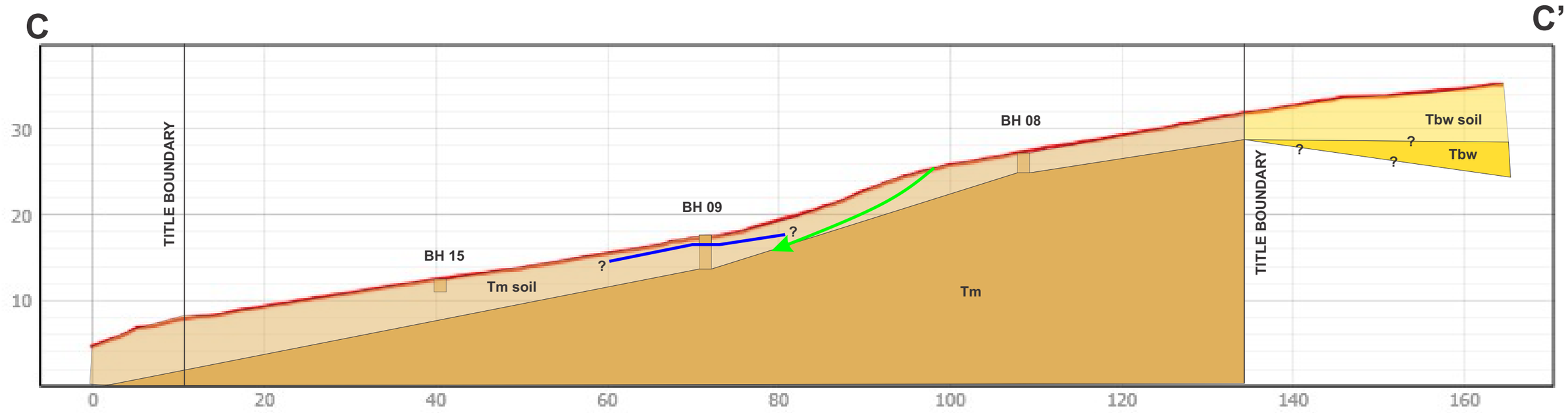
- Tm — Calcareous sandstone and calcarenite with Lower Miocene/Upper Oligocene marine fossils (Table Cape Group)
- Tbw — Predominantly deeply-weathered basalt

Quaternary

- Qpsa — Older sand, gravel and clay on coastal plains

Possible Landslide Scenario

GEOTON Pty Ltd				Client:	BLUFF DEVELOPMENTS ESTATE PTY LTD
				Project:	LOT 2 GOLF LINKS ROAD WYNYARD
Date	12/08/2026	Drawn	TB		
Scale	As Shown	Approved	AF	Title:	GEOLOGICAL MODEL B-B’
Original size	A3	Rev	2	Project no: GL24537A	Drawing no. 6



Legend

Paleogene-Neogene

- Tm — Calcareous sandstone and calcarenite with Lower Miocene/Upper Oligocene marine fossils (Table Cape Group)
- Tbw — Predominantly deeply-weathered basalt

Quaternary

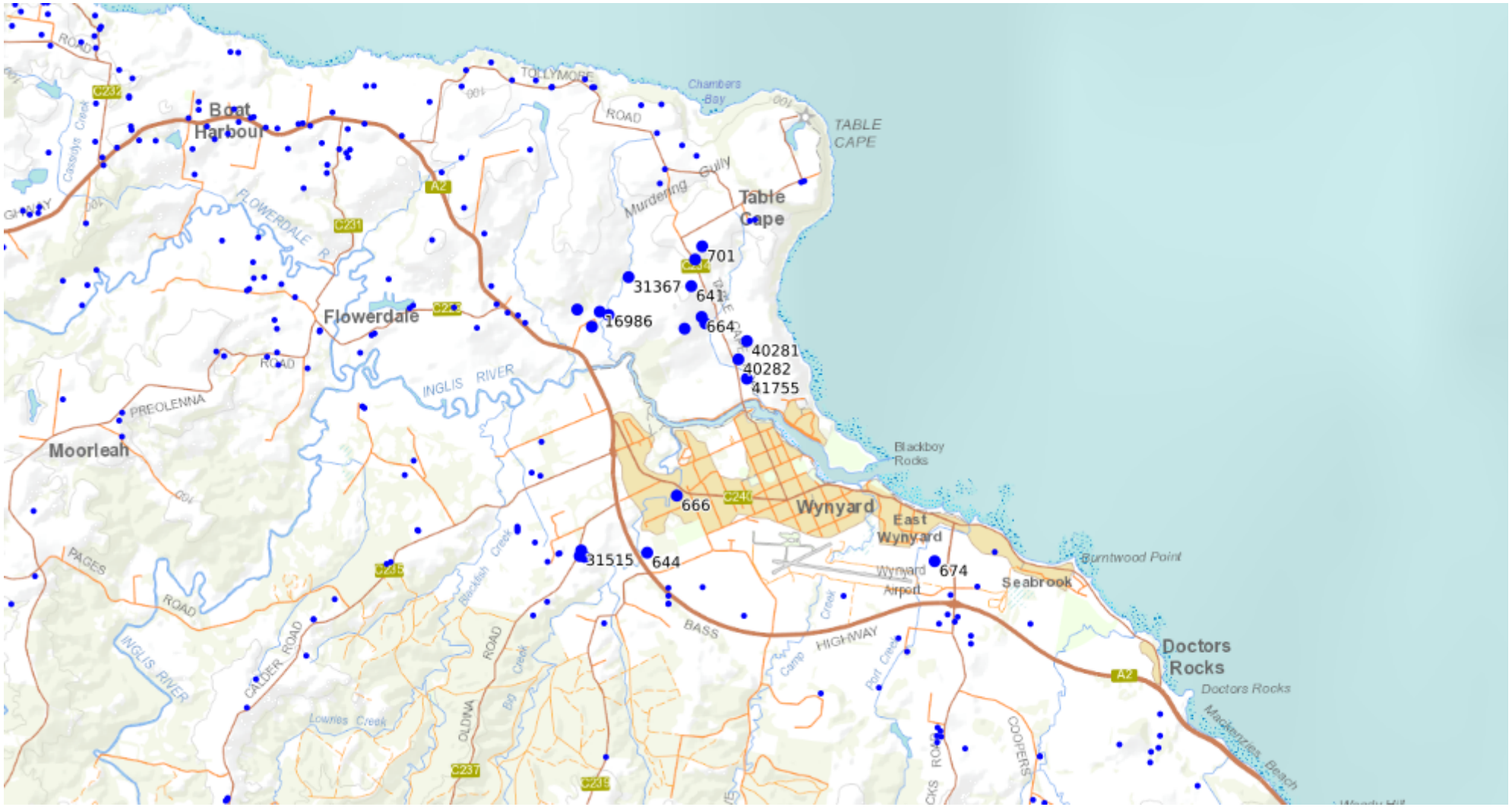
- Qpsa — Older sand, gravel and clay on coastal plains

Possible Landslide Scenario

GEOTON Pty Ltd				Client:	BLUFF DEVELOPMENTS ESTATE PTY LTD
				Project:	LOT 2 GOLF LINKS ROAD WYNYARD
Date	12/08/2026	Drawn	TB		
Scale	As Shown	Approved	AF	Title:	GEOLOGICAL MODEL C-C’
Original size	A3	Rev	2	Project no: GL24537A	Drawing no. 7

Appendix A

Detailed Information of Groundwater Bores



Identification

Feature id: 641 **Feature type:** Bore

Location

Locality: Wynyard
Easting: 391600.000 **Datum:** GDA94
Northing: 5464271.000 **Accuracy:** 2000
Ground level (m ASL):

Construction

Date drilled: 29/05/1975
Drilling company: Mono Pumps Australia Pty Ltd
Depth (metres): 39.30
Initial yield (L/sec): 0.90
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
0.0	39.3	140.00	Air Percussion (Rotary air - R)

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
0.0	39.3		152.00	unknown

Screens

From (m)	To (m)	Inlet type
NA		

Seals

From (m)	To (m)	Material type
NA		

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
NA		

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
29/05/1975	35.7		0.90

Main aquifer geology: Permian
Final TDS (mg/L):

Standing Water Levels

Standing water levels

Date	SWL (metres)
NA	

Current status

Last recorded statuses

Type	Value	Date recorded
function	functioning	29/05/1975
purpose	Unknown	29/05/1975

Identification

Feature id: 644 **Feature type:** Bore

Location

Locality: Wynyard
Easting: 391047.000 **Datum:** GDA94
Northing: 5460925.000 **Accuracy:** 2000
Ground level (m ASL):

Construction

Date drilled: 15/07/1973
Drilling company: Mono Pumps Australia Pty Ltd
Depth (metres): 59.00
Initial yield (L/sec): 1.01
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
0.0	59.0		Air Percussion (Rotary air - R)

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
0.0	14.9		152.00	unknown

Screens

From (m)	To (m)	Inlet type
NA		

Seals

From (m)	To (m)	Material type
NA		

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
0.0	0.3	top soil
0.3	1.5	black sandy clay
1.5	3.7	brown sandy clay
3.7	5.2	decomposed materials
5.2	6.1	grey sandy clay
6.1	11.0	brown sandy clay
11.0	12.8	sandy clay
12.8	21.3	mudstone
21.3	21.9	clay and fossilised shells
21.9	30.5	mudstone

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
15/07/1973	27.4		
15/07/1973	50.3		
15/07/1973	56.0		1.01

Main aquifer geology: Permian
Final TDS (mg/L): 1100

Standing Water Levels

Standing water levels

Date	SWL (metres)
15/07/1973	18.30

Current status

Last recorded statuses

Type	Value	Date recorded
function	Unknown	15/07/1973
purpose	Unknown	15/07/1973

Identification

Feature id: 663 **Feature type:** Bore

Location

Locality: Table Cape
Easting: 391517.000 **Datum:** GDA94
Northing: 5463736.000 **Accuracy:** 2000
Ground level (m ASL):

Construction

Date drilled: 18/04/1979
Drilling company: Mono Pumps Australia Pty Ltd
Depth (metres): 42.70
Initial yield (L/sec): 1.50
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
0.0	42.7	140.00	Air Percussion (Rotary air - R)

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
NA				

Screens

From (m)	To (m)	Inlet type
NA		

Seals

From (m)	To (m)	Material type
NA		

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
0.0	1.5	top soil
1.5	6.1	clay
6.1	39.7	decomposed basalt
39.7	42.7	sand

