Attachments to item number 5.1 -

Traffic Impact Assessment;

Natural Values Assessment;

Site Assessment; and

Landslide Assessment

Sorell Council
Development Application: Response to Request for Information - 55 Craigs Hill Road, Boomer Bay

Plans Reference: P3
Date Received: 27/06/2023

55 CRAIGS HILL ROAD, BOOMER BAY – DISTILLERY, CELLAR DOOR, AND RESTAURANT

TRAFFIC IMPACT ASSESSMENT

Hubble Traffic

MODIFIED JUNE 2023

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Version	Date	Reason for Issue
Draft	February 2023	Draft issued for client feedback
Final	17 February 23	Final issued
Modified	25 June 2023	Modified to response to Council RFI

Table of Contents

1. Introduction

Taylor and Beeson Building has engaged Hubble Traffic Consulting on behalf of the developer, to prepare an independent Traffic Impact Assessment, to consider the traffic impacts of a new building that will accommodate the existing Hellfire Bluff Distillery and cellar door, supplemented with a restaurant, at 55 Craigs Hill Road, Boomer Bay.

This assessment considers the amount of traffic currently using Craigs Hill Road, the amount of traffic the proposed development site is likely to generate, and how these additional traffic movements will impact the performance of Craigs Hill Road.

The property has existing uses, Hellfire Bluff Distillery with cellar door, Daly Farm potatoes, and a rural residential property, with traffic generated from these activities considered within this assessment.

This assessment has been prepared to satisfy the requirements of Austroads, Guide to Traffic Management Part 12: Traffic Impacts of Developments, 2019, and has referred to the following information and resources:

- Tasmanian Planning Scheme (Sorell Council)
- Road Traffic Authority NSW (RTA) Guide to Traffic Generating Developments
- Australian Standards 2890 parts 1, 2 and 6
- Austroads series of Traffic Management and Road Design
  - Part 4: Intersection and crossings, General
  - Part 4a: Unsignalised and Signalised Intersections
  - Part 12: Traffic Impacts of Development
- Google Earth imagery
- Department of State Growth crash database
- LIST land information database

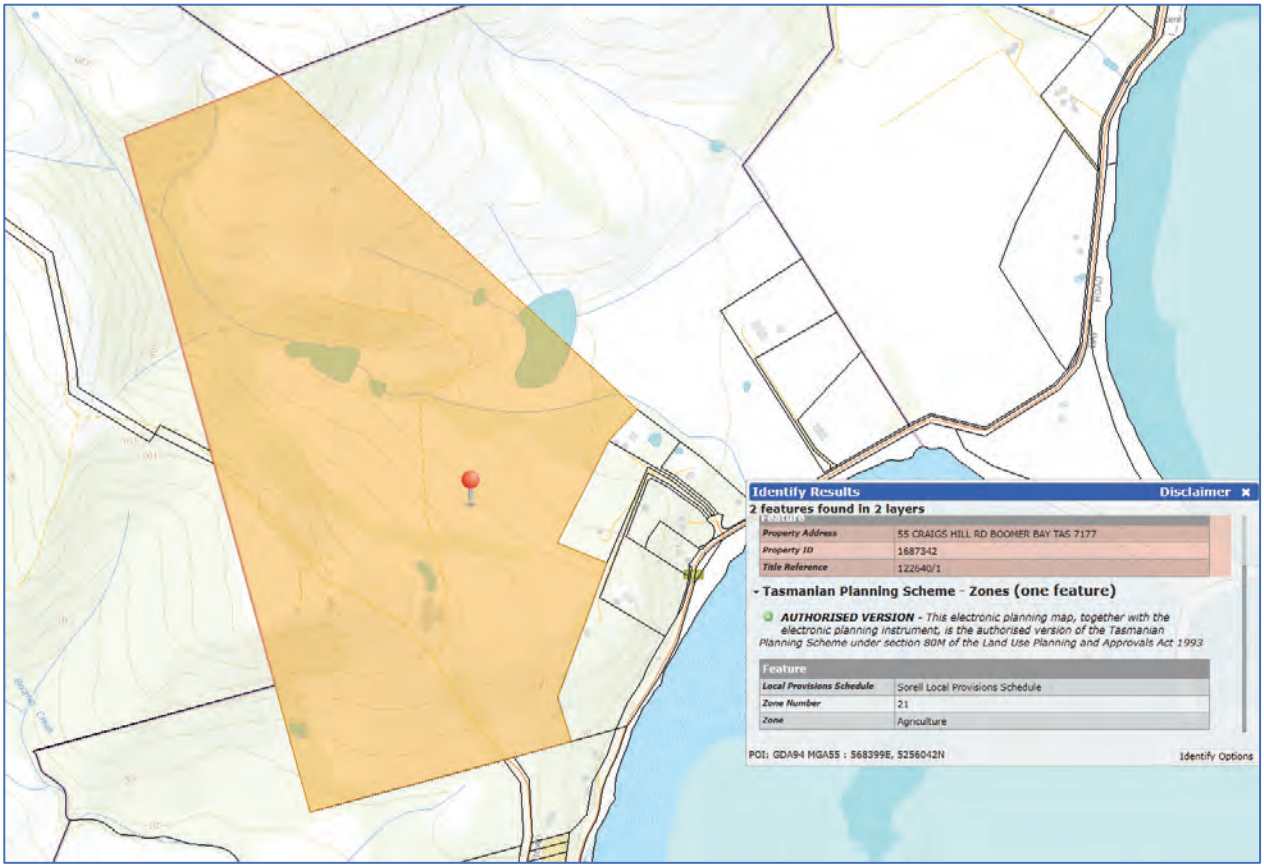
2. Site Description

The property at 55 Craigs Hill Road, is a large parcel of land, with a single access located at the end of Craigs Hill Road, connecting to an internal gravel driveway that services the site. The new development is situated on a section of land located on the northern side of the internal driveway, opposite the existing residential property, and west of the distillery, as shown in the diagram below.

The property is located within the Sorell municipality, and land zoned as agriculture under the List Land Database, as shown in Diagram 2.1.

Diagram 2.0 – Google Earth Imagery

Diagram 2.1 – Extract from the LIST land information database



3. Development proposal

The parcel of land has two existing uses, Hellfire Bluff Distillery with cellar door, and Daly Farm potatoes, with both uses to remain, along with the existing residential dwelling. The proposed development will include facilities for the relocation of Hellfire Bluff Distillery with cellar door, supplemented with a restaurant. The existing distillery and cellar door building will be retained and converted for farm purposes.

The distillery, cellar door, and restaurant will be supported with on-site parking. Opening hours for the restaurant is expected to be 10:00am to 5:00pm seven days a week, and distillery production 7:00am to 4:00pm, seven days a week.