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
18/04/1979	18.3	42.7	1.50

Main aquifer geology: Tertiary Basalt
Final TDS (mg/L):

Standing Water Levels

Standing water levels

Date	SWL (metres)
NA	

Current status

Last recorded statuses

Type	Value	Date recorded
function	abandoned	18/04/1979

Identification

Feature id: 664 **Feature type:** Bore

Location

Locality: Table Cape
Easting: 391730.000 **Datum:** GDA94
Northing: 5463884.000 **Accuracy:** 2000
Ground level (m ASL):

Construction

Date drilled: 20/04/1979
Drilling company: Mono Pumps Australia Pty Ltd
Depth (metres): 38.10
Initial yield (L/sec): 5.05
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
0.0	38.1	152.00	Air Percussion (Rotary air - R)

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
0.0	38.1		152.00	unknown

Screens

From (m)	To (m)	Inlet type
NA		

Seals

From (m)	To (m)	Material type
NA		

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
0.0	4.6	red topsoil
4.6	10.7	clay
10.7	38.1	decomposed basalt

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
20/04/1979	13.7	36.6	5.05

Main aquifer geology: Tertiary Basalt
Final TDS (mg/L):

Standing Water Levels

Standing water levels

Date	SWL (metres)
NA	

Current status

Last recorded statuses

Type	Value	Date recorded
function	functioning	20/04/1979

Identification

Feature id: 666 **Feature type:** Bore

Location

Locality: Wynyard
Easting: 391418.000 **Datum:** GDA94
Northing: 5461642.000 **Accuracy:** 100
Ground level (m ASL):

Construction

Date drilled: 12/10/1971
Drilling company: Mono Pumps Australia Pty Ltd
Depth (metres): 103.60
Initial yield (L/sec): 0.38
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
0.0	103.6	152.00	Air Percussion (Rotary air - R)

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
0.0	4.6		152.00	unknown

Screens

From (m)	To (m)	Inlet type
NA		

Seals

From (m)	To (m)	Material type
NA		

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
0.0	1.8	top soil and clay
1.8	3.7	clay and gravel
3.7	103.6	tillite ?? and quartz

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
12/10/1971	24.4		0.38

Main aquifer geology: Permian
Final TDS (mg/L):

Standing Water Levels

Standing water levels

Date	SWL (metres)
12/10/1971	4.60

Current status

Last recorded statuses

Type	Value	Date recorded
function	abandoned	12/10/1971

Identification

Feature id: 674 **Feature type:** Bore

Location

Locality: Wynyard
Easting: 394658.000 **Datum:** GDA94
Northing: 5460818.000 **Accuracy:** 2000
Ground level (m ASL):

Construction

Date drilled: 10/12/1980
Drilling company: G and G Drilling Pty Ltd
Depth (metres): 9.10
Initial yield (L/sec): 1.55
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
0.0	9.1	190.00	Air Percussion (Rotary air - R)

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
0.0	7.6		152.00	unplasticised polyvinylchloride uPVC

Screens

From (m)	To (m)	Inlet type
NA		

Seals

From (m)	To (m)	Material type
NA		

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
0.0	2.5	soft soil
2.5	7.6	gravel
7.6	9.1	river wash

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
10/12/1980	7.6		1.55

Main aquifer geology: Tertiary Sediments
Final TDS (mg/L):

Standing Water Levels

Standing water levels

Date	SWL (metres)
10/12/1980	0.90

Current status

Last recorded statuses

Type	Value	Date recorded
function	functioning	10/12/1980

Identification

Feature id: 701 **Feature type:** Bore

Location

Locality: Table Cape
Easting: 391738.000 **Datum:** GDA94
Northing: 5464769.000 **Accuracy:** 2000
Ground level (m ASL):

Construction

Date drilled:
Drilling company: Phillips
Depth (metres): 36.60
Initial yield (L/sec):
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
0.0	36.6		Air Percussion (Rotary air - R)

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
NA				

Screens

From (m)	To (m)	Inlet type
NA		

Seals

From (m)	To (m)	Material type
NA		

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
0.0	36.6	basalt

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
NA			

Main aquifer geology: Tertiary Basalt
Final TDS (mg/L):

Standing Water Levels

Standing water levels

Date	SWL (metres)
NA	

Current status

Last recorded statuses

Type	Value	Date recorded
function	Unknown	

Identification

Feature id: 4759 **Feature type:** Bore

Location

Locality: Wynyard
Easting: 391777.000 **Datum:** GDA94
Northing: 5463803.000 **Accuracy:** 200
Ground level (m ASL):

Construction

Date drilled: 07/01/1987
Drilling company: Gerald Spaulding Drillers Pty Ltd
Depth (metres): 36.60
Initial yield (L/sec): 1.26
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
0.0	36.6	203.00	Air Percussion (Rotary air - R)

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
0.0	36.6		152.00	unplasticised polyvinylchloride uPVC

Screens

From (m)	To (m)	Inlet type
NA		

Seals

From (m)	To (m)	Material type
NA		

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
0.0	12.2	clay
12.2	36.6	basalt

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
NA			

Main aquifer geology: Tertiary Basalt
Final TDS (mg/L):

Standing Water Levels

Standing water levels

Date	SWL (metres)
07/01/1987	18.30

Current status

Last recorded statuses

Type	Value	Date recorded
function	functioning	07/01/1987

Identification

Feature id: 16986 **Feature type:** Bore

Location

Locality: Wynyard
Easting: 390450.000 **Datum:** GDA94
Northing: 5463950.000 **Accuracy:** 500
Ground level (m ASL):

Construction

Date drilled: 28/01/1997
Drilling company: Gerald Spaulding Drillers Pty Ltd
Depth (metres): 29.00
Initial yield (L/sec): 1.01
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
0.0	29.0	203.00	Air Percussion (Rotary air - R)

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
0.0	29.0	147.00	160.00	"unplasticised polyvinylchloride uPVC, Class 9"

Screens

From (m)	To (m)	Inlet type
NA		

Seals

From (m)	To (m)	Material type
NA		

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
0.0	4.6	clay
4.6	25.9	soft grey mudstone
25.9	29.0	Calder gravel and sand (2 to 30 mm diameter)

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
28/01/1997	25.9	29.0	1.01

Main aquifer geology: Tertiary Sediments
Final TDS (mg/L):

Standing Water Levels

Standing water levels

Date	SWL (metres)
28/01/1997	15.20

Current status

Last recorded statuses

Type	Value	Date recorded
function	functioning	28/01/1997

Identification

Feature id: 31367 **Feature type:** Bore

Location

Locality: Table Cape
Easting: 390813.000 **Datum:** GDA94
Northing: 5464383.000 **Accuracy:** 500
Ground level (m ASL):

Construction

Date drilled: 01/01/2003
Drilling company: Gerald Spaulding Drillers Pty Ltd
Depth (metres): 100.00
Initial yield (L/sec): 6.32
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
0.0	100.0	203.00	Unknown

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
0.0	24.0	152.00	152.00	"unplasticised polyvinylchloride uPVC, Class 12"
24.0	80.0	152.00	152.00	"unplasticised polyvinylchloride uPVC, Class 9"

Screens

From (m)	To (m)	Inlet type
NA		

Seals

From (m)	To (m)	Material type
NA		

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
0.0	9.0	clay
9.0	13.0	loose basalt
13.0	18.0	sandy clay
18.0	23.0	basalt
23.0	100.0	mudstone

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
NA			

Main aquifer geology: Tertiary Sediments
Final TDS (mg/L):

Standing Water Levels

Standing water levels

Date	SWL (metres)
NA	

Current status

Last recorded statuses

Type	Value	Date recorded
function	functioning	01/01/2003
purpose	Unknown	01/01/2003

Identification

Feature id: 31513 **Feature type:** Bore

Location

Locality: Wynyard
Easting: 390266.000 **Datum:** GDA94
Northing: 5460872.000 **Accuracy:** 100
Ground level (m ASL):

Construction

Date drilled: 03/02/2000
Drilling company: Gerald Spaulding Drillers Pty Ltd
Depth (metres): 61.00
Initial yield (L/sec):
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
NA			

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
NA				

Screens

From (m)	To (m)	Inlet type
NA		

Seals

From (m)	To (m)	Material type
NA		

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
0.0	12.0	clay
12.0	61.0	mudstone

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
NA			

Main aquifer geology: Permian
Final TDS (mg/L):

Standing Water Levels

Standing water levels

Date	SWL (metres)
NA	

Current status

Last recorded statuses

Type	Value	Date recorded
function	abandoned	03/02/2000
purpose	Unknown	03/02/2000

Identification

Feature id: 31514 **Feature type:** Bore

Location

Locality: Wynyard
Easting: 390198.000 **Datum:** GDA94
Northing: 5460884.000 **Accuracy:** 100
Ground level (m ASL):

Construction

Date drilled: 03/02/2000
Drilling company: Gerald Spaulding Drillers Pty Ltd
Depth (metres): 79.00
Initial yield (L/sec):
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
NA			

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
NA				

Screens

From (m)	To (m)	Inlet type
NA		

Seals

From (m)	To (m)	Material type
NA		

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
0.0	9.0	clay
9.0	79.0	mudstone

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
NA			

Main aquifer geology: Permian
Final TDS (mg/L):

Standing Water Levels

Standing water levels

Date	SWL (metres)
NA	

Current status

Last recorded statuses

Type	Value	Date recorded
function	abandoned	03/02/2000
purpose	Unknown	03/02/2000

Identification

Feature id: 31515 **Feature type:** Bore

Location

Locality: Wynyard
Easting: 390218.000 **Datum:** GDA94
Northing: 5460953.000 **Accuracy:** 25
Ground level (m ASL):

Construction

Date drilled: 03/02/2000
Drilling company: Gerald Spaulding Drillers Pty Ltd
Depth (metres): 61.00
Initial yield (L/sec):
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
NA			

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
NA				

Screens

From (m)	To (m)	Inlet type
NA		

Seals

From (m)	To (m)	Material type
NA		

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
0.0	0.6	clay
0.6	61.0	mudstone shale

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
NA			

Main aquifer geology: Permian
Final TDS (mg/L):

Standing Water Levels

Standing water levels

Date	SWL (metres)
NA	

Current status

Last recorded statuses

Type	Value	Date recorded
function	abandoned	03/02/2000
purpose	Unknown	03/02/2000

Identification

Feature id: 40258 **Feature type:** Bore

Location

Locality: Flowerdale
Easting: 390560.000 **Datum:** GDA94
Northing: 5463909.000 **Accuracy:** 50
Ground level (m ASL):