Diagram 3.0A – Proposed layout

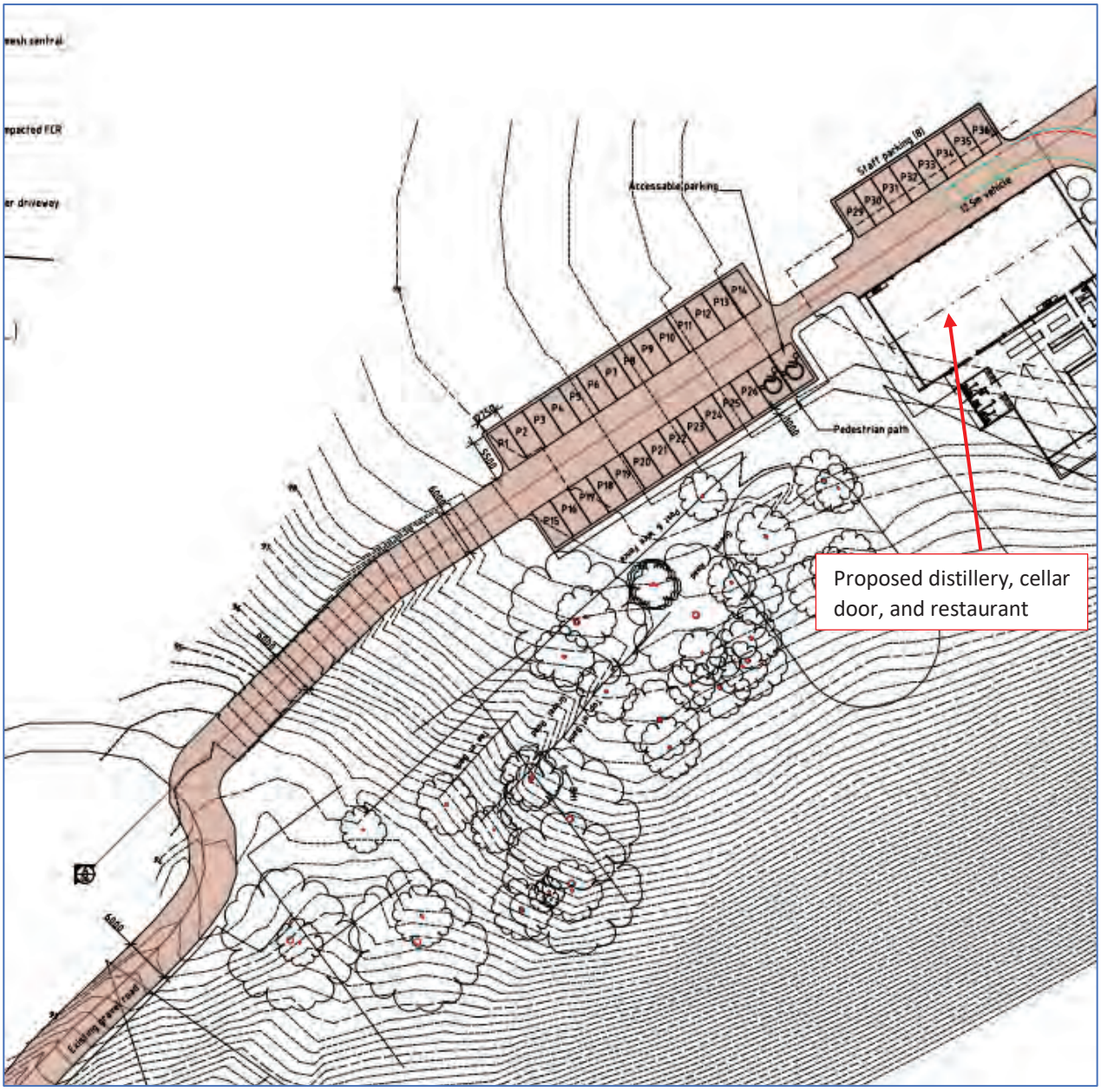
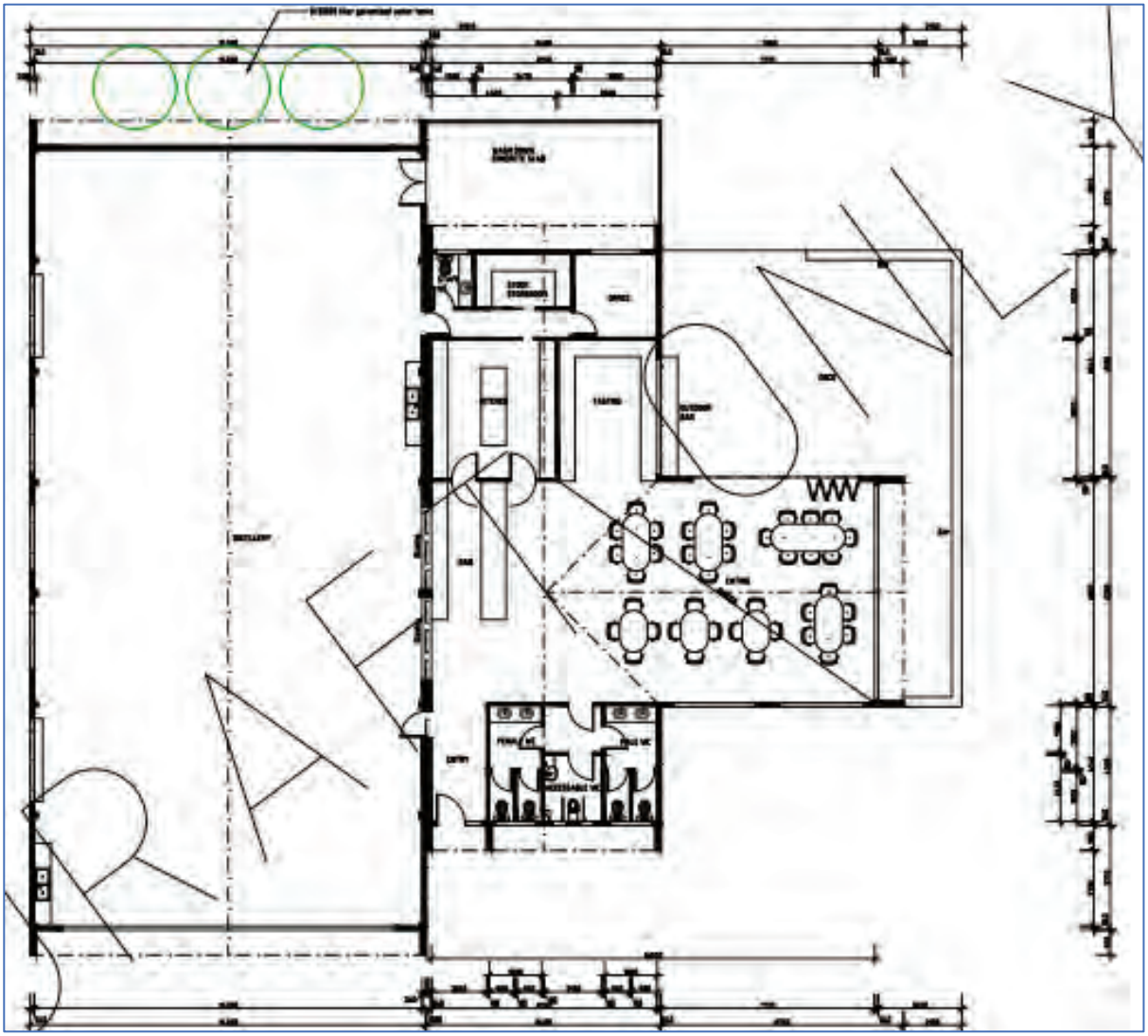


Diagram 3.0B – Proposed layout – distillery, cellar door and tasting room, restaurant, and outdoor deck



4. Trip generation by this development

A trip in this report is defined as a one-way vehicular movement from one point to another, excluding the return journey. Therefore, a return trip to and from a land use is counted as two trips.

The new trip generation for this development is based on information provided under the RTA Guide to Traffic Generating Developments (RTA Guide), while the existing trips is based on information supplied by the developer.

4.1 Existing property trips

The developer has advised that the property's existing uses, including the residential property, Daly Farm, and Hellfire Bluff Distillery and cellar door, are currently generating a maximum of 42 daily trips, and 299 trips over seven days, as detailed in the table below.

Table 4.1 – Trips generated by the existing property as defined by the developer

Property Use	Vehicle Type	Trips per day	Trips per week
Hellfire Bluff Distillery - Production	Medium rigid vehicle	1.7	12
	Heavy ridged vehicle	1.5	11
Hellfire Bluff Distillery – Cellar Door	Light vehicles	15	105
Daly Farm	Light vehicles	15	105
	Semi-Trailer	2	17
Residential property	Light vehicles	7	49
	Total	**42**	**299**

4.2 Generation of new trips

The new trips will be generated by the restaurant, which is a new use. The new building includes a restaurant, with a food service area that includes the kitchen, and indoor and outdoor seating, which has a combined estimated gross floor area of 355 square metres.

The RTA Guide specifies that a restaurant is expected to generate five trips per peak hour, per 100m^2 of floor area, and daily trips at a rate of 60 trips per 100m^2 of floor area. This generation rate is based on a restaurant operating for 10 hours, assumed to be located within a populated area, generating customers throughout the day. The RTA Guide also indicates that restaurants rarely operate at 100 percent capacity, and it is reasonable to calculate the traffic and parking demand based on the use operating at 85th percentile capacity.

The proposed development is located remote from large, populated areas, with the traffic generation rate expected to be quite different to the RTA Guide. To assist with determining the traffic generation from this restaurant, traffic observations were undertaken at a similar Vineyard operating with a restaurant, Bangor Vineyard operating at Dunalley, as this site also operates remote from large-populated areas. The observation found the restaurant generates a lunchtime

peak traffic generation between 11 am and 2pm, and outside of these times the traffic generation is quite low. The volume of traffic generated by the restaurant fluctuates, very seasonal as it relies on tourists, with weekends significantly busier than weekdays.

The table below predicts the daily and peak hour traffic flow for when the restaurant is expected to operate during the peak season, to provide a worst case scenario, and off-season to compare the different in trip generation. This assessment estimates the restaurant has the potential to generate additional 72 daily trips with 15 of these trips expected in the busiest hour periods (11am to 2pm).

During the off-season, the number of daily trips is expected to be much lower, with this assessment estimating the number of daily trips reducing from 72 to 38, with the number of trips in the busiest hour reducing from 15 to 9.

Table 4.2 – Prediction on the number of new trips generated by the development new use

Operating hours	RTA Guide trips based on floor area	Peak season		Off peak or weekdays	
		Expected demand for development	Predicted trips per hour	Expected demand	Predicted trips per hour
10 to 11am	18	30 %	5	20%	4
11 to 12 noon	18	85%	15	40%	7
12 to 1pm	18	85%	15	50%	9
1 to 2pm	18	85%	15	50%	9
2 to 3pm	18	60%	11	30%	5
3 to 4pm	18	40%	7	20%	4
4 to 5pm	18	20%	4	20%	4
		Total	**72**		**38**

Retail, and hospitality employees

The developer has advised that a maximum of five restaurant employees, are expected to be employed on-site at any one time. Each employee is expected to generate two daily trips, with these trips expected to occur outside of the customer trips, and generate additional ten daily trips.

Distillery

The existing uses, distillery, cellar door, residential dwelling, and farm operations, are not expected to generate any additional trips.

Restaurant deliveries

The restaurant is expected to generate daily delivery trips, with these trips expected to occur outside of the operational time of the restaurant, not coincide with customers arriving or leaving, and generate an additional six daily trips during the peak season.

4.3 Summary of trips generation

From a traffic perspective, employees are not expected to arrive or leave at the same time as the customers, and delivery vehicles will be scheduled to occur outside of the restaurant peak operating times where possible, to reduce conflict between different vehicle types.

Based on available information, during the peak season the restaurant is predicted to generate an additional 72 daily trips, with 15 of these trips generated within the busiest hour periods (11am to 2pm). While in the non-peak periods, the number of trips is predicted to be significantly less, predicted to be additional 38 daily trips, with nine expected in the busiest hour period.

The development new use is predicted to generate additional 16 daily trips generated by additional staff and deliveries, during the peak season, reducing to 12 in non-peak periods.

Table 4.3 – Summary of daily and peak hour trips generated by the property (existing and new)

	Peak season		Off-peak season or weekdays	
Activity	**Daily trips**	**Trips within the busiest hour**	**Daily trips**	**Trips within the busiest hour**
Existing trips	42	4	42	4
New trips by development	72	15	38	9
Employee trips	10	0	8	0
Deliveries to restaurant	6	0	4	0
Additional trips generated by new use	88	15	50	13
Total development	**130**	**19**	**92**	**13**

It is important to acknowledge that new trips generated by the development are expected to occur outside of the times when the peak hour periods when trips from the existing land-uses is expected to be operating along Craigs Hill Road.

For assessment purposes, to consider the worst case scenario, the development new use in the peak season is predicted to generate additional 88 daily trips, with 15 of these trips expected in the busiest hour periods.

5. Parking requirements

5.1 Planning scheme requirements

Having consideration to the Tasmanian Planning Scheme, Table 6.2 Categorising Use or Development, the development site falls under Resource Processing, with ancillary uses, such as restaurant and cellar door. For the purpose of determining the parking requirements, each use has been assessed separately, as follows:

- Food Services Use Class – Restaurant - For the 308m^2 combined indoor and outdoor floor areas, one parking space is required per 15m^2, totalling 21 parking spaces.
- General Retail and Hire Use Class - Cellar door – For the 17m^2 estimated gross floor area, one parking space is required per 30m^2 of floor area, totalling one parking space.
- Hotel Industry Use Class - Internal bar – For the 30 m^2 floor area one parking space is required per 20m^2 of floor area, totalling two parking spaces.
- Resource Processing Use Class – Distillery - This Use requires two parking spaces per three employees, totalling four parking spaces.

Table 5.1 – Minimum planning scheme parking requirements

Use	Development Areas	Parking space requirements - Table 6.2 Use Classes	Floor area	Number of spaces
Food Services	indoor customer seating	one parking space per 15m^2 of floor area	195	13
Food Services	Outdoor customer seating	one parking space per 15m^2 of floor area	113	8
General retail and Hire	Cellar door	one parking space per 30m^2 of floor area	17	1
Bar area	Hotel Industry	One parking space per 20m^2 of floor area	30	2
Resource Processing	Distillery	Two parking space per three employees	-	4
		Total – Parking requirements	**355m^2**	**28**

To cater for the multiple uses, the planning scheme specifies that the site should have a minimum of 28 on-site parking spaces, as defined in table C2.1. The development will provide a total of 36 parking spaces, comprising 28 customer parking spaces, which includes two accessible spaces, and a separate staff parking area with eight parking spaces.

6. Existing traffic conditions

The development site has direct access to Craigs Hill Road, which is managed by the Sorell Council. The road is a local rural access road that provides no-through road function.

The nearest arterial road to the development site is the Arthur Highway, with customers having two main routes that connect to Craigs Hill Road, either Boomer Road, or Bay Road.

6.1 Craigs Hill Road characteristics

Craigs Hill Road is of a rural road standard, and travels in a northerly direction from Bay Road for 560 metres, terminating at the development site access. At the commencement of Craigs Hill Road at the junction with Bay Road, there is a short section (15 metres in length) of bitumen, beyond his point the road surface is unsealed, varying in trafficable width through to the development site access, with no street lighting.

For the first 250 metres from Bay Road (section one) the trafficable road width averages 5.5 metres wide, and is adequate to accommodate two-way traffic movements. Trafficable road width is the road formation which include the section of road where majority of the vehicles travel, plus the shoulders, which means when opposing vehicles meet, one vehicle may require to use the road shoulder. On low trafficked unsealed roads, majority of drivers prefer to travel in the middle of the road, which cause loose gravel to form on the edges, underneath this loose gravel the road is formed, and suitable for traffic use.

For the next 300 metres (section two) to the development site access, the road width at certain locations reduces to less than 5.5 metres, due to the presence of trees adjacent to the edge of the road, or the road formation is reduced. When this section is used by opposing vehicles, one vehicle would need to pull to the side of the road where there is adequate road width, to allow for the opposing vehicle to pass.

Photograph 6.1A – Typical Road standard of Craigs Hill Road (section one)

Photograph 6.1B – Typical Road standard of Craigs Hills Road (section two where trees reduce the trafficable road width to less than 5.5 metres)

Photograph 6.1C – Craigs Hills Road (section two where the road formation is less than 5.5 metres)

6.2 Prediction of existing traffic using Craigs Hill Rd generated by the existing land-use

According to the LIST database there are 17 properties along the western side, 16 of these properties are small residential size lots with a residential type dwelling, all with direct road access. While along the eastern side there are two large properties.

In addition to the residential dwellings, there is Littles Logistics that provides refrigerated transport and local school bus services, which have commercial trucks and buses parked along the side of the road as shown in the photograph below.

Photograph 6.2 – Littles commercial trucks and buses parked along Craigs Hill Road

These 16 residential properties are expected to generate a low number of daily trips, the number of trips can be predicted based on the RTA Guide, which indicates on average a residential dwelling has the potential to generate 7.4 daily vehicle trips, with 0.8 of these trips operating in each of the peak periods. Due to the properties being reasonably remote from large-populated areas, the number of daily vehicle trips is expected to be slightly less, and for the purpose of this assessment average of five trips per day. These 16 residential properties could generate 80 daily trips, with 10 of these trips likely to be operating in the peak hour periods.

The commercial vehicles associated with the Littles Logistics business also has the potential to generate vehicular trips, based on the number of large vehicles parked on the eastern side, assuming that drivers would arrive in the morning and leave in the evening, it is predicted this business has the potential to generate 20 daily trips, with majority of these trips operating within the peak hour periods.

Overall, this assessment predicts the existing land-uses along Craig Hill Road not including the existing distillery, has the potential to generate 100 daily vehicular trips, with 20 of these trips likely occurring in the weekday peak hour periods.

6.3 Existing traffic trips from development site

The developer has advised the existing development can generate a maximum 42 daily trips, with four of these trips expected to operate in the busiest hour period.

6.4 Manual traffic survey at the junction of Bay Road and Craigs Hill Road

A manual traffic survey was conducted at the junction of Bay Road and Craigs Hill Road from 8:30am to 12:30pm, on Wednesday morning 21 September 2022. As the manual survey was conducted outside of the morning peak hour traffic flow, it captured significantly less traffic than the predicted traffic generation in section 6.2. This manual traffic data simply demonstrates when the new use restaurant is generating additional traffic movements the road is lightly trafficked, creating no adverse impact with opposing vehicles.

To assess the traffic impacts from the increase in daily vehicle movements, the RTA predicted daily traffic movements as defined in section 6.2 should be used, rather than this manual survey data.

Table 6.4 - Manual traffic survey data for junction of Bay Road with Craigs Hill Road

Time	**Bay Road**		**Craigs Hill Road**			
	North	South	Right in	Left In	Left Out	Right Out
8:30-8:45am	4	1	3	0	0	1
8:45-9:00am	1	2	0	0	1	0
9:00-9:15am	2	1	1	1	2	0
9:15-9:30am	2	1	0	0	0	1
9:30-9:45am	1	1	0	0	1	1
9:450-10:00am	3	0	0	0	0	0
10:00-10:15am	2	1	0	0	1	1
10:15-10:30am	3	0	1	0	1	0
10:30-10:45am	0	4	0	0	1	0
10:45-11:00am	1	1	1	0	0	0
11:00-11:15am	0	1	0	1	0	0
11.15-11:30am	2	2	0	0	1	0
11:30-11:45am	5	1	0	0	0	0
11:45-12:00am	4	2	0	1	0	0
12:00-12:15pm	2	2	0	1	1	0
12:15-12:30pm	2	2	1	3	0	0
Total	**34**	**22**	**7**	**7**	**9**	**4**

6.5 Access to the development property

The property access is located 560 metres from Bay Road, at the end of Craigs Hill Road, on a reasonably straight section of road. A passing area is located on the eastern side, prior to a formal brick fence creating the property access, which is approximately five metres wide, with a stock grate.

Within the development site, the width of the internal driveway varies, and basically operates as a single traffic lane. The internal driveway has a range of vertical uphill grades and runs across farmland.

6.6 Speed limit and operating speed

There is no speed limit posted along Craigs Hill Road, and although the road surface is gravel, which would normally indicate an 80km/h speed limit, due to the relatively high density of residential properties along the western side, the urban default speed limit of 50 km/h is expected to apply under State traffic regulations. The gravel road surface, combined with the undeveloped land along the eastern side could generate ambiguity with some motorists, which can be eliminated with the provision of a 50 km/h speed limit sign, posted on Craigs Hill Road after the Bay Road junction.

6.7 Traffic safety at this location

The Department of State Growth maintains a database of reported road crashes. A check of this database for the last five years, found one property damage crash reported along Craigs Hill Road, and an unknown crash type in August 2022, occurring approximately 50 metres from Bay Road.

There were no crashes reported at the junction of Craigs Hill Road and Bay Road, and no crashes reported on Bay Road between Craigs Hills Road and Boomer Road. There was one property damage crash reported on Boomer Road in March 2018, involving two vehicles, with one vehicle rolling backwards.

This crash report indicates motorists are not encountering any difficulty with negotiating Craigs Hill Road, or the surrounding connecting roads.

6.8 Road characteristics of Boomer Road and Bay Road

Boomer Road connects between the Arthur Highway and Bay Road; the road is posted with an 80 km/h speed limit, has a gravel surface and curved road alignment delineated by alignment warning signs and guide posts, and sufficient road width to accommodate two-way traffic movements.

Photograph 6.6B – Typical cross section of Boomer Road

Bay Road connects from the Arthur Highway to Craigs Hill Road, the road surface is sealed, with sufficient pavement width to accommodate two-way traffic movements, and a speed limit that varies between 60 and 80 km/h.

Photograph 6.6B – Typical cross section of Bay Road

7. Impact from traffic generated by this development

As determined in section 4 of this assessment, the new use at the development site is expected to generate a moderate number of new vehicle trips. This assessment estimates the existing two-way traffic flow is 142 vehicles per day, based on the existing dwellings and Little Logistics having the potential to generate 100 trips, with the existing development generating 42 trips.

Having consideration to the new trips, this assessment estimates the new restaurant use (including additional staff and deliveries) has the potential to generate an additional 88 daily trips, with 15 of these trips likely to occur within the busiest hour periods, when the restaurant is operating during peak season. Outside of the peak season the number of trips is significantly less, predicted at 50 additional daily trips, with nine of these trips occurring in the busiest hour periods.

Based on the predicted daily use by other land-use developments (16 dwellings and Littles refrigeration and bus operations), this new use at the development site is predicted to generate a moderate increase in the number of daily trips.

These additional trips can be expressed as a percentage of the existing daily trips predicted to be using Craigs Hill Road. During the peak season, the additional 88 trips represent 62 percent increase on the predicted 142 existing daily trips. While in the non-peak season, the additional 50 trips from the new use represents a 35 percent increase in daily trips.

This represents a moderate increase, as discussed previously, the new use is predicted to generate majority of the new trips between 11am and 2pm when the restaurant is operating, and within these periods the new use is predicted to generate additional 15 trips per hour. With these new trips expected to occur outside of the weekday commuter trips generated by the other land-uses along Craigs Hill Road, minimising traffic impact.

Table 7.0 – Comparison of new daily trips based on existing daily trips

Scenario	Development site daily trips			Existing two-way flows	Total daily trips with new use	Percent increase
	Existing trips	New Trips	Total trips			
Peak season	42	88	130	142	230	62 percent
Non-peak season	42	50	92	142	192	35 percent

7.1 Traffic impact to the surrounding properties

Any new development in urban areas can be concerning to local residents, and it can be difficult to argue that a traffic increase is reasonable. The RTA Guide has considered this matter, and provided an environmental performance standard, which can be used to evaluate the likely impact on residential amenity.

Diagram 7.1 is an extract from the RTA Guide and relates to urban environments, providing maximum peak hour environmental goals, and indicates a local urban street should be able to carry 200 vehicles per hour without impacting residential amenity.