Construction

Date drilled: 09/04/2009
Drilling company: Gerald Spaulding Drillers Pty Ltd
Depth (metres): 24.00
Initial yield (L/sec): 4.42
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
4.0	24.0	162.00	Downhole Hammer (Rotary Hammer)
0.0	4.0	162.00	Rotary (Rotary Mud)

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
0.0	6.0	125.00	140.00	"unplasticised polyvinylchloride uPVC, Class 12"
18.0	24.0	125.00	140.00	"unplasticised polyvinylchloride uPVC, Class 12"

Screens

From (m)	To (m)	Inlet type
6.0	18.0	slotted casing

Seals

From (m)	To (m)	Material type
NA		

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
0.0	6.0	Clay
6.0	12.0	Decomposed mudstone
12.0	18.0	Mudstone
18.0	24.0	Mudstone - Sand & gravel

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
09/04/2009	8.0	10.0	
09/04/2009	16.0	17.0	4.42

Main aquifer geology: Tertiary Sediments

Final TDS (mg/L):

Standing Water Levels

Standing water levels

Date	SWL (metres)
09/04/2009	3.50

Current status

Last recorded statuses

Type	Value	Date recorded
function	capped	09/04/2009

Identification

Feature id: 40281 **Feature type:** Bore

Location

Locality: Wynyard
Easting: 392298.000 **Datum:** GDA94
Northing: 5463582.000 **Accuracy:** 25
Ground level (m ASL):

Construction

Date drilled: 04/05/2009
Drilling company: Gerald Spaulding Drillers Pty Ltd
Depth (metres): 96.00
Initial yield (L/sec): 2.53
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
12.0	96.0	200.00	Downhole Hammer (Rotary Hammer)
0.0	12.0	200.00	Downhole Hammer (Rotary Hammer)

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
0.0	12.0	200.00		steel
0.0	24.0	125.00		unplasticised polyvinylchloride uPVC

Screens

From (m)	To (m)	Inlet type
24.0	54.0	slotted casing

Seals

From (m)	To (m)	Material type
54.0	96.0	

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
0.0	12.0	Clay with basalt floaters
12.0	24.0	Hard basalt
24.0	30.0	Grey clay with basalt chips
30.0	54.0	Hard basalt little fractures
54.0	78.0	Grey clay, basalt chips, small shells & river silt
78.0	96.0	Mudstone, grey

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
04/05/2009	24.0	42.0	

Main aquifer geology: Tertiary Basalt
Final TDS (mg/L):

Standing Water Levels

Standing water levels

Date	SWL (metres)
04/05/2009	16.00

Current status

Last recorded statuses

Type	Value	Date recorded
function	functioning	04/05/2009

Identification

Feature id: 40282 **Feature type:** Bore

Location

Locality: Wynyard
Easting: 392191.000 **Datum:** GDA94
Northing: 5463352.000 **Accuracy:** 25
Ground level (m ASL):

Construction

Date drilled: 06/05/2009
Drilling company: Gerald Spaulding Drillers Pty Ltd
Depth (metres): 72.00
Initial yield (L/sec): 1.64
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
6.0	72.0	200.00	Downhole Hammer (Rotary Hammer)
0.0	6.0	200.00	Downhole Hammer (Rotary Hammer)

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
0.0	6.0	200.00		steel
0.0	30.0		127.00	unplasticised polyvinylchloride uPVC

Screens

From (m)	To (m)	Inlet type
6.0	18.0	slotted casing

Seals

From (m)	To (m)	Material type
52.0	72.0	rock

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
0.0	12.0	Topsoil clay
12.0	45.0	Grey clay, sea-shells & river silt
45.0	72.0	Mudstone black with quarts & shale

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
06/05/2009	12.0	24.0	
06/05/2009	36.0	42.0	1.64

Main aquifer geology: Tertiary Sediments

Final TDS (mg/L):

Standing Water Levels

Standing water levels

Date	SWL (metres)
06/05/2009	4.00

Current status

Last recorded statuses

Type	Value	Date recorded
function	functioning	06/05/2009

Identification

Feature id: 40766 **Feature type:** Bore

Location

Locality: Wynyard
Easting: 391648.000 **Datum:** GDA94
Northing: 5464605.000 **Accuracy:** 25
Ground level (m ASL):

Construction

Date drilled: 18/01/2007
Drilling company: Gerald Spaulding Drillers Pty Ltd
Depth (metres): 96.00
Initial yield (L/sec): 0.63
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
60.0	96.0	162.00	Downhole Hammer (Rotary Hammer)
23.0	60.0	200.00	Downhole Hammer (Rotary Hammer)
0.0	23.0	200.00	Rotary (Rotary Mud)

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
0.0	23.0	200.00		steel
0.0	36.0	150.00		unplasticised polyvinylchloride uPVC

Screens

From (m)	To (m)	Inlet type
36.0	60.0	slotted casing

Seals

From (m)	To (m)	Material type
NA		

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
0.0	6.0	Top soil
6.0	24.0	Clay
24.0	96.0	Basalt

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
18/01/2007	36.0	42.0	0.32
18/01/2007	42.0	54.0	0.63

Main aquifer geology: Tertiary Basalt

Final TDS (mg/L):

Standing Water Levels

Standing water levels

Date	SWL (metres)
18/01/2007	12.00

Current status

Last recorded statuses

Type	Value	Date recorded
function	capped	18/01/2007

Identification

Feature id: 41755 **Feature type:** Bore

Location

Locality: Wynyard
Easting: 392298.000 **Datum:** GDA94
Northing: 5463110.000 **Accuracy:** 5
Ground level (m ASL):

Construction

Date drilled: 01/09/2016
Drilling company: Gerald Spaulding Drillers Pty Ltd
Depth (metres): 66.00
Initial yield (L/sec): 0.50
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
0.0	16.0	250.00	Downhole Hammer (Rotary Hammer)
16.0	66.0	200.00	Downhole Hammer (Rotary Hammer)

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
0.0	12.0	125.00	140.00	"unplasticised polyvinylchloride uPVC, Class 12"
0.0	15.0	210.00	219.00	steel
30.0	54.0	125.00	140.00	"unplasticised polyvinylchloride uPVC, Class 12"
60.0	66.0	125.00	140.00	"unplasticised polyvinylchloride uPVC, Class 12"

Screens

From (m)	To (m)	Inlet type
12.0	30.0	slotted casing
54.0	60.0	slotted casing

Seals

From (m)	To (m)	Material type
0.0	8.0	spoil-cuttings

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
0.0	3.0	top soil and clay
3.0	13.0	sand
13.0	14.0	clay
14.0	17.0	gravel
17.0	66.0	mudstone

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
01/09/2016	18.0	18.0	0.20
01/09/2016	54.0	66.0	0.50

Main aquifer geology:
Final TDS (mg/L):

Standing Water Levels

Standing water levels

Date	SWL (metres)
01/09/2016	5.00

Current status

Last recorded statuses

Type	Value	Date recorded
function	capped	01/09/2016

Identification

Feature id: 42618 **Feature type:** Bore

Location

Locality: Flowerdale
Easting: 390351.000 **Datum:** GDA94
Northing: 5463762.000 **Accuracy:** 5
Ground level (m ASL):

Construction

Date drilled: 06/05/2022
Drilling company: Gerald Spaulding Drillers Pty Ltd
Depth (metres): 18.00
Initial yield (L/sec): 6.00
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
6.0	24.0	178.00	Downhole Hammer (Rotary Hammer)
1.0	6.0	225.00	Air Percussion (Rotary air - R)

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
0.0	12.0	125.00	140.00	"unplasticised polyvinylchloride uPVC, Class 12"

Screens

From (m)	To (m)	Inlet type
12.0	18.0	slotted casing

Seals

From (m)	To (m)	Material type
0.0	5.0	spoil-cuttings
5.0	6.0	bentonite clay

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
0.0	1.0	Sandy topsoil
1.0	3.0	Clay
3.0	15.0	Mudstone
15.0	24.0	Shingle rock, quartz gravel & silt

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
06/05/2022	15.0	18.0	3.00
06/05/2022	18.0	24.0	6.00

Main aquifer geology: Tertiary Sediments

Final TDS (mg/L): 310

Standing Water Levels

Standing water levels

Date	SWL (metres)
06/05/2022	4.00

Current status

Last recorded statuses

Type	Value	Date recorded
function	capped	06/05/2022

Identification

Feature id: 42714 **Feature type:** Bore

Location

Locality: Wynyard
Easting: 390167.000 **Datum:** GDA94
Northing: 5463977.000 **Accuracy:** 5
Ground level (m ASL):

Construction

Date drilled: 25/09/2023
Drilling company: Gerald Spaulding Drillers Pty Ltd
Depth (metres): 64.00
Initial yield (L/sec): 4.00
Initial EC (µS/cm):

Bore diameters

From (m)	To (m)	Diameter (mm)	Drilling technique
0.0	9.0	225.00	Air Percussion (Rotary air - R)
0.0	36.0	250.00	Downhole Hammer (Rotary Hammer)
36.0	66.0	178.00	Downhole Hammer (Rotary Hammer)

Casings

From (m)	To (m)	Inside diameter (mm)	Outside diameter (mm)	Material
0.0	58.0	125.00	140.00	"unplasticised polyvinylchloride uPVC, Class 12"
0.0	66.0	208.00	219.00	steel

Screens

From (m)	To (m)	Inlet type
58.0	64.0	slotted casing

Seals

From (m)	To (m)	Material type
0.0	7.0	spoil-cuttings
7.0	9.0	bentonite clay
9.0	9.3	rubber

Geological / Hydrogeological Information

Lithological Log

From (m)	To (m)	Lithological description
0.0	1.0	Topsoil
1.0	7.0	Clay Decomposed basalt
7.0	9.0	Quartz gravels & clay
9.0	33.0	Grey mudstone
33.0	50.0	Sand, veg/wood & quartz gravels
50.0	66.0	Fine quartz gravel to large shingle rock

Depth to water struck

Date	From (m)	To (m)	Cumulative yield
25/09/2023	33.0	66.0	4.00

Main aquifer geology: Tertiary Sediments
Final TDS (mg/L): 370

Standing Water Levels

Standing water levels

Date	SWL (metres)
25/09/2023	18.00

Current status

Last recorded statuses

Type	Value	Date recorded
function	capped	25/09/2023

Appendix B

Borehole Logs

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH01

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392614
Northing : 5462756
Inclination : -90deg
Azimuth :

Sheet : 1 OF 1
Job No : GL24537A
Logged : AF
Logged Date : 06/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing: DCP	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV				2			ML	Topsoil- Clayey SILT- low plasticity, brown, root fibres	M	F	
				2							
				2	0.25		CI	Natural- Silty CLAY- medium plasticity, brown grey.	M	F-St	w ~ PL
				2							
			Bs: CBR=1.5%	3			CH	Natural- Silty CLAY- high plasticity, brown mottled grey.	W-M	F-St	w > PL, w < LL
				3	0.50						
				3							
				3	0.75						
				2							
				2							
				3	1						
				3							
				2	1.25						
				5							
				3			LST	Extremely weathered LIMESTONE- Sandy CLAY soil properties- medium plasticity, orange brown, fine grained sand.	M	St	
				5							
				13				**BH01 Terminated at 1.5m**			
					1.75						
					2						
					2.25						
					2.50						
					2.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH02

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392620
Northing : 5462796
Inclination : -90deg
Azimuth :

Sheet : 1 OF 1
Job No : GL24537A
Logged : AF
Logged Date : 06/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing: DCP	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV				3			ML	Topsoil- Clayey SILT- low plasticity, brown, root fibres	M	St	
				4							
				3	0.25		CH	Natural- Silty CLAY- high plasticity, brown grey, trace cobbles	W-M	St	w > PL, w < LL
			Bs: CBR=2.5%	12							
				5							
				4	0.50						
				4							
				4	0.75						
				4							
				7							
				9	1						
				11							
				14	1.25						
							CH	Becoming brown.	M	VSt	w < PL
								BH02 Terminated at 1.5m			
					1.75						
					2						
					2.25						
					2.50						
					2.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH03

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392599
Northing : 5462844
Inclination : -90deg
Azimuth :

Sheet : 1 OF 1
Job No : GL24537A
Logged : AF
Logged Date : 06/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing DCP	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV				4			ML	Topsoil- Clayey SILT- low plasticity, brown, root fibres	M	St	
				3							
				2	0.25		CH	Natural- Silty CLAY- high plasticity, brown grey.	W-M	F	w > PL, w < LL
				2							
				1							
				2	0.50						
				3							
				4	0.75						
				2							
				3							
				2	1						
				2							
				3	1.25						
				6							
				5							
				6				**BH03 Terminated at 1.5m**			
				7							
					1.75						
					2						
					2.25						
					2.50						
					2.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH04

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392602
Northing : 5462857
Inclination : -90deg
Azimuth :

Sheet : 1 OF 1
Job No : GL24537A
Logged : AF
Logged Date : 06/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing V (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV					0.25		ML	Topsoil- Clayey SILT- low plasticity, brown, root fibres, with cobbles	M	St	
				R on cobble	0.50		CH	Natural- Silty CLAY- high plasticity, brown grey, with cobbles	W-M	St	w > PL, w < LL
			D (%): LL=78, PL=30, PI=48, LS=16.0, MC=53.5	74	1		CH	Becoming brown.	W-M	St	
					1.25						
					1.50		CH		M-D	St	
					1.75			**BH04 refusal at 1.6m (auger refusal on inferred highly weathered limestone)**			
					2						
					2.25						
					2.50						
					2.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH05

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392606
Northing : 5462870
Inclination : -90deg
Azimuth :

Sheet : 1 OF 1
Job No : GL24537A
Logged : AF
Logged Date : 06/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing V (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV					0.25		ML	Topsoil- Clayey SILT- low plasticity, brown, root fibres	M		
							CH	Natural- Silty CLAY- high plasticity, brown.	M	St	
				70	0.50		CH	Becoming grey.	W-M	St	w > PL, w < LL
				80	0.75						
					1						
					1.25						
							LST	Extremely weathered LIMESTONE- Sandy CLAY soil properties- high plasticity, yellow brown, fine to medium grained sand, with cobbles	M	VSt	
					1.50						
					1.75						
					2			**BH05 refusal at 1.8m (auger refusal on inferred highly weathered limestone)**			
					2.25						
					2.50						
					2.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH06

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392633
Northing : 5462851
Inclination : -90deg
Azimuth :

Sheet : 1 OF 1
Job No : GL24537A
Logged : AF
Logged Date : 06/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing V (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV					0.25		ML	Topsoil- Clayey SILT- low plasticity, brown, root fibres	M	St	
				130	0.50		CH	Natural- Silty CLAY- high plasticity, brown.	M	VSt	w ~ PL
				R on cobble	0.75		CH	Becoming grey, trace cobbles	W-M	St	w > PL, w < LL
			D (%):		1.25		LST	Extremely weathered LIMESTONE- Silty CLAY soil properties- high plasticity, pale brown mottled white, trace fine to medium grained sand.	M	VSt	poor spoil recovery
					1.50						
					1.75						
					2			**BH06 refusal at 1.9m (auger refusal on inferred highly weathered limestone)**			
					2.25						
					2.50						
					2.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH07

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392655
Northing : 5462884
Inclination : -90deg
Azimuth :

Sheet : 1 OF 2
Job No : GL24537A
Logged : AF
Logged Date : 06/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing V (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV					0.25		ML	Topsoil- Clayey SILT- low plasticity, brown, root fibres	M	St	Residual basalt soil. Groundwater well installed. Well dry 11/11/2024
				R	0.50		MH	Natural- Clayey SILT- high plasticity, red brown mottled black, trace cobbles	M	VSt	w < PL
					0.75						
					1		MH		W-M	VSt	w > PL, w < LL
				R			MH	Becoming brown.	M	VSt	w ~ PL
			D (%): LL=62, PL=34, PI=28, LS=15.0, MC=44.9		1.25						
					1.50						
					1.75						
				R on cobble	2						
					2.25						
					2.50						
					2.75						

ENGINEERING BOREHOLE LOG: BH07

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392655
Northing : 5462884
Inclination : -90deg
Azimuth :

Sheet : 2 OF 2
Job No : GL24537A
Logged : AF
Logged Date : 06/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing V (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV							MH	Becoming brown.	M	VSt	
					3.25		BAS	Extremely weathered BASALT- Clayey SAND soil properties- medium grained, high plasticity clay, brown mottled dark brown, trace cobbles .	M	D	
			U63 Tube:		3.50						
					3.75						
					4		BAS	Extremely weathered BASALT- Silty CLAY soil properties- high plasticity, brown, with fine to coarse sized gravel.	M	VSt	
					4.25						
					4.50						
					4.75		BAS	With cobbles	M	VSt	
					5			**BH07 refusal at 4.9m (auger refusal on inferred highly weathered basalt)**			
					5.25						
					5.50						
					5.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH08

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392674
Northing : 5462833
Inclination : -90deg
Azimuth :

Sheet : 1 OF 1
Job No : GL24537A
Logged : AF
Logged Date : 06/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing V (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV					0.25		ML	Topsoil- Clayey SILT- low plasticity, brown, root fibres	M	St	
					0.50		CI	Natural- Silty CLAY- medium plasticity, brown, trace fine to medium sized gravel, with cobbles	M	St	
				70			MH	Natural- Clayey SILT- high plasticity, grey mottled brown, with cobbles	W-M	VSt	w > PL, w < LL
			D (%): LL=75, PL=42, PI=33, LS=15.5, MC=56.5	110	0.75						
					1						
					1.25						
					1.50						
					1.75		LST	Extremely weathered LIMESTONE- Silty CLAY soil properties- medium plasticity, yellow brown, with fine grained sand, trace fine to medium sized gravel, with cobbles	M	VSt	
				R on cobble	2		LST	Extremely weathered LIMESTONE- Silty CLAY soil properties- high plasticity, yellow brown, with fine grained sand.	M	VSt	poor spoil recovery
					2.25						
					2.50			**BH08 refusal at 2.3m (auger refusal on inferred highly weathered limestone)**			
					2.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH09

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392670
Northing : 5462801
Inclination : -90deg
Azimuth :

Sheet : 1 OF 2
Job No : GL24537A
Logged : AF
Logged Date : 06/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing V (kPa)	Testing PP (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV						0.25		ML	Topsoil- Clayey SILT- low plasticity, brown, root fibres	M	F	Groundwater well installed
				76		0.50		CI	Natural- Silty CLAY- medium plasticity, brown, trace medium sized gravel.	W-M	St	
						0.75		CH	Natural- Silty CLAY- high plasticity, grey mottled brown, trace medium sized gravel, trace medium grained sand, trace cobbles	W-M	St	w > PL, w < LL
				80		1						
		▼				1.25						Groundwater measured @ 1.1m 11/11/2024
		▼				1.50						
						1.75						groundwater measured @ 1.8m shortly after drilling
				70		2		CH	Becoming brown, trace cobbles	W	St	increasing moisture
						2.25						
						2.50		MH	Natural- Clayey SILT- high plasticity, grey, trace medium grained sand, trace shell fossil fragments	M	VSt	w ~ PL
						2.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH09

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392670
Northing : 5462801
Inclination : -90deg
Azimuth :

Sheet : 2 OF 2
Job No : GL24537A
Logged : AF
Logged Date : 06/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing V (kPa)	Testing PP (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV			U63 Tube: LL=67, PL=39, PI=28, LS=11.5, MC=81.5		>500	3.25		MH	Natural- Clayey SILT- high plasticity, grey, trace medium grained sand, trace shell fossil fragments	M	VSt	
						3.50		MH		W	H	
						3.75						
						4			**BH09 refusal at 3.9m (auger refusal on inferred highly weathered limestone)**			
						4.25						
						4.50						
						4.75						
						5						
						5.25						
						5.50						
						5.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH10

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392614
Northing : 5462822
Inclination : -90deg
Azimuth :

Sheet : 1 OF 2
Job No : GL24537A
Logged : AF
Logged Date : 06/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing V (kPa)	Testing PP (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV						0.25		ML	Topsoil- Clayey SILT- low plasticity, brown, root fibres	M	St	
				R on cobble		0.50		CH	Natural- Silty CLAY- high plasticity, grey mottled brown, trace cobbles	M	St	w ~ PL
						0.75		CH		W-M	St	w > PL, w < LL
				66		1						
						1.25						
						1.50						
						1.75						
				R		2		LST	Extremely weathered LIMESTONE- Sandy CLAY soil properties- medium plasticity, brown mottled pale brown, fine to medium grained sand.	M	VSt	
						2.25						
						2.50						
						2.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH10

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392614
Northing : 5462822
Inclination : -90deg
Azimuth :