Extract 7.1 from the RTA Guide – Residential environmental standards

Table 4.6
Environmental capacity performance standards on residential streets

Road class	Road type	Maximum Speed (km/hr)	Maximum peak hour volume (veh/hr)
Local	Access way	25	100
	Street	40	200 environmental goal
			300 maximum
Collector	Street	50	300 environmental goal
			500 maximum

Note: Maximum speed relates to the appropriate design maximum speeds in new residential developments. In existing areas maximum speed relates to 85th percentile speed.

This assessment predicts the new trips are expected to be generated outside of the periods when the existing residential dwellings are generating traffic to and from their properties in the weekday morning and evening periods, minimising traffic impact. In demonstrating that these additional trips are expected to have a minimal traffic impact on existing users, the existing weekday peak hour traffic movements of 24, plus additional 15 trips generated by the new use (busiest hour) is 39 trips per hour. This is well below the acceptable environmental threshold for an urban street of 200 two-way vehicles per peak hour.

Table 7.1 – Comparison of two-way traffic flow

	Highest hour two-way traffic flow per hour	Predicted two-way traffic flow with additional development traffic
Craigs Hill Road	24	39
Bay Road	56	71

7.2 Traffic efficiency along Craigs Hill Road

The RTA Guide provides level of service for urban roads, based on the directional peak hour traffic flows. As demonstrated in section 7.1, as a worst case scenario, the number of two-way traffic movements on Craigs Hill Road is predicted to be less than 40 vehicle movements per hour. Clearly demonstrating the road will operate at the highest level of traffic efficiency, as the RTA Guide indicates that for an urban road where the directional traffic flow is less than 200 vehicles per hour, motorists are receiving level of service LOS A.

Extract 7.2 from RTA Guide – Level of service for urban functional roads

Urban road peak hour flows per direction

Level of Service	One Lane (veh/hr)	Two Lanes (veh/hr)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

7.3 Traffic impact along the surrounding local road network

Both Boomer Road and Bay Road are lightly trafficked, with sufficient spare traffic capacity to easily absorb additional vehicle movements generated by this development, without causing adverse traffic impact to existing road users.

8. Development layout and access arrangement

8.1 On-site car parking

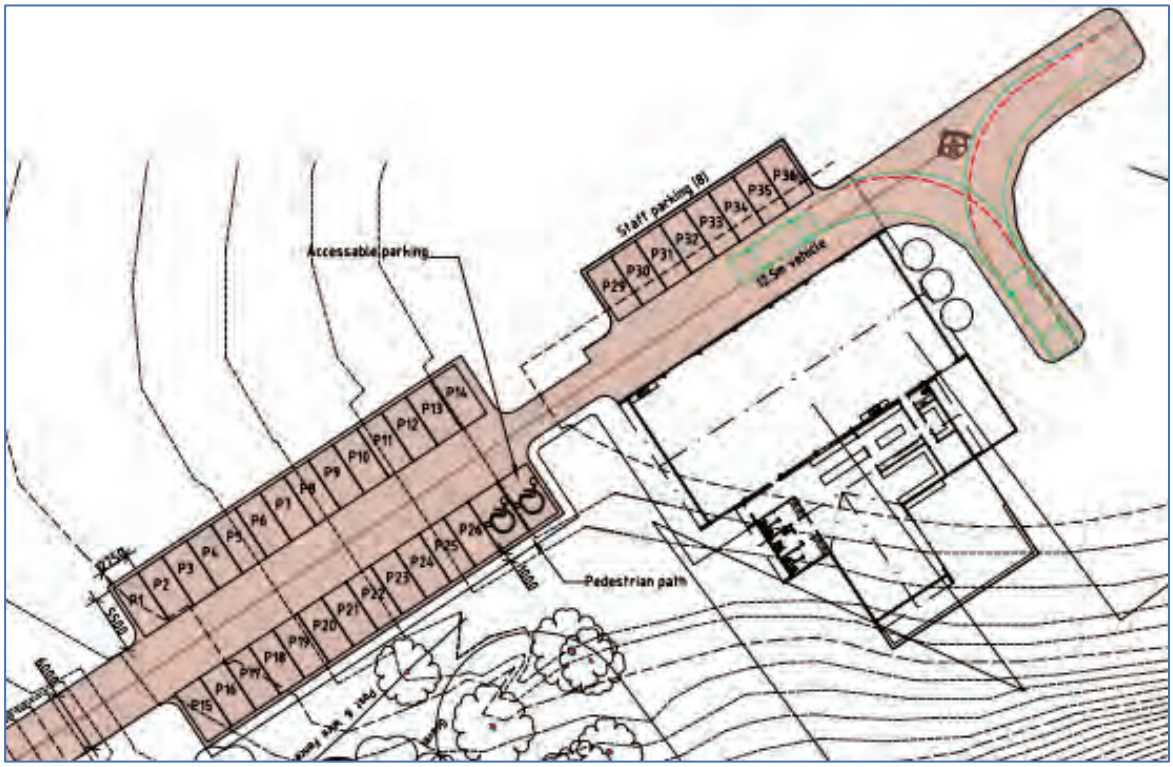
The development will provide a total of 36 car parking spaces, located in two parking modules. The first parking module of 28 spaces will be designated for customer parking and include two accessible spaces. These customer spaces will be connected to the building entrance with a one metre pathway. The second parking module of eight spaces will be allocated for staff parking. This number of on-site car parking spaces is expected to meet the reasonable demand of the development, complying with the planning scheme.

The parking modules will consist of the following attributes:

- Parking bays to be a minimum of 2.6 metres wide and 5.4 metres long.
- Supported with minimum manoeuvring area of 6.4 metres.
- All parking spaces to be ninety degrees to the parking aisle.
- Parking area to be a sealed surface, with spaces designated by line markings and wheel stops.
- The gradient of the parking area to match the current land terrain, and grade of all parking spaces to be less than five percent.

The parking modules complies with the planning scheme and Australian Standards 2890.1:2004, enabling all vehicles to enter the spaces in a single turning manoeuvre, with the two-way driveway and parking aisle ensuring vehicles can arrive and leave in a forward-driving direction.

Diagram 8.1 – Layout of car parking spaces



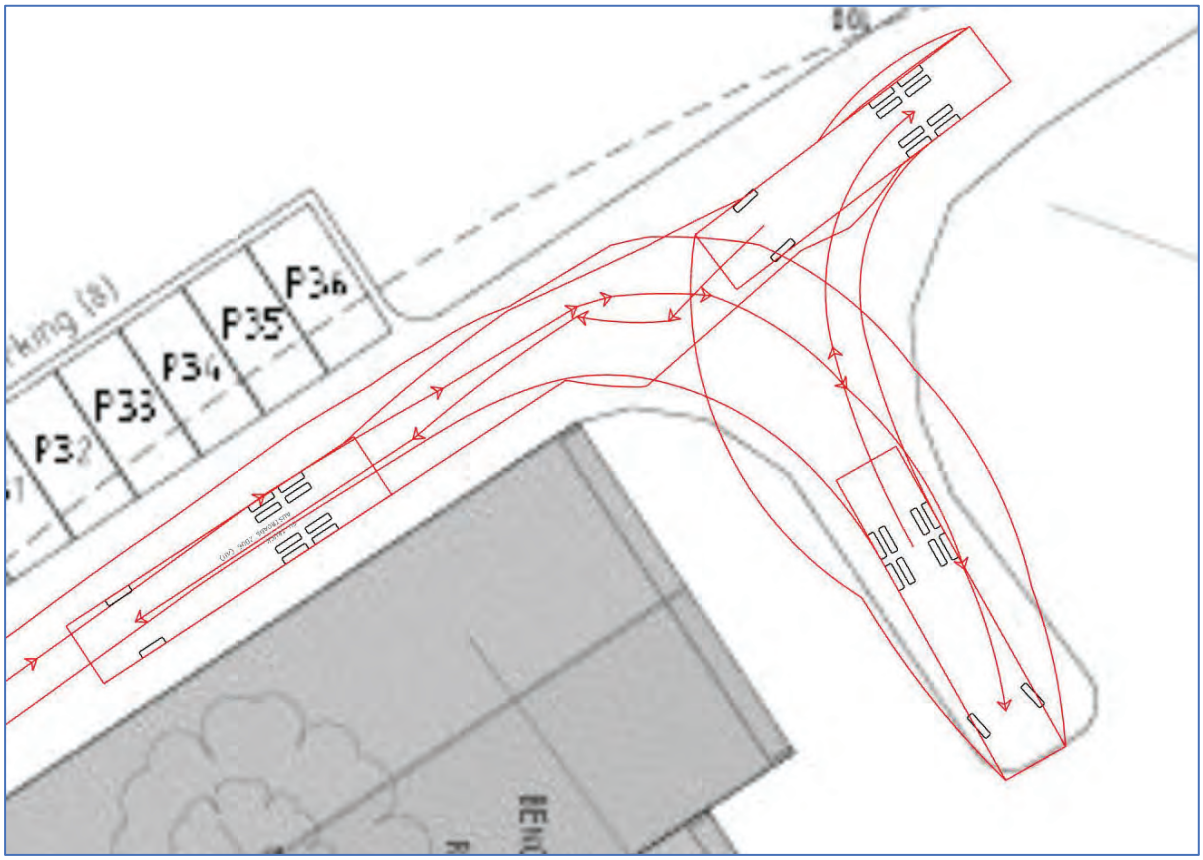
8.2 Commercial vehicles

The existing distillery operation generates a low volume of heavy vehicle movements, which will remain the same when the distillery is relocated to the new premises.

Where possible the heavy vehicle deliveries will be scheduled to occur outside of the peak customer periods, and the access and internal road infrastructure has been designed to accommodate heavy vehicle movements.

A loading bay has been designed to be located at the end of the building, separated from the car parking modules. The maximum size vehicle expected to arrive on site for the new development is a heavy rigid vehicle (12.5 metres in length). The diagram below demonstrates the swept path for a heavy rigid vehicle using the loading bay, and turning around so the vehicle can enter and leave in a forward-driving direction.

Diagram 8.2 – Commercial delivery area – swept path for heavy rigid vehicle



8.3 Internal driveway

The development will include works that widened the existing internal driveway from Craigs Hill Road to the new building and be a constant width of six metres to accommodate two-way vehicle movements. The road surface from Craigs Hill Road to the beginning of the car parking modules will be a hard-wearing gravel surface, with appropriate drainage system to manage surface water.

The existing internal driveway has a variety of gradients, with a maximum of 15 percent over one section. Overall, the existing gradient of the internal driveway complies with section 2.5.3 of the Australian Standard 2890.1:2004, being less than 16.7 percent for a driveway exceeding 20 metres or longer. The change in grade along the internal driveway appears to be compliant, as the change in grades are supported with vertical curves, minimising any adverse impact for vehicles, and eliminating the risk of vehicles bottoming out.

Photograph 8.3A – Existing internal driveway with maximum gradient

Photograph 8.3B – Existing internal driveway – change in vertical gradients

8.4 Sight distance for vehicles using the property access

As discussed previously, the internal driveway connects to the end of Craigs Hill Road, with vehicles entering and leaving the property in a straight direction, where forward sight distance is adequate for the operating speed of approaching vehicles. On Craigs Hill Road, prior to the property access there is road widening that can be used as a passing bay, to overcome the existing brick wall access width being less than 5.5 metres. No adverse traffic impact is expected with vehicles entering or leaving the development site.

Photograph 8.4 – Sight distance for motorists entering and leaving the development site

8.5 Headroom clearance for parking spaces

Both the customer and employee parking spaces will not be covered, and there are no overhead structures to cause height clearance impacts.

8.6 Internal pedestrian movement

A suitable pedestrian footpath will be provided to connect the customer parking spaces with the building entrance, to ensure safe and efficient pedestrian access.

8.7 Bicycle facilities

Six bicycle wheel frames will be provided within 50 metres of the main entrance to cater for employee and customer use, as per the planning scheme requirements for the multi uses.

8.8 Accessible parking

Two parking spaces will be provided for customer accessible parking, located as near as practicable to the main entrance, and supported with a pedestrian pathway.

9. Junction of Craigs Hill Road with Bay Road

All vehicles entering and leaving the development site must travel through the junction of Craigs Hill Road and Bay Road. Craigs Hill Road intersects Bay Road at an acute angle forming a T-junction, the road surface through the junction is sealed, and located on reasonably flat ground, as shown in the photograph below.

Photograph 9.0A – The junction of Craigs Hill Road and Bay Road

The speed limit along Bay Road between the Arthur Highway and Craigs Hill Road changes between 60 and 80 km/h, with the Craigs Hill Road junction located within a posted 80 km/h speed limit, although directly opposite the junction there is a short length of ribbon residential properties.

At the junction, the sight distance for motorists leaving Craigs Hill Road, viewing to the left to vehicles approaching on Bay Road, is limited by roadside vegetation and embankment to approximately 80 metres, while in the opposite direction the sight distance exceeds 150 metres.

Austroads Guide to Road Design provides guidance for Safe Intersection Sight Distance (SISD) and is based on the operating speed of approaching vehicles. For an operating speed of 80 km/h, the recommended SISD is 170 metres, with the driver having a reaction time of 1.5 seconds. As the alignment on Bay Road approaching the junction is curved, the operating speed of vehicles is expected to be lower than 80 km/h, which would lower the required SISD.

Austroads also provides guidance on Stopping Sight Distance (SSD), which is the minimum sight distance requirement for junctions, and for a vehicle operating at 80 km/h the recommended SSD is 88 metres, based on the driver having 1.5 seconds of reaction time. With the operating speed of approaching vehicles being moderated by the curved road alignment, the available SSD is providing motorists with the minimum acceptable level of sight distance.

This assessment found that moderate sight benching to the left, in association with removal of roadside vegetation could increase the available sight distance from 80 to 110 metres, which would improve the level of safety for existing road users. Also, reducing the speed limit from 80 to 60 km/h could also improve the level of safety for existing road users, as the required SISD would reduce to 114 metres, and the SSD reduce to 56 metres.

With the junction being lightly trafficked the current level of sight distance is considered fit-for-purpose, and this is supported by no reported crashes occurring at the junction. However, improving sight distance is an easy method to improve the level of safety for existing motorists, and as the number of vehicle movements using the junction intensifies, the sight distance improvements become a higher priority.

Photograph 9.0B – Available sight distance for motorists looking left (80 metres)

Photograph 9.0C – Available sight distance for motorists looking right (exceeds 150 metres)

Photograph 9.0D – Possible benching of embankment to increase sight distance

10. Localised road widening along Craigs Hill Road

As discussed earlier, the first 250 metres from Bay Road, the unsealed trafficable road width averages 5.5 metre wide, is suitable to accommodate two-way traffic movements, this distance generally covers the majority of the existing residential dwellings.

The second section of the road to the development access, the width of the unsealed gravel road surface varies, with sections of the road being less than 5.5 metres wide. This is due to the presence of trees adjacent to the road edge, or the trafficable road width being narrower.

The developer has agreed to undertake localised road widening to provide a consistent unsealed road width of 5.5 metres from Bay Road to the development access, and this will involve removing trees adjacent to the road edge.

Photograph 10.0A – Road narrowing caused by trees

Photograph 10.0B – Trees adjacent to the road edge

11. Planning scheme

11.1 C3.0 Road and Railway Assets Code

C3.5.1 Existing Road accesses and junctions

This development will intensify traffic movements generated by development site, by more than 20 percent or 40 vehicles a day and therefore must be considered under the performance criteria P1, with the access connecting to a 50 km/h road.

Performance criteria	Assessment
To minimise any adverse effects on the safety and efficiency of the road or rail network from vehicular traffic generated from the site at an existing or new vehicle crossing or level crossing or new junction.	
a) any increase in traffic caused by the use;	The property has an existing distillery and cellar door, Hellfire Bluff Distillery, which will be relocated as part of the new development for a distillery, cellar door and restaurant. The increase in vehicle movements will be caused by customer, employee, and delivery vehicles associated with the new restaurant use, estimated at 88 additional vehicle movements per day, with a maximum of 15 movements in any one hour, when the restaurant is operating during the peak season. Outside of the peak season, the traffic increase will be much lower, predicted to be 50 daily vehicle movements with nine of these movements occurring in the busiest hour periods.
b) the nature of the traffic generated by the use;	Customer and employee vehicles are expected to be light vehicles less than 5.5 metres in length, which have good manoeuvrability and excellent vehicle performances in respect to braking and acceleration. This type of vehicle is compatible with the existing vehicles using Craigs Hill Road. Deliveries are expected to be undertaken by heavy rigid trucks and these types of vehicles can be accommodated along Craigs Hill Road, without causing adverse impact.
c) The nature of the road;	The development site is located at the end of Craigs Hill Road, within the surrounding local road network, the road would function as a local road, providing access to the abutting properties, which consists of 16 residential dwellings and farmland. The road is 560 metres long, carries no through traffic, has a rural construction standard, the width of the gravel surface varies. The developer has agreed to undertake localised road widening to ensure the unsealed road is 5.5 metres wide to accommodate two-way traffic movements. Overall, the road is considered suitable to absorb the additional vehicle movements, particularly once the road widening is completed.
d) The speed limit and traffic flow of the road;	Based on the density of the residential development, the urban default speed limit of 50 km/h would apply by State regulations. The road is lightly trafficked, estimated at 24 two-way traffic movements per hour, with the development having the potential

	to increase the hourly two-way traffic flow by an additional 15 vehicles. This assessment has demonstrated the increase in traffic flow is not expected to cause any adverse impact to the surrounding properties, and there is sufficient traffic capacity on Craigs Hill Road to absorb the increase without causing any reduction in traffic performance or cause any adverse traffic to other road users. The surrounding connecting local roads, Boomer Road and Bay Road are lightly trafficked, both are expected to absorb the predicted traffic increase without causing any adverse impact to other users.
e) Any alternative access to a road;	The property has no other road access.
f) the need for the use;	The development site is located within a reasonable distance to the Arthur Highway, which is a tourist route, and would contribute to Tourism within the State, which is important for economic growth.
g) any traffic impact assessment; and	This independent Traffic Impact Assessment found no reason for this development not to proceed.
h) any written advice received from the road authority.	Sorell Council requesting further advice to Taylor & Beeson Building Pty Ltd.

11.2 C3.0 Parking and Sustainable Transport Code

C2.5.1 Car parking numbers

The planning scheme specifies that any new use must provide an appropriate level of car parking spaces to meet the reasonable needs of the use. The development will be providing 36 parking spaces for the combined uses, which complies with the acceptable solution A1.

C2.5.2 Bicycle parking numbers

Table C2.1 Parking Space Requirements, details the bicycle parking spaces for the following uses:

- Food services - Restaurant area of 195m^2 requires one space for every 75 m^2, totalling three bicycle parking spaces,
- General retail and hire - Cellar door area of 17m^2 requires bike facilities at the rate of one space for every 100m^2, totalling one bicycle parking space,
- Hotel Industry requires one space per 100m^2 of floor area available to the public, and for 30m^2 bar floor area, requiring one space, and
- Resource processing requires bike facilities for employees at the rate of one space per five employees, totalling one bicycle parking space.

The combined uses require six bicycle parking spaces, which will be provided within 50 metres of the development entrance, which complies with the acceptable solution A1.

C2.5.3 Motorcycle parking numbers

The planning scheme table C2.4 requires one motorcycle parking space for 20-40 car parking spaces. One dedicated motorcycle parking space will be provided to comply with the planning acceptable solution A1.

C2.5.4 Loading bays

The development is providing a dedicated loading bay, complying with the acceptable solution A1.

11.3 C2.6 Development Standards for Buildings and Works

C2.6.1 Construction of parking areas	The new access road to the parking modules from the internal roadway will be constructed with a hard-wearing concrete surface, suitably graded to direct surface water to an approved stormwater drainage system. The rest of the driveway to Craigs Hill Road will be improved, widened to a minimum of six metres, and be constructed with a hard-wearing gravel surface, and supported with a suitable drainage system. This design complies with the acceptable solution A1.
C2.6.2 Design and layout of parking areas	The new parking spaces will be 2.6 metres wide, 5.4 metres long, supported with a 6.4 metre wide parking aisle, facilitating easy manoeuvring into and out of the spaces. The parking spaces will be delineated with line markings and provided with wheel stops. The two-way access will have a minimum width of six metres to accommodate two-way traffic movements, to ensure all vehicles can enter and leave in a forward-driving direction. Any parking deck or driveway that is elevated above the natural ground surface by more than 600 millimetres will be supplemented with an approved traffic barrier. Two accessible parking spaces will be provided within the new car park, located as near as practicable to the main entrance, and connected by a suitable pathway. Overall, the design of the parking areas complies with the acceptable solution A1(a).
C2.6.3 Number of accesses for vehicles	The development site will continue to operate with a single access point to Craigs Hill Road, complying with the acceptable solution A1.
C2.6.4 Lighting of parking areas within the General Business Zone and Central Business Zone	The development will provide suitable infrastructure to ensure all parking areas, and pathways are lit to the appropriate Australian Standard, complying with the acceptable solution A1.
C2.6.5 Pedestrian access	The customer parking module will consist of 28 car parking spaces, the spaces will be connected to the entrance of the main building by a one metre pedestrian pathway, with wheel stops used to provide separation of the parking spaces and the pathway. The employee car parking module of eight parking spaces will not be provided with a pedestrian pathway. The design complies with the acceptable solution.