Sheet : 2 OF 2
Job No : GL24537A
Logged : AF
Logged Date : 06/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing V (kPa)	Testing PP (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV			U63 Tube:		300	3.25		LST	Extremely weathered LIMESTONE- Clayey SILT soil properties- low plasticity, pale brown, trace fine to medium sized gravel, trace fine to medium grained sand.	M	VSt	w ~ PL
						3.50						w > PL, w < LL
						3.75						
									BH10 refusal at 3.8m (auger refusal on inferred highly weathered limestone)			
						4						
						4.25						
						4.50						
						4.75						
						5						
						5.25						
						5.50						
						5.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH11

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392559
Northing : 5462851
Inclination : -90deg
Azimuth :

Sheet : 1 OF 2
Job No : GL24537A
Logged : AF
Logged Date : 11/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing V (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV					0.25		ML	Topsoil- Clayey SILT- low plasticity, dark brown, root fibres, trace cobbles	D	FR	
							ML	Natural- Clayey SILT- low plasticity, dark brown, trace cobbles	M	VSt	
				R	0.50		CH	Natural- Silty CLAY- high plasticity, grey mottled brown, trace medium to coarse sized gravel, trace cobbles	M	St	w > PL, w < LL
				R on cobble	0.75						
					1						
					1.25						
					1.50		CH	Trace cobbles	M	VSt	
					1.75						
				120	2						
					2.25						
					2.50						
					2.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH11

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392559
Northing : 5462851
Inclination : -90deg
Azimuth :

Sheet : 2 OF 2
Job No : GL24537A
Logged : AF
Logged Date : 11/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing V (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV							CH	Trace cobbles	M	VSt	
					3.25		LST	Extremely weathered LIMESTONE- Silty CLAY soil properties- medium plasticity, pale brown, trace fossil shell fragments	M-D	VSt-H	w < PL
					3.50			**BH11 Terminated at 3.4m (near auger refusal on extremely weathered limestone)**			
					3.75						
					4						
					4.25						
					4.50						
					4.75						
					5						
					5.25						
					5.50						
					5.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH12

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392574
Northing : 5462827
Inclination : -90deg
Azimuth :

Sheet : 1 OF 1
Job No : GL24537A
Logged : AF
Logged Date : 11/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing V (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV					0.25		ML	Topsoil- Clayey SILT- low plasticity, dark brown.	M	St	
							MH	Natural- Clayey SILT- high plasticity, dark brown.	M	St	
				88	0.50		CH	Natural- Silty CLAY- high plasticity, grey brown.	W-M	St	w > PL, w < LL
				96	0.75						
					1						
					1.25						
				114			CH		W-M	VSt	
								BH12 Terminated at 1.5m			
					1.75						
					2						
					2.25						
					2.50						
					2.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH13

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392587
Northing : 5462793
Inclination : -90deg
Azimuth :

Sheet : 1 OF 2
Job No : GL24537A
Logged : AF
Logged Date : 11/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing V (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV					0.25		ML	Topsoil- Clayey SILT- low plasticity, dark brown, trace fine to medium sized gravel, root fibres	M	St	
							ML	Natural- Clayey SILT- low plasticity, dark brown, with fine sized gravel.	M	VSt	
				>140	0.50		CH	Natural- Silty CLAY- high plasticity, brown grey.	W-M	St	w > PL, w < LL
					0.75						
				84	1						
					1.25						
					1.50						
					1.75		CH	Becoming grey mottled orange brown.	W-M	St	decreasing plasticity
				140	2						increasing moisture
					2.25						
					2.50						
					2.75		LST	Extremely weathered LIMESTONE-	M	VSt-	w < PL

GEOTON Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH13

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392587
Northing : 5462793
Inclination : -90deg
Azimuth :

Sheet : 2 OF 2
Job No : GL24537A
Logged : AF
Logged Date : 11/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing V (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV							LST	Extremely weathered LIMESTONE- Clayey SILT soil properties- low plasticity, brown, trace fossilised shell fragments	M	VSt-H	
					3.25		LST	Trace cobbles	M	H	
					3.50		LST	Extremely weathered LIMESTONE- Silty CLAY soil properties- high plasticity, blue grey, with cobbles, trace fossilised shell fragments	M-D	VSt-H	w < PL
					3.75						
					4						
					4.25						
					4.50						
					4.75						
					5						too many cobbles to do U63 sample
					5.25						
					5.50			**BH13 refusal at 5.4m (auger refusal on inferred highly weathered limestone)**			
					5.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH14

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392623
Northing : 5462770
Inclination : -90deg
Azimuth :

Sheet : 1 OF 1
Job No : GL24537A
Logged : AF
Logged Date : 11/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing V (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV					0.25		ML	Topsoil- Clayey SILT- low plasticity, dark brown, trace medium sized gravel, root fibres	M-D	St	
							ML	Natural- Clayey SILT- low plasticity, dark brown, trace fine to medium sized gravel, trace cobbles	M	VSt	
				R	0.50		CH	Natural- Silty CLAY- high plasticity, brown.	W-M	St	w > PL, w < LL
				74	0.75						
					1						
					1.25						
				110			CH		W-M	VSt	
								BH14 Terminated at 1.5m			
					1.75						
					2						
					2.25						
					2.50						
					2.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH15

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392652
Northing : 5462769
Inclination : -90deg
Azimuth :

Sheet : 1 OF 1
Job No : GL24537A
Logged : AF
Logged Date : 11/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing V (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV					0.25		ML	Topsoil- Clayey SILT- low plasticity, dark brown, root fibres	M-D	St	
				72	0.50		CH	Natural- Silty CLAY- high plasticity, brown grey.	W-M	St	w > PL, w < LL
				110	1		CH	Becoming brown.	W-M	VSt	
				>140	1.25						
								BH15 Terminated at 1.5m			
					1.75						
					2						
					2.25						
					2.50						
					2.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH16

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392713
Northing : 5462754
Inclination : -90deg
Azimuth :

Sheet : 1 OF 1
Job No : GL24537A
Logged : AF
Logged Date : 11/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing V (kPa)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV					0.25		ML	Topsoil- Clayey SILT- low plasticity, dark brown, root fibres	M-D	St	
				62	0.50		MH	Natural- Clayey SILT- high plasticity, dark brown.	M	St	
				70	0.75 1 1.25		CH	Natural- Silty CLAY- high plasticity, brown.	M	St	w > PL, w < LL
				120			CH		M	VSt	poor spoil recovery
					1.75 2 2.25 2.50 2.75			**BH16 Terminated at 1.5m**			

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH17

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392351
Northing : 5462895
Inclination : -90deg
Azimuth :

Sheet : 1 OF 1
Job No : GL24537A
Logged : AF
Logged Date : 11/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV					0.25		SM	Topsoil- Silty SAND- fine grained, trace fine to medium sized gravel, grey, root fibres .	D	MD	
							SP	Natural- SAND- fine grained, trace fine to medium sized gravel, grey.	D	MD-D	
					0.50		CL	Natural- Gravelly CLAY- low plasticity, orange brown, fine to medium sized gravel, with low plasticity silt.	M-D	VSt	w < PL
					0.75						
					1						
					1.25		CI	Natural- Sandy CLAY- medium plasticity, brown, medium grained sand, with fine to medium sized gravel.	M-D	VSt	w < PL
					1.75			**BH17 Terminated at 1.5m**			
					2						
					2.25						
					2.50						
					2.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH18

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392339
Northing : 5462928
Inclination : -90deg
Azimuth :

Sheet : 1 OF 1
Job No : GL24537A
Logged : AF
Logged Date : 11/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV					0.25		SM	Topsoil- Silty SAND- fine grained, grey, root fibres .	D	MD	
							SM	Natural- Silty SAND- fine grained, brown mottled grey.	D	MD	
					0.50		CH	Natural- Silty CLAY- high plasticity, brown, trace fine to medium sized gravel.	M-D	VSt	w < PL
					0.75						
					1						
					1.25						
					1.75			**BH18 Terminated at 1.5m**			
					2						
					2.25						
					2.50						
					2.75						

GEOTON
Geotechnical Consultants

ENGINEERING BOREHOLE LOG: BH19

Client : Bluff Developments Estate Pty Ltd
Project : Karst Assessment & Geotechnical Investigation
Location : Lot 2 Golf Links Road, Wynyard TAS

Easting : 392329
Northing : 5462949
Inclination : -90deg
Azimuth :

Sheet : 1 OF 1
Job No : GL24537A
Logged : AF
Logged Date : 11/11/2024
Drill Rig : DrillTech 150mm

Method	Drilling	Water	Samples	Testing	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture condition	Consistency density, index	Structure, Additional Observations
ADV					0		SM	Topsoil- Silty SAND- fine grained, grey, root fibres .	D	MD	
							SM	Natural- Silty SAND- fine grained, brown mottled grey.	D	MD	
					0.25						
					0.50		CH	Natural- Silty CLAY- high plasticity, brown.	M	VSt	w < PL
					0.75						
											w ~ PL
					1						
					1.25						
								BH19 Terminated at 1.5m			
					1.75						
					2						
					2.25						
					2.50						
					2.75						

Appendix C

Laboratory Results

Material Test Report

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

[redacted]

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

Report Number: **RE24/239-136**
Issue Number: 1
Date Issued: 14/11/2024
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: Wynyard
Client Reference: GL24537A
Work Request: 2224
Sample Number: S2224B
Date Sampled: 07/11/2024
Dates Tested: 07/11/2024 - 13/11/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Preparation Method: In accordance with the test method
Sample Location: **BH04 , Depth: 0.8-1.0m**
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 (%)	78		
Plastic Limit (%)	30		
Plasticity Index (%)	**48**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**16.0**		
Cracking Crumbling Curling	Cracking & Curling		

Material Test Report

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

[redacted]

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

Report Number: **RE24/239-136**
Issue Number: 1
Date Issued: 14/11/2024
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: Wynyard
Client Reference: GL24537A
Work Request: 2224
Sample Number: S2224C
Date Sampled: 07/11/2024
Dates Tested: 07/11/2024 - 13/11/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Preparation Method: In accordance with the test method
Sample Location: **BH07 , Depth: 1.4-1.6m**
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 (%)	62		
Plastic Limit (%)	34		
Plasticity Index (%)	**28**		

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		

Material Test Report

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

[redacted]

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

Report Number: **RE24/239-136**
Issue Number: 1
Date Issued: 14/11/2024
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: Wynyard
Client Reference: GL24537A
Work Request: 2224
Sample Number: S2224D
Date Sampled: 07/11/2024
Dates Tested: 07/11/2024 - 13/11/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Preparation Method: In accordance with the test method
Sample Location: **BH08 , Depth: 0.8-1.0m**
Material: Brown Silty Clay