C2.6.6 Loading Bays	A dedicated loading area is being provided within the development site, separated from the parking areas, and delivery vehicles will be able to enter and leave in a forward-driving direction.
C2.6.7 Bicycle parking and storage facilities within the General Business Zone and Central Business Zone	Not applicable for a rural location.
C2.6.8 Siting of parking and turning areas	The two parking modules are well set back from the property boundary and will be supported with landscaping to minimise visual impact. There will be sufficient turning area, to allow for all vehicles to enter and leave the parking area and development site in a forward-driving direction.

12. Conclusion

From a traffic engineering and road safety perspective, this development is likely to generate a moderate increase in the number of traffic movements, and is not expected to create any adverse safety, amenity, or traffic efficiency issues, as:

- the design and operation of the internal driveway is predicted to provide safe and efficient traffic movements, easily catering for the traffic demand,
- the amount of traffic expected to be generated during the peak hour periods is reasonably low, and there is sufficient capacity within the surrounding road network to absorb the extra vehicle movements, without adversely impacting other users, or the level of traffic performance,
- drivers will have available sight distance that will be adequate for the prevailing speed of vehicles approaching the access, and motorists will be able to enter and leave the development site in a safe and efficient manner,
- there will be a sufficient supply of on-site parking spaces to meet the reasonable demand, eliminating the risk of overflow parking, and the parking spaces have been designed to ensure vehicles can enter and leave in an efficient manner,
- the internal driveway will be upgraded to provide sufficient width to accommodate two-way traffic flow, ensuring all vehicles will enter and leave in a forward-driving direction,
- a dedicated loading area will be provided, separately located from the car parking spaces, to accommodate a heavy rigid vehicle,
- the developer has agreed to undertake widening to the unsealed road surface along Craigs Hill Road to ensure there is consistent 5.5 metres width to accommodate two-way traffic movements, which will require the removal of trees located adjacent to the road edge.

This Traffic Impact Assessment found no reason for this development not to proceed.

This assessment found the available sight distance at the junction of Bay Road with Craigs Hill Road is limited to the left by a roadside embankment, and moderate sight benching should be a priority for the road manager, to improve safety for existing and future road users. Alternatively, applying to the Transport Commission for the speed limit to be lowered from 80 to 60 km/h along Bay Road, in the vicinity of the Craigs Hill Road junction.

Consideration by the Sorell Council for the installation of a 50 km/h speed limit sign at the beginning of Craigs Hill Road.

GEO-ENVIRONMENTAL SITE ASSESSMENT

55 Craig's Hill Road

Boomer Bay

July 2022

GES

GEO-ENVIRONMENTAL

SOLUTIONS

Sorell Council
Development Application: Response to Request for Information - 55 Craigs Hill Road, Boomer Bay.pdf
Date Received: 10/ 03 / 2023
Plans Referenced: P2

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Geo-Environmental Solutions P/L 29 Kirksway Place Battery Point 7004. Ph 6223 1839

Introduction

Client: Hellfire Bluff

Date of inspection: 02/02/22

Location: 55 Craig's Hill Road, Boomer Bay

Land description: Approx. 92.89ha lot

Building type: Proposed cellar door

Investigation: Geoprobe 540UD

Inspected by: M Campbell

Background Information

Map: Mineral Resources Tasmania –, 1:250 000

Rock type: Triassic sandstone

Soil depth: > 1.60m

Planning overlays: Potential Dispersive Soils (minor), Bushfire Prone Area, Low & Medium Landslide Hazard Area

Local meteorology: Annual rainfall approx. 750 mm

Local services: Tank water, with on-site wastewater disposal required

Site Conditions

Slope and aspect: Approximately 20% to the ENE

Site drainage: Well to moderately drained

Vegetation: Mixed flora and grasses

Weather conditions: Fine, <5mm rainfall received in preceding 7 days

Ground surface: Dry surface conditions

Investigation

A number of test holes were completed to identify the distribution of, and variation in soil materials on the site. Representative test holes at the approximate location indicated on the attached site plan were chosen for testing and classification according to AS2870-2011 & AS1547-2012 (see profile summary).

Profile Summary

Hole 1 Depth (m)	Hole 2 Depth (m)	Horizon	Description
0.00 – 0.20	0.00 – 0.20	A1	Dark Grey **SAND (SP)**, single grain, structure, slightly moist, loose consistency, gradual boundary to
0.20 – 1.10	0.20 – 1.20	A2	White Grey **SAND (SP)**, single grain structure, slightly moist, loose consistency, gradual boundary to
1.10 – 1.60	1.20 – 1.60	A3	Orange **SAND (SP)**, trace clay, single grain, slight moist, medium dense consistency, BH 2 lower boundary undefined, BH1 gradual boundary to
	1.60 – 1.90	A4	Orange Brown **Sandy CLAY (Cl)**, medium plasticity, slightly moist, stiff consistency, lower boundary undefined.

Hole 3 Depth (m)	Hole 4 Depth (m)	Horizon	Description
0.00 – 0.20	0.00 – 0.20	A1	Dark Grey **SAND (SP)**, single grain, structure, slightly moist, loose consistency, gradual boundary to
0.20 – 1.30	0.20 – 1.00	A2	White Grey **SAND (SP)**, single grain structure, slightly moist, loose consistency, gradual boundary to
1.30 – 1.90	1.00 – 1.70	A3	Orange **SAND (SP)**, trace clay, single grain, slight moist, medium dense consistency, lower boundary undefined.

Wastewater Depth (m)	Horizon	Description
0.00 – 0.40	A1	Dark Grey **SAND (SP)**, single grain, structure, slightly moist, loose consistency, gradual boundary to
0.40 – 1.30	A2	White Grey **SAND (SP)**, single grain structure, slightly moist, loose consistency, gradual boundary to
1.30 – 1.80	A3	Orange **SAND (SP)**, trace clay, single grain, slight moist, medium dense consistency, lower boundary undefined.

Soil Profile Notes

The soil consists of sand topsoil overlying sandy clay subsoils derived from weathered Triassic sandstone. They are expected to have high hydraulic conductivity for wastewater disposal but low intrinsic ion exchange capacity for the adsorption of nutrients. The soils on site were not identified as dispersive.

Site Classification

According to AS2870-2011 for construction the soil is classified as **Class S** Based upon reactivity.

Wind Classification

The AS 4055-2021 *Wind Loads for Housing* classification of the site is:

Region:	**A**
Terrain category:	**TC1**
Shielding Classification:	**PS**
Topographic Classification:	**T1**
Wind Classification:	**N3**
Design Wind Gust Speed ($V_{h,u}$)	**50 m/sec**

Wastewater Classification & Recommendations

The proposed cellar door requires an onsite wastewater disposal system. According to AS1547-2012 for on-site wastewater management the soil on the property is classified as **Sandy LOAM (category 2)**. The soils are characterised by deep sands and are ideal for a primary treatment system. Therefore, a Design Loading Rate of 20L/m^2/day assigned for primary treated effluent.

The cellar door will provide distillery tours and tastings for visitors, and limited food service (self-assembled cold food platters of cheese etc). Whilst the facility has up to 100 seats, experience at similar facilities around Tasmania has shown that only a small percentage (approx. 25%) of visitors stop for a food platter and beverage. The majority of visitors (approx. 75%) stop for distillery tours, tastings and take away purchases or orders only.

Unfortunately, the Tasmanian on site wastewater guidelines (note: guidelines only not a regulation) do not have an entry for distillery facilities. In the absence of a guidelines alternative publications should be referenced where suitable. The South Australian Guidelines have a setting of 8L/person/day for wine tasting facilities, and this setting has been utilised for design purposes at many other approved cellar door facilities in Tasmania. Therefore, the settling of 8L/person/day has been adopted for distillery tour and tasting patrons.

A setting of 30L/person/day has been assigned to visitors eating on site which is considered conservative given the type of food service provided and the typical length of visitation when compared to say an all-day conference venue.

Allowing for a peak of up to 100 visitors per day and a split of 75% distillery visitors and 25% in house dining yields a total daily peak loading of 1350L/day (600L/day from distillery visitors and 750L/day from food service visitors). An additional allowance of 100L/day has been made for up to 5 on site staff such that the total estimated average loading is 1450L/day.

It should also be noted that the actual average daily wastewater loading is likely to be far less as visitor numbers will be closer to peak on weekends and much lower numbers on weekdays, especially in the winter season. For example, data from other cellar doors in Tasmania suggest that weekday visitor numbers are generally 40-60% of weekends during summer months and overall weekly seasonal loadings in winter are 30-40% of summer loads.

Given the estimated average wastewater loading of 1450L/day and a DLR of 20L/m^2/day, an absorption area of 72m^2 is required. This may be accommodated by three 20m x 1.2m x 0.4m terraced absorption trenches connected to a dual-purpose septic tank (min 4500L) via a three-way splitter box with speed levellers to ensure equal distribution.

The system must also be designed to process the anticipated BOD from these facilities, with the total expected loads outlined below:

- Cellar door (dining-in): 25 @ 30L/person/day = 750L/day -50g BOD/day = 1.25kg
- Cellar door (distillery visitors): 75 @ 8L/person/day = 600L/day -5g BOD/day = 375g
- Staff: 5 persons @ 20L/person/day = 100L/day -15g BOD/day = 75g

Total average daily loading = 1450L/day +1.7kg BOD/day

The proposed wastewater system will have the capacity to handle the expected BOD. If further development were to place increased demand on the proposed wastewater system (such as large-scale kitchen facilities or processing of distillery waste) upgrades would be required to ensure that the system is of sufficient design and capacity to accommodate the increased flows and BOD.

A cut-off diversion drain is recommended upslope of the absorption area and the area excluded from traffic or any future building works. A designated 100% reserve area has not been allocated due to sufficient space onsite. For further detail please refer to the attached plan and Trench summary reports.

The following setback distances are required to comply with E23 of the Sorell Interim Planning Scheme 2015 and the Building Act 2016:

Upslope or level buildings:	2m
Downslope buildings:	15m
Upslope or level boundaries:	1.5m
Downslope boundaries:	22m
Downslope surface water:	100m

To comply with E23.10.1 of the Interim Planning Scheme 2015;

A1 Horizontal separation distance from a building to a land application area must comply with one of the following:

(a) be no less than 6m;	Non-compliance
(b) be no less than; (i) 2m from an upslope or level building; (ii) if primary treated effluent be no less than 4m plus 1m for every degree of average gradient from a downslope building; (iii) if secondary treated effluent and subsurface application, no less than 2m plus 0.25m for every degree of average gradient from a down slope building.	Complies Complies. Minimum distance 15m

A2 Horizontal separation distance from downslope surface water to a land application area must comply with any of the following:

(a) be no less than 100m;	Complies
(b) if the site is within a high rainfall area or the site soil category is 4, 5 or 6, be no less than the following; (i) if primary treated effluent standard or surface application, 50m plus 7m for every degree of average gradient from downslope surface water; (ii) if secondary treated effluent standard and subsurface application, 50m plus 2m for every degree of average gradient from down slope surface water.	
(c) if the site is not within a high rainfall area or the site soil category is not 4, 5 or 6, be no less than the following; (i) if primary treated effluent 15m plus 7m for every degree of average	

gradient from downslope surface water; (ii) if secondary treated effluent and subsurface application, 15m plus 2m for every degree of average gradient from down slope surface water.	

A3 Horizontal separation distance from a property boundary to a land application area must comply with either of the following:

(a) be no less than 40m from a property boundary;	Non-compliance
(b) be no less than: (i) 1.5m from an upslope or level property boundary; and	Complies
(ii) if primary treated effluent 2m for every degree of average gradient from a downslope property boundary; or	Complies. Minimum distance 22m
(iii) if secondary treated effluent and subsurface application, 1.5m plus 1m for every degree of average gradient from a downslope property boundary.	

A4

Horizontal separation distance from a downslope bore, well or similar water supply to a land application area must be no less than 50m.	N/A

A5

Vertical separation distance between groundwater and a land application area must be no less than 1.5m.	Complies – no groundwater encountered

A6

Vertical separation distance between a limiting layer and a land application area must be no less than 1.5m.	Complies – no limiting layer identified

A7 The arrangement of a land application area must comply with both of the following:

(a) not include areas beneath buildings, driveways or other hard stand areas;	Complies
(b) have a minimum horizontal dimension of 3m.	Complies

Compliance with Building Act 2016 Guidelines for On-site Wastewater Management Systems is outlined in the attached table.

Construction Recommendations

According to AS2870-2011 for construction the soil is classified as **Class S**. would be assigned for the sands onsite. All site Earthworks must comply with AS3798-2012. Attention should be paid to the preparation of a consistent footing surface, and appropriate backfilling in accordance with recommendations in AS2870-2011 for reactive clay sites. In addition, adequate drainage should be installed surrounding the construction areas to ensure soil strength is not compromised by excessive soil moisture.

During construction GES will need to be notified of any major variation to the foundation conditions or wastewater loading as predicted in this report.

Dr John Paul Cumming B.Agr.Sc (hons) PhD CPSS GAICD
Environmental and Engineering Soil Scientist

GES P/L

Land suitability and system sizing for on-site wastewater management

Trench 3.0 (Australian Institute of Environmental Health)

Assessment Report

Site assessment for wastewater system

Assessment for	Hellfire Bluff	Assess. Date	8-Jul-22
		Ref. No.	
Assessed site(s)	55 Craig's Hill Road, Boomer Bay	Site(s) inspected	13-Dec-18
Local authority	Sorell Council	Assessed by	John Paul Cumming

This report summarises wastewater volumes, climatic inputs for the site, soil characteristics and sustem sizing and design issues. Site Capability and Environmental sensitivity issues are reported separately, where 'Alert' columns flag factors with high (A) or very high (AA) limitations which probably require special consideration for system design(s). Blank spaces on this page indicate data have not been entered into TRENCH.

Wastewater Characteristics

Wastewater volume (L/day) used for this assessment = 1,450 (using a method independent of the no. of bedrooms)

Septic tank wastewater volume (L/day) = 900

Sullage volume (L/day) = 550

Total nitrogen (kg/year) generated by wastewater = 9.0

Total phosphorus (kg/year) generated by wastewater = 4.3

Climatic assumptions for site (Evapotranspiration calculated using the crop factor method)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean rainfall (mm)	55	58	59	69	58	66	68	70	56	66	65	74
Adopted rainfall (R, mm)	55	58	59	69	58	66	68	70	56	66	65	74
Retained rain (Rr, mm)	44	46	47	55	46	53	54	56	45	53	52	59
Max. daily temp. (deg. C)												
Evapotrans (ET, mm)	130	110	91	63	42	29	32	42	63	84	105	126
Evapotr. less rain (mm)	**86**	**64**	**44**	**8**	**-4**	**-23**	**-23**	**-14**	**18**	**31**	**53**	**67**

Annual evapotranspiration less retained rain (mm) = 306

Soil characterisitics

Texture = SANDY LOAM Category = 2 Thick. (m) = 1.8

Adopted permeability (m/day) = 3 Adopted LTAR (L/sq m/day) = 20 Min depth (m) to water = 5

Proposed disposal and treatment methods

Proportion of wastewater to be retained on site:	All wastewater will be disposed of on the site
The preferred method of on-site primary treatment:	In dual purpose septic tank(s)
The preferred method of on-site secondary treatment:	In-ground
The preferred type of in-ground secondary treatment:	Trench(es)
The preferred type of above-ground secondary treatment:	None
Site modifications or specific designs:	Not needed

Suggested dimensions for on-site secondary treatment system

Total length (m) =	60
Width (m) =	1.2
Depth (m) =	0.5
Total disposal area (sq m) required =	72
comprising a Primary Area (sq m) of:	72
and a Secondary (backup) Area (sq m) of:	

Sufficient area is available on site

To enter comments, click on the line below 'Comments'. (This yellow-shaded box and the buttons on this page will not be printed.)

Comments

The calculated DLR for the Category 2 soil present is 20L/sq m/day with a required absorption area of 72sq m for the proposed cellar door on tank water. Therefore the system will have the capacity to cope with predicted climatic and loading events.

GES P/L

Land suitability and system sizing for on-site wastewater management

Trench 3.0 (Australian Institute of Environmental Health)

Site Capability Report

Site assessment for wastewater system

Assessment for	Hellfire Bluff	Assess. Date	8-Jul-22
		Ref. No.	
Assessed site(s)	55 Craig's Hill Road, Boomer Bay	Site(s) inspected	13-Dec-18
Local authority	Sorell Council	Assessed by	John Paul Cumming

This report summarises data relating to the physical capability of the assessed site(s) to accept wastewater. Environmental sensitivity and system design issues are reported separately. The 'Alert' column flags factors with high (A) or very high (AA) site limitations which probably require special consideration in site acceptability or for system design(s). Blank spaces indicate data have not been entered into TRENCH.

Alert	Factor	Units	Value	Confid level	Limitation		Remarks
					Trench	Amended	
	Expected design area	sq m	5,000	V. high	Very low		
	Density of disposal systems	/sq km	3	High	Very low		
	Slope angle	degrees	11	V. high	Moderate		
	Slope form	Convex spreading		V. high	Very low		
	Surface drainage	Good		High	Very low		
	Flood potential	Site floods <1:100 yrs		High	Very low		
	Heavy rain events	Infrequent		High	Moderate		
	Aspect (Southern hemi.)	Faces E or W		V. high	Moderate		
	Frequency of strong winds	Common		High	Low		
AA	Wastewater volume	L/day	1,450	High	Very high		
	SAR of septic tank effluent		1.7	Mod.	Low		
	SAR of sullage		2.1	Mod.	Moderate		
	Soil thickness	m	1.8	V. high	Very low		
	Depth to bedrock	m	1.8	High	Low		
	Surface rock outcrop	%	0	High	Very low		
	Cobbles in soil	%	0	High	Very low		
	Soil pH		7.5	High	Very low		
	Soil bulk density	gm/cub. cm	1.2	High	Very low		
	Soil dispersion	Emerson No.	7	V. high	Very low		
AA	Adopted permeability	m/day	3	High	Very high		
	Long Term Accept. Rate	L/day/sq m	20	High	Low	Moderate	

To enter comments, click on the line below 'Comments' . (This yellow-shaded box and the buttons on this page will not be printed.)

Comments:

The site has good capacity to accept onsite wastewater

GES P/L

Land suitability and system sizing for on-site wastewater management

Trench 3.0 (Australian Institute of Environmental Health)

Environmental Sensitivity Report

Site assessment for wastewater system

Assessment for	Hellfire Bluff	Assess. Date	8-Jul-22
		Ref. No.	
Assessed site(s)	55 Craig's Hill Road, Boomer Bay	Site(s) inspected	13-Dec-18
Local authority	Sorell Council	Assessed by	John Paul Cumming

This report summarises data relating to the environmental sensitivity of the assessed site(s) in relation to applied wastewater. Physical capability and system design issues are reported separately. The 'Alert' column flags factors with high (A) or very high (AA) limitations which probably require special consideration in site acceptability or for system design(s). Blank spaces indicate data have not been entered into TRENCH.

Alert	Factor	Units	Value	Confid level	Limitation		Remarks
					Trench	Amended	
A	Cation exchange capacity	mmol/100g	30	High	High		
A	Phos. adsorp. capacity	kg/cub m	0.3	Mod.	High		
	Annual rainfall excess	mm	-306	High	Very low		
	Min. depth to water table	m	5	High	Very low		
	Annual nutrient load	kg	13.3	High	Moderate		
	G'water environ. value	Agric non-sensit		High	Low		
	Min. separation dist. required	m	10	High	Low		
	Risk to adjacent bores	Very low		High	Very low		
	Surf. water env. value	Agric sensit/dom drink		High	Moderate		
	Dist. to nearest surface water	m	170	High	Moderate		
	Dist. to nearest other feature	m	400	V. high	Very low		
	Risk of slope instability	Low		High	Low		
	Distance to landslip	m	0	Mod.	Very high	Moderate	Other factors lessen impact

To enter comments, click on the line below 'Comments'. (This yellow-shaded box and the buttons on this page will not be printed.)