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	75		
Plastic Limit (%)	42		
Plasticity Index (%)	**33**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**15.5**		
Cracking Crumbling Curling	Cracking & Curling		

Material Test Report

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

[redacted]

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

Report Number: **RE24/239-136**
Issue Number: 1
Date Issued: 14/11/2024
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: Wynyard
Client Reference: GL24537A
Work Request: 2224
Sample Number: S2224E
Date Sampled: 07/11/2024
Dates Tested: 07/11/2024 - 13/11/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Preparation Method: In accordance with the test method
Sample Location: **BH09 , Depth: 3.4-3.6m**
Material: Grey 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 (%)	67		
Plastic Limit (%)	39		
Plasticity Index (%)	**28**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**11.5**		
Cracking Crumbling Curling	Cracking		

Material Test Report

Report Number: **RE24/239-136**
Issue Number: 1
Date Issued: 14/11/2024
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: Wynyard
Client Reference: GL24537A
Work Request: 2224
Dates Tested: 07/11/2024 - 07/11/2024

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

[redacted]

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

Moisture Content AS 1289 2.1.1

Sample Number	Sample Location	Moisture Content (%)	Material
S2224B	BH04 , Depth: 0.8-1.0m	53.5 %	Brown Silty Clay
S2224C	BH07 , Depth: 1.4-1.6m	44.9 %	Brown Silty Clay
S2224D	BH08 , Depth: 0.8-1.0m	56.5 %	Brown Silty Clay
S2224E	BH09 , Depth: 3.4-3.6m	81.5 %	Grey Silty Clay

Material Test Report

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

[redacted]

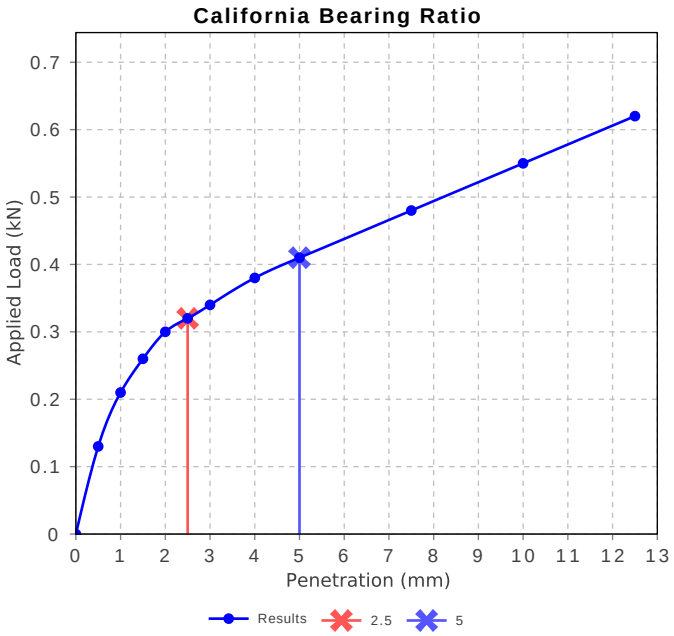
Approved Signatory: Arlen Thompson
Quality Manager
NATA Accredited Laboratory Number: 20328

Report Number: **RE24/239-136a**
Issue Number: 1
Date Issued: 25/11/2024
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: Wynyard
Client Reference: GL24537A
Work Request: 2224
Sample Number: S2224A
Date Sampled: 07/11/2024
Dates Tested: 07/11/2024 - 22/11/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Preparation Method: In accordance with the test method
Sample Location: **BH02, Depth: 0.2-0.6m**
Material: Brown Silty Clay

Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1)		Min	Max
Mould Type	1 LITRE MOULD A		
Compaction	Standard		
Maximum Dry Density (t/m^3)	1.25		
Optimum Moisture Content (%)	44.0		
Oversize Sieve (mm)	19.0		
Oversize Material Wet (%)	9		
Method used to Determine Plasticity	Visual Assessment		
Curing Hours (h)	113.6		

Moisture Content (AS 1289 2.1.1)	
Moisture Content (%)	48.8

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**2.5**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m^3)	1.25		
Optimum Moisture Content (%)	44.0		
Laboratory Density Ratio (%)	97.5		
Laboratory Moisture Ratio (%)	100.5		
Dry Density after Soaking (t/m^3)	1.19		
Field Moisture Content (%)	48.8		
Moisture Content at Placement (%)	44.0		
Moisture Content Top 30mm (%)	56.2		
Moisture Content Rest of Sample (%)	49.5		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	116.8		
Swell (%)	3.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	8.5		



Material Test Report

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

[redacted]

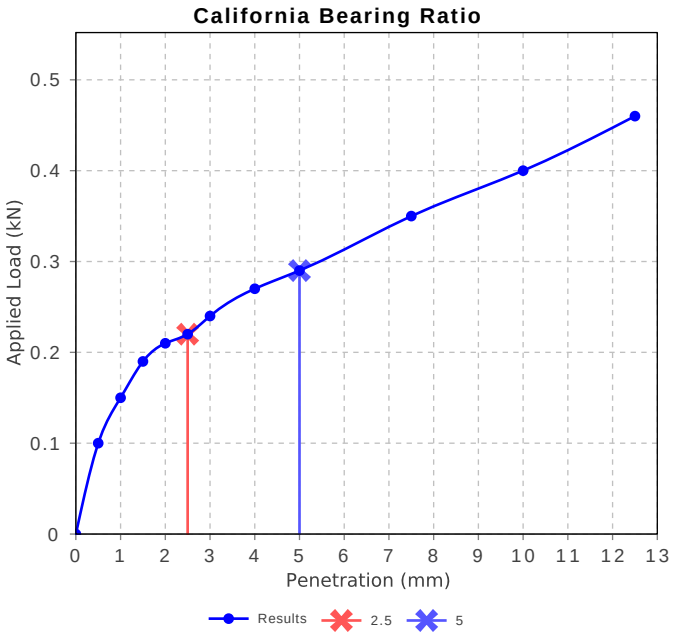
Approved Signatory: Arlen Thompson
Quality Manager
NATA Accredited Laboratory Number: 20328

Report Number: **RE24/239-136a**
Issue Number: 1
Date Issued: 25/11/2024
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: Wynyard
Client Reference: GL24537A
Work Request: 2224
Sample Number: S2224F
Date Sampled: 07/11/2024
Dates Tested: 07/11/2024 - 22/11/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Preparation Method: In accordance with the test method
Sample Location: **BH01, Depth: 0.3-0.7m**
Material: Brown Silty Clay

Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1)		Min	Max
Mould Type	1 LITRE MOULD A		
Compaction	Standard		
Maximum Dry Density (t/m^3)	1.47		
Optimum Moisture Content (%)	26.5		
Oversize Sieve (mm)	19.0		
Oversize Material Wet (%)	0		
Method used to Determine Plasticity	Visual Assessment		
Curing Hours (h)	116.0		

Moisture Content (AS 1289 2.1.1)	
Moisture Content (%)	33.2

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**1.5**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m^3)	1.47		
Optimum Moisture Content (%)	26.5		
Laboratory Density Ratio (%)	98.0		
Laboratory Moisture Ratio (%)	100.5		
Dry Density after Soaking (t/m^3)	1.39		
Field Moisture Content (%)	33.2		
Moisture Content at Placement (%)	26.9		
Moisture Content Top 30mm (%)	35.1		
Moisture Content Rest of Sample (%)	28.1		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	97.3		
Swell (%)	3.5		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	0.0		



Appendix D

Qualitative Terminology for Use in Assessing Risk to Property

QUALITATIVE TERMINOLOGY FOR USE IN ASSESSING RISK TO PROPERTY

QUALITATIVE MEASURES OF LIKELIHOOD

Approximate Annual Probability		Implied Indicative Landslide Recurrence Interval		Description	Descriptor	Level
Indicative Value	**Notional Boundary**					
10^{-1}	5x10-2	10 years	20 years	The event is expected to occur over the design life.	ALMOST CERTAIN	A
10-2	5x10-3	100 years	200 years	The event will probably occur under adverse conditions over the design life.	LIKELY	B
10-3	5x10-4	1000 years	2000 years	The event could occur under adverse conditions over the design life.	POSSIBLE	C
10-4	5x10-5	10,000 years	20,000 years	The event might occur under very adverse circumstances over the design life.	UNLIKELY	D
10-5	5x10-6	100,000 years	200,000 years	The event is conceivable but only under exceptional circumstances over the design life.	RARE	E
10-6		1,000,000 years		The event is inconceivable or fanciful over the design life.	BARELY CREDIBLE	F

Note: (1) The table should be used from left to right; use Approximate Annual Probability or Description to assign Descriptor, not *vice versa*.

QUALITATIVE MEASURES OF CONSEQUENCES TO PROPERTY

Approximate Cost of Damage		Description	Descriptor	Level
Indicative Value	**Notional Boundary**			
200%	100%	Structure(s) completely destroyed and/or large scale damage requiring major engineering works for stabilisation. Could cause at least one adjacent property major consequence damage.	CATASTROPHIC	1
60%	40%	Extensive damage to most of structure, and/or extending beyond site boundaries requiring significant stabilisation works. Could cause at least one adjacent property medium consequence damage.	MAJOR	2
20%	10%	Moderate damage to some of structure, and/or significant part of site requiring large stabilisation works. Could cause at least one adjacent property minor consequence damage.	MEDIUM	3
5%	1%	Limited damage to part of structure, and/or part of site requiring some reinstatement stabilisation works.	MINOR	4
0.5%		Little damage. (Note for high probability event (Almost Certain), this category may be subdivided at a notional boundary of 0.1%. See Risk Matrix.)	INSIGNIFICANT	5

Notes: (2) The Approximate Cost of Damage is expressed as a percentage of market value, being the cost of the improved value of the unaffected property which includes the land plus the unaffected structures.

(3) The Approximate Cost is to be an estimate of the direct cost of the damage, such as the cost of reinstatement of the damaged portion of the property (land plus structures), stabilization works required to render the site to tolerable risk level for the landslide which has occurred and professional design fees, and consequential costs such as legal fees, temporary accommodation. It does not include additional stabilisation works to address other landslides which may affect the property.

(4) The table should be used from left to right; use Approximate Cost of Damage or Description to assign Descriptor, not vice versa

QUALITATIVE TERMINOLOGY FOR USE IN ASSESSING RISK TO PROPERTY (CONTINUED)

QUALITATIVE RISK ANALYSIS MATRIX – LEVEL OF RISK TO PROPERTY

LIKELIHOOD		CONSEQUENCES TO PROPERTY (With Indicative Approximate Cost of Damage)				
	Indicative Value of Approximate Annual Probability	**1: CATASTROPHIC 200%**	**2: MAJOR 60%**	**3: MEDIUM 20%**	**4: MINOR 5%**	**5: INSIGNIFICANT 0.5%**
A – ALMOST CERTAIN	10^{-1}	**VH**	**VH**	**VH**	**H**	**M or L (5)**
B - LIKELY	10^{-2}	**VH**	**VH**	**H**	**M**	**L**
C - POSSIBLE	10^{-3}	**VH**	**H**	**M**	**M**	**VL**
D - UNLIKELY	10^{-4}	**H**	**M**	**L**	**L**	**VL**
E - RARE	10^{-5}	**M**	**L**	**L**	**VL**	**VL**
F - BARELY CREDIBLE	10^{-6}	**L**	**VL**	**VL**	**VL**	**VL**

Notes: (5) For Cell A5, may be subdivided such that a consequence of less than 0.1% is Low Risk.
(6) When considering a risk assessment it must be clearly stated whether it is for existing conditions or with risk control measures which may not be implemented at the current time.

RISK LEVEL IMPLICATIONS

Risk Level		**Example Implications** (7)
VH	**VERY HIGH RISK**	Unacceptable without treatment. Extensive detailed investigation and research, planning and implementation of treatment options essential to reduce risk to Low; may be too expensive and not practical. Work likely to cost more than value of the property.
H	**HIGH RISK**	Unacceptable without treatment. Detailed investigation, planning and implementation of treatment options required to reduce risk to Low. Work would cost a substantial sum in relation to the value of the property.
M	**MODERATE RISK**	May be tolerated in certain circumstances (subject to regulator's approval) but requires investigation, planning and implementation of treatment options to reduce the risk to Low. Treatment options to reduce to Low risk should be implemented as soon as practicable.
L	**LOW RISK**	Usually acceptable to regulators. Where treatment has been required to reduce the risk to this level, ongoing maintenance is required.
VL	**VERY LOW RISK**	Acceptable. Manage by normal slope maintenance procedures.

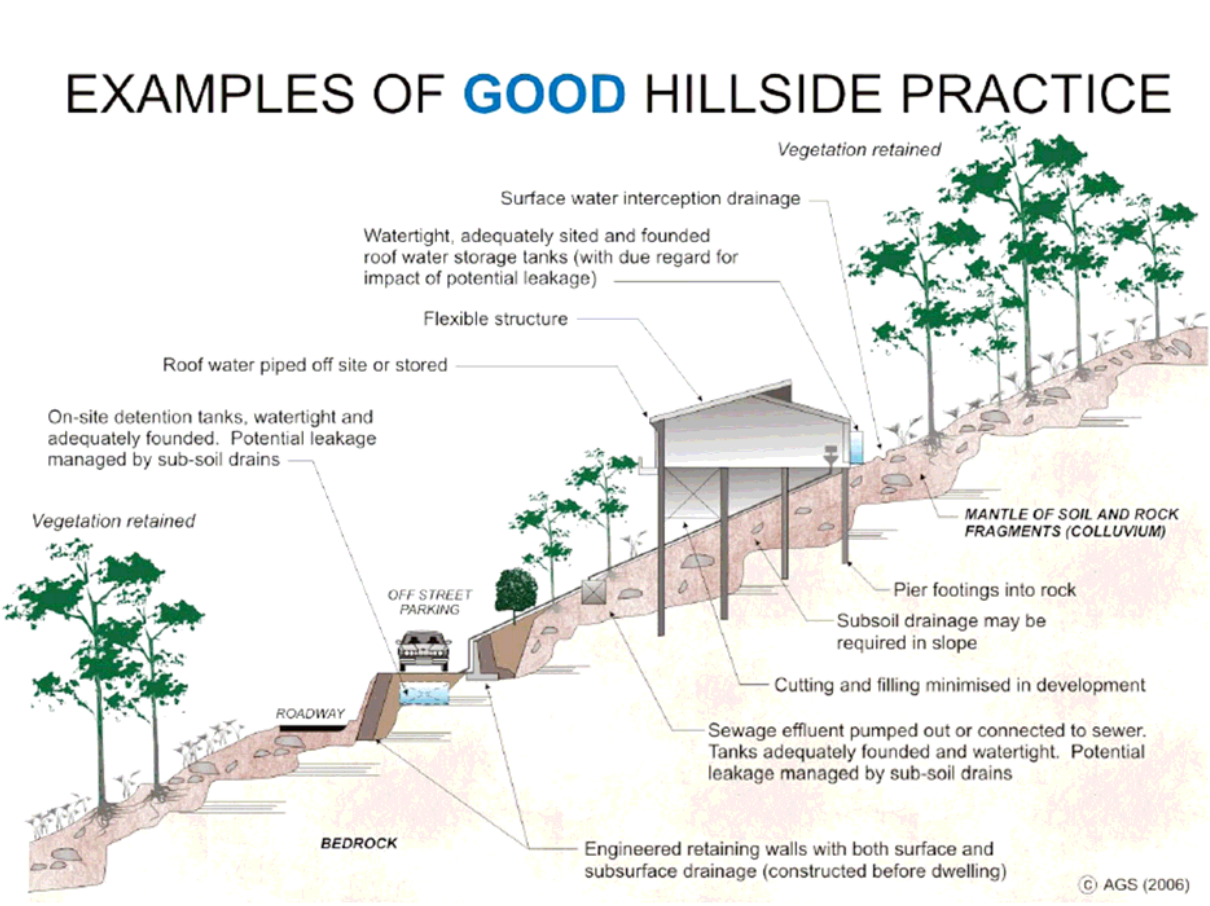
Note: (7) The implications for a particular situation are to be determined by all parties to the risk assessment and may depend on the nature of the property at risk; these are only given as a general guide