Comments:

The soil onsite has a clayey texture with a good CEC and P absorption, therefore the soil system has a good capacity to cope with the applied nutrient load from the wastewater system. The planting of deep rooted grasses is recommended to aid in nutrient uptake and evapotranspiration. There is a low environmental risk associated with onsite wastewater disposal.

Appendix 1 – PSP Results

Perth Sand Penetrometer (PSP) Conversion to Californian Bearing Ratio
(ref: Australian Standard AS 1289.6.3.3 - 1997)

DCP Location TH1

Depth (mm)	PSP (Blows/100mm)	PSP (mm/Blow)	PSP Resistance (mPa)	Allowable Bearing Capacity (kPa)	CBR (Rounded Up)
0-100	1	100.0	0.3	37	2
100-200	1	100.0	0.3	37	2
200-300	2	50.0	0.6	74	4
300-400	2	50.0	0.6	74	4
400-500	3	33.3	0.9	110	6
500-600	2	50.0	0.6	74	4
600-700	2	50.0	0.6	74	4
700-800	3	33.3	0.9	110	6
800-900	3	33.3	0.9	110	6
900-1000	4	25.0	1.3	147	8
1000-1100	6	16.7	1.9	221	13
1100-1200	6	16.7	1.9	221	13
1200-1300	10	10.0	3.1	368	22
1300-1400	10	10.0	3.1	368	22
1400-1500	14	7.1	4.4	515	32

DCP Location TH3

Depth (mm)	PSP (Blows/100mm)	PSP (mm/Blow)	PSP Resistance (mPa)	Allowable Bearing Capacity (kPa)	CBR (Rounded Up)
0-100	1	100.0	0.3	37	2
100-200	2	50.0	0.6	74	4
200-300	2	50.0	0.6	74	4
300-400	2	50.0	0.6	74	4
400-500	2	50.0	0.6	74	4
500-600	2	50.0	0.6	74	4
600-700	3	33.3	0.9	110	6
700-800	3	33.3	0.9	110	6
800-900	3	33.3	0.9	110	6
900-1000	5	20.0	1.6	184	10
1000-1100	4	25.0	1.3	147	8
1100-1200	4	25.0	1.3	147	8
1200-1300	8	12.5	2.5	294	17
1300-1400	10	10.0	3.1	368	22
1400-1500	13	7.7	4.1	478	30
1500-1600	15	6.7	4.7	551	35

Demonstration of wastewater system compliance to *Building Act 2016 Guidelines for On-site Wastewater Disposal*

Acceptable Solutions	**Performance Criteria**	**Compliance**
A1 Horizontal separation distance from a building to a land application area must comply with one of the following: a) be no less than 6m; or b) be no less than: (i) 3m from an upslope building or level building; (ii) If primary treated effluent to be no less than 4m plus 1m for every degree of average gradient from a downslope building; (iii) If secondary treated effluent and subsurface application, no less than 2m plus 0.25m for every degree of average gradient from a downslope building.	P1 a) The land application area is located so that (i) the risk of wastewater reducing the bearing capacity of a building's foundations is acceptably low.; and (ii) is setback a sufficient distance from a downslope excavation around or under a building to prevent inadequately treated wastewater seeping out of that excavation	Complies with E23 Land application area will be located with a minimum separation distance of 2m from an upslope or level building Complies with A1 (b) (ii) Land application area will be located with a minimum separation distance of 15m of downslope building
A2 Horizontal separation distance from downslope surface water to a land application area must comply with (a) or (b) (a) be no less than 100m; or (b) be no less than the following: (i) if primary treated effluent 15m plus 7m for every degree of average gradient to downslope surface water; or (ii) if secondary treated effluent and subsurface application, 15m plus 2m for every degree of average gradient to down slope surface water.	P2 Horizontal separation distance from downslope surface water to a land application area must comply with all of the following: a) Setbacks must be consistent with AS/NZS 1547 Appendix R; b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.	Complies with A2 (a) Land application area located > 100m from downslope surface water

A3 Horizontal separation distance from a property boundary to a land application area must comply with either of the following: (a) be no less than 40m from a property boundary; or (b) be no less than: (i) 1.5m from an upslope or level property boundary; and (ii) If primary treated effluent 2m for every degree of average gradient from a downslope property boundary; or (iii) If secondary treated effluent and subsurface application, 1.5m plus 1m for every degree of average gradient from a downslope property boundary.	P3 Horizontal separation distance from a property boundary to a land application area must comply with all of the following: (a) Setback must be consistent with AS/NZS 1547 Appendix R; and (b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.	Complies with A3 (b) (i) Land application area will be located with a minimum separation distance of 1.5m from an upslope or level property boundary Complies with A3 (b) (ii) Land application area will be located with a minimum separation distance of 22m of downslope property boundary
A4 Horizontal separation distance from a downslope bore, well or similar water supply to a land application area must be no less than 50m and not be within the zone of influence of the bore whether up or down gradient.	P4 Horizontal separation distance from a downslope bore, well or similar water supply to a land application area must comply with all of the following: (a) Setback must be consistent with AS/NZS 1547 Appendix R; and (b) A risk assessment completed in accordance with Appendix A of AS/NZS 1547 demonstrates that the risk is acceptable	No bore or well identified within 50m

A5 Vertical separation distance between groundwater and a land application area must be no less than: (a) 1.5m if primary treated effluent; or (b) 0.6m if secondary treated effluent	P5 Vertical separation distance between groundwater and a land application area must comply with the following: (a) Setback must be consistent with AS/NZS 1547 Appendix R; and (b) A risk assessment completed in accordance with Appendix A of AS/NZS 1547 that demonstrates that the risk is acceptable	No groundwater encountered
A6 Vertical separation distance between a limiting layer and a land application area must be no less than: (a) 1.5m if primary treated effluent; or (b) 0.5m if secondary treated effluent	P6 Vertical setback must be consistent with AS/NZS1547 Appendix R.	No limiting layer identified
A7 nil	P7 A wastewater treatment unit must be located a sufficient distance from buildings or neighbouring properties so that emissions (odour, noise or aerosols) from the unit do not create an environmental nuisance to the residents of those properties	Complies

AS1547:2012 – Loading Certificate – Septic System Design

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

Site Address: 55 Craig's Hill Road, Boomer Bay

System Capacity: 1450L/day

Summary of Design Criteria

DLR: 20L/m^2/day

Absorption area: 72m^2

Reserve area location /use: Not assigned – more than 100% available

Water saving features fitted: Standard fixtures

Allowable variation from design flows: 1 event @ 200% daily loading per quarter

Typical loading change consequences: Expected to be minimal due to capacity of system and site area (provided loading changes within 25% of design)

Overloading consequences: Continued overloading may cause hydraulic failure of the absorption area and require upgrading/extension of the area. Risk considered acceptable due to visible signs of overloading and owner monitoring.

Underloading consequences: Lower than expected flows will have minimal consequences on system operation unless the house has long periods of non-occupation. Under such circumstances additional maintenance of the system may be required. Risk considered acceptable.

Lack of maintenance / monitoring consequences: Issues of underloading/overloading and condition of the absorption area require monitoring and maintenance, if not completed system failure may result in unacceptable health and environmental risks. Septic tank de-sludging must also be monitored to prevent excessive sludge and scum accumulation. Monitoring and regulation by the property owner required to ensure compliance.

Other operational considerations: Owners/occupiers must be aware of the operational requirements and limitations of the system, including the following: the absorption area must not be subject to traffic by vehicles or heavy stock and should be fenced if required. The absorption area must be kept with adequate grass cover to assist in evapotranspiration of treated effluent in the absorption trenches. The septic tank must be desludged at least every 3 years, and any other infrastructure such as septic tank outlet filters must also be cleaned regularly (approx. every 6 months depending upon usage). Foreign materials such as rubbish and solid waste must be kept out of the system.

CERTIFICATE OF THE RESPONSIBLE DESIGNER

Section 94
Section 106
Section 129
Section 155

Form **35**

To: Hellfire Bluff
55 Craigs Hill Road
Boomer Bay 7177

Designer details:

Name:	John-Paul Cumming	Category:	Bld. Srvcs. Dsgnr. - Hydraulic
Business name:	Geo-Environmental Solutions	Phone No:	03 6223 1839
Business address:	29 Kirksway Place		
	Battery Point 7004	Fax No:	N/A
Licence No:	CC774A	Email address:	office@geosolutions.net.au

Details of the proposed work:

Owner/Applicant	Hellfire Bluff	Designer's project reference No.	J5156
Address:	55 Craigs Hill Road	Lot No:	122640/1
	Boomer Bay 7177		

Type of work: Building work ☐ Plumbing work ☒

Description of work:

On-site wastewater management system - design

Description of the Design Work (Scope, limitations or exclusions):

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

Deemed-to-Satisfy: ☐ Performance Solution: ☐

Other details:

Dual-purpose septic tank with onsite absorption.

Design documents provided:

The following documents are provided with this Certificate –

C8' u2 / #(%/ 3' 07(8#D

Drawing numbers:	Prepared by: Geo-Environmental Solutions	Date: Jul-22
Schedules:	Prepared by:	Date:
Specifications:	Prepared by: Geo-Environmental Solutions	Date: Jul-22
Computations:	Prepared by:	Date:
Performance solution proposals:	Prepared by:	Date:
Test reports:	Prepared by: Geo-Environmental Solutions	Date: Jul-22

Standards, codes or guidelines relied on in design process:

AS1547:2012 On-site domestic wastewater management.

AS3500 (Parts 0-5)-2013 Plumbing and drainage set.

Any other relevant documentation:

Geo-Environmental Assessment - 55 Craig's Hill Road, Boomer Bay - Jul-22

Attribution as designer:

I John-Paul Cumming, am responsible for the design of that part of the work as described in this certificate;

The documentation relating to the design includes sufficient information for the assessment of the work in accordance with the *Bu !" #$ &' ( ) * +,* and sufficient detail for the builder or plumber to carry out the work in accordance with the documents and the Act;

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

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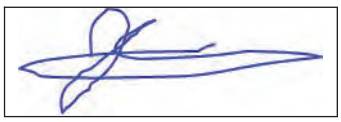
Designer:	John-Paul Cumming		11/07/2022
Licence No:	CC774A		

Assessment of Certifiable Works: (TasWater)

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

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

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

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

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

Certification