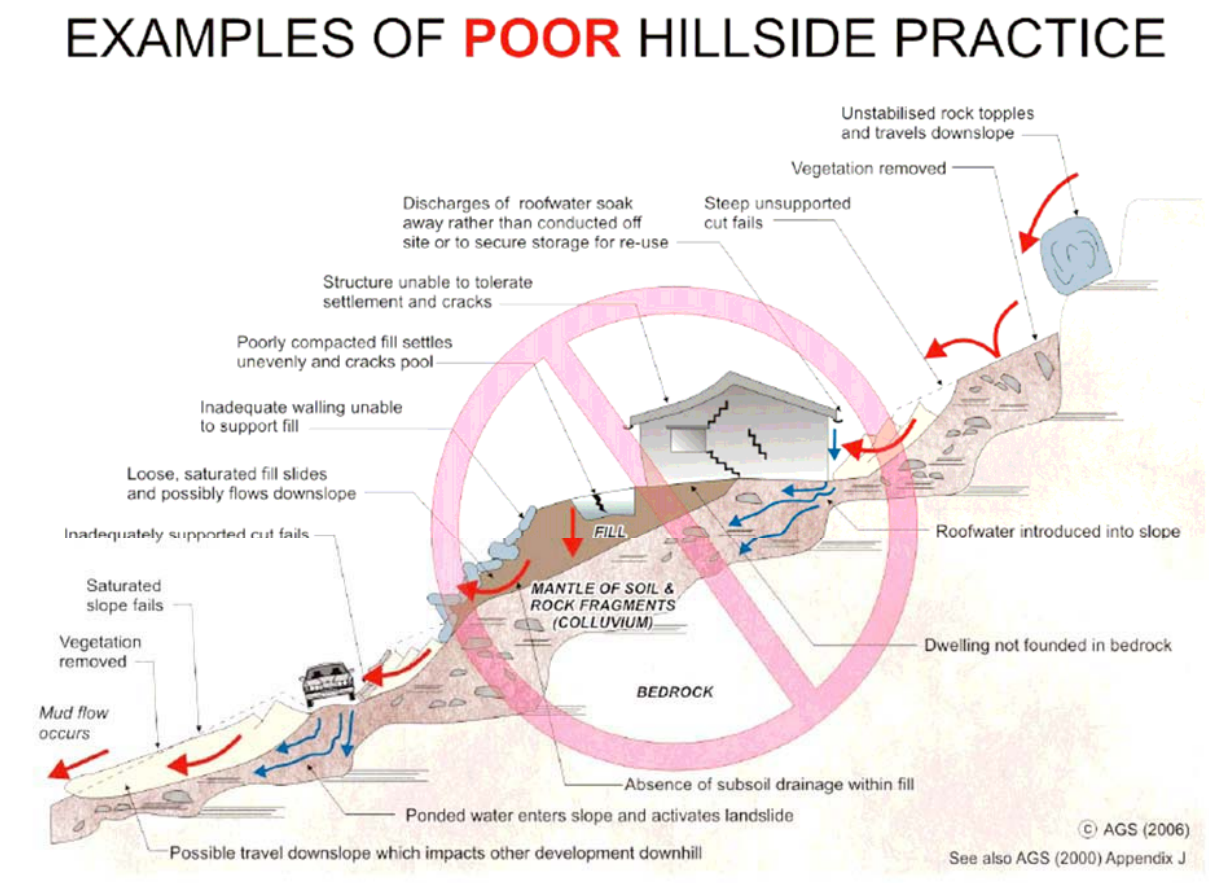
Appendix E

Some Guidelines for Hillside Construction

APPENDIX - SOME GUIDELINES FOR HILLSIDE CONSTRUCTION

	GOOD ENGINEERING PRACTICE	*POOR ENGINEERING PRACTICE*
ADVICE		
GEOTECHNICAL ASSESSMENT	Obtain advice from a qualified, experienced geotechnical practitioner at early stage of planning and before site works.	Prepare detailed plan and start site works before geotechnical advice.
PLANNING		
SITE PLANNING	Having obtained geotechnical advice, plan the development with the risk arising from the identified hazards and consequences in mind.	Plan development without regard for the Risk.
DESIGN AND CONSTRUCTION		
HOUSE DESIGN	Use flexible structures which incorporate properly designed brickwork, timber or steel frames, timber or panel cladding. Consider use of split levels. Use decks for recreational areas where appropriate.	Floor plans which require extensive cutting and filling. Movement intolerant structures.
SITE CLEARING	Retain natural vegetation wherever practicable.	Indiscriminately clear the site.
EARTHWORKS	Retain natural contours wherever possible.	Indiscriminatory bulk earthworks.
CUTS	Minimise depth. Support with engineered retaining walls or batter to appropriate slope. Provide drainage measures and erosion control.	Large scale cuts and benching. Unsupported cuts. Ignore drainage requirements
FILLS	Minimise height. Strip vegetation and topsoil and key into natural slopes prior to filling. Use clean fill materials and compact to engineering standards. Batter to appropriate slope or support with engineered retaining wall. Provide surface drainage and appropriate subsurface drainage.	Loose or poorly compacted fill, which if it fails, may flow a considerable distance including onto property below. Block natural drainage lines. Fill over existing vegetation and topsoil. Include stumps, trees, vegetation, topsoil, boulders, building rubble etc in fill.
ROCK OUTCROPS & BOULDERS	Remove or stabilise boulders which may have unacceptable risk. Support rock faces where necessary.	Disturb or undercut detached blocks or boulders.
RETAINING WALLS	Found on rock where practicable. Provide subsurface drainage within wall backfill and surface drainage on slope above. Construct wall as soon as possible after cut/fill operation.	Construct a structurally inadequate wall such as sandstone flagging, brick or unreinforced blockwork. Lack of subsurface drains and weepholes.
FOOTINGS	Found within rock where practicable. Use rows of piers or strip footings oriented up and down slope. Design for lateral creep pressures if necessary. Backfill footing excavations to exclude ingress of surface water.	Found on topsoil, loose fill, detached boulders or undercut cliffs.
SWIMMING POOLS	Engineer designed. Support on piers to rock where practicable. Provide with under-drainage and gravity drain outlet where practicable. Design for high soil pressures which may develop on uphill side whilst there may be little or no lateral support on downhill side.	
DRAINAGE		
SURFACE	Provide at tops of cut and fill slopes. Discharge to street drainage or natural water courses. Provide general falls to prevent blockage by siltation and incorporate silt traps. Line to minimise infiltration and make flexible where possible. Special structures to dissipate energy at changes of slope and/or direction.	Discharge at top of fills and cuts. Allow water to pond on bench areas.
SUBSURFACE	Provide filter around subsurface drain. Provide drain behind retaining walls. Use flexible pipelines with access for maintenance. Prevent inflow of surface water.	Discharge roof runoff into absorption trenches.
SEPTIC & SULLAGE	Usually requires pump-out or mains sewer systems; absorption trenches may be possible in some areas if risk is acceptable. Storage tanks should be water-tight and adequately founded.	Discharge sullage directly onto and into slopes. Use absorption trenches without consideration of landslide risk.
EROSION CONTROL & LANDSCAPING	Control erosion as this may lead to instability. Revegetate cleared area.	Failure to observe earthworks and drainage recommendations when landscaping.
DRAWINGS AND SITE VISITS DURING CONSTRUCTION		
DRAWINGS	Building Application drawings should be viewed by geotechnical consultant	
SITE VISITS	Site Visits by consultant may be appropriate during construction/	
INSPECTION AND MAINTENANCE BY OWNER		
OWNER'S RESPONSIBILITY	Clean drainage systems; repair broken joints in drains and leaks in supply pipes. Where structural distress is evident see advice. If seepage observed, determine causes or seek advice on consequences.	


EXAMPLES OF GOOD HILLSIDE PRACTICE
Vegetation retained
Surface water interception drainage
Watertight, adequately sited and founded roof water storage tanks (with due regard for impact of potential leakage)
Flexible structure
Roof water piped off site or stored
On-site detention tanks, watertight and adequately founded. Potential leakage managed by sub-soil drains
Vegetation retained
OFF STREET PARKING
ROADWAY
BEDROCK
MANTLE OF SOIL AND ROCK FRAGMENTS (COLLUVIUM)
Pier footings into rock
Subsoil drainage may be required in slope
Cutting and filling minimised in development
Sewage effluent pumped out or connected to sewer. Tanks adequately founded and watertight. Potential leakage managed by sub-soil drains
Engineered retaining walls with both surface and subsurface drainage (constructed before dwelling)
© AGS (2006)


EXAMPLES OF POOR HILLSIDE PRACTICE
Unstabilised rock topples and travels downslope
Vegetation removed
Discharges of roofwater soak away rather than conducted off site or to secure storage for re-use
Steep unsupported cut fails
Structure unable to tolerate settlement and cracks
Poorly compacted fill settles unevenly and cracks pool
Inadequate walling unable to support fill
Loose, saturated fill slides and possibly flows downslope
Inadequately supported cut fails
FILL
Roofwater introduced into slope
Saturated slope fails
MANTLE OF SOIL & ROCK FRAGMENTS (COLLUVIUM)
Vegetation removed
Dwelling not founded in bedrock
BEDROCK
Mud flow occurs
Absence of subsoil drainage within fill
Ponded water enters slope and activates landslide
Possible travel downslope which impacts other development downhill
© AGS (2006)
See also AGS (2000) Appendix J

Appendix F

Certificate Forms

FORM **A**

Geotechnical Declaration and Verification Development Application

Office Use Only		Regulator: <*Waratah-Wynyard Council*>

To be submitted with a development application. If this form is not submitted with the geotechnical report the report will be refused.
This form is essential to verify that the geotechnical report has been prepared in accordance with <*Regulator's geotechnical DCP*> and that the author of the geotechnical report is a geotechnical engineer or engineering geologist as defined by <*Regulator's geotechnical DCP*>. Alternatively, where a geotechnical report has been prepared for subdivision or is greater than two years old or by a professional person not recognised by <*Regulator's geotechnical DCP*> , then this form may be used as technical verification of the geotechnical report if signed by a geotechnical engineer or engineering geologist as defined by <*Regulator's geotechnical DCP*>.

Section 1 Related Application

Reference	What is the Council development application number?
DA Site Address	Lot 2 Golf Links Road, Wynyard (PID 2758376)
DA Applicant	Bluff Developments Estate Pty Ltd

Section 2 Geotechnical Report

Details	Title: Geotechnical Investigation	
	Author's Company/ Organisation Name: Geoton Pty Ltd	Report Reference No: GL24537Ac
	Author: Tony Barriera/Anne Foster	Dated: 12 / 08 / 2026

Section 3 Checklist

The following checklist covers the minimum requirements to be addressed in a geotechnical report. This checklist is to accompany the report. Each item is to be cross-referenced to the section or page of the geotechnical report which addresses that item.

Geotechnical Requirements (Tick as appropriate, either Yes or No) Yes	No	
☒	☐	A review of readily available history of slope instability in the site or related land
☒	☐	An assessment of the risk posed by all reasonably identifiable geotechnical hazards
☒	☐	Plans and sections of the site and related land
☒	☐	Presentation of a geological model
☒	☐	Photographs and/or drawings of the site
☒	☐	A conclusion as to whether the site is suitable for the development proposed to be carried out either conditionally or unconditionally
☐	☒	If any items above are ticked No, an explanation is to be included in the report to justify why. N/A

Yes	No	Subject to recommendations and conditions relevant to:
☐	☒	selection and construction of footing systems, (as per future recommended site classification reports)
☒	☐	earthworks,
☒	☐	surface and sub surface drainage,
☒	☐	recommendations for the selection of structural systems consistent with the geotechnical assessment of the risk,
☐	☒	any conditions that may be required for the ongoing mitigation and maintenance of the site and the proposal, from a geotechnical viewpoint,
☐	☒	highlighting and detailing the inspection regime to provide the <PCA> and builder with adequate notification for all necessary inspections.
☒	☐	State Design life adopted: 50 Years

Note: <Add reference>: Add in the relevant section or page number of the listed geotechnical report which addresses each item.

FORM **A**

Geotechnical Declaration and Verification Development Application

Section 4 List of Drawings referenced in Geotechnical Report

Design Documents	Description	Plan or Document No.	Revision or Version No.	Date	Author
	Preliminary subdivision plans – PDA Surveyors, Engineers & Planners	Job No. 49895, Sheets 01 to 06	01	19/04/2023	AB
	Draft subdivision plans – PDA Surveyors, Engineers & Planners	49895AB-PA-05	-	20/06/2025	AB
	Subdivision plan – PDA Surveyors, Engineers & Planners	49895AB-PA-05	B	25/11/2025	AB

Section 5 Declaration

Declaration (Tick all that apply) Yes	No	
☒	☐	**I am a geotechnical engineer or engineering geologist as defined by the <*Regulator's geotechnical DCP*> and on behalf of the company below, I:**
☒	☐	am aware that the geotechnical report I have either prepared or am technically verifying (referenced above) is to be submitted in a support of a development application for the proposed development site (referenced above) and its findings will be relied upon by Waratah-Wynyard Council in determining the development application.
☒	☐	prepared the geotechnical report referenced above in accordance with the AGS (2007c) as amended and the Tasmanian Planning Scheme - Waratah-Wynyard.
☒	☐	am willing to technically verify that the Geotechnical Report referenced above has been prepared in accordance with the AGS (2007c) as amended and the Tasmanian Planning Scheme -Waratah-Wynyard.
☒	☐	am willing to technically verify that the geotechnical report prepared for the development application for the site confirms the land will achieve the level of <*acceptable risk*> of slope instability as a result of the considerations described in Sections C15.6.1 and C15.7.1 of the Tasmanian Planning Scheme -Waratah-Wynyard taking into account the total development and site disturbances proposed.
☐	☒	am willing to technically verify that the geotechnical report prepared for the site and related land being greater than two years old confirms the land will achieve the level of <*acceptable risk*> of slope instability as a result of the considerations described in Sections C15.6.1 and C15.7.1 of the Tasmanian Planning Scheme -Waratah-Wynyard *taking into account the total development and site disturbances proposed.*
☒	☐	have professional indemnity insurance in accordance with the Tasmanian Planning Scheme - Waratah-Wynyard of not less than $5 million, being in force for the year in which the report is dated, with retroactive cover under this insurance policy extending back to the engineer's first submission to Waratah-Wynyard Council.

Section 6 Geotechnical Engineer or Engineering Geologist Details

Company/ Organisation Name	Geoton Pty Ltd	
Name (Company Representative)	Surname: Barriera	Mr /Mrs /Other: Mr
	Given Names: Antonio Jose	
	Chartered Professional Status: CPEng, NER	Registration No: 471929
	[redacted]	Dated: 12 / 08 / 2026

Reference: AGS (2007c) *"Practice Note Guidelines for Landslide Risk Management"*. Australian Geomechanics Society, Australian Geomechanics, V42, .N1, March 2007.

Note: N/A = Not Applicable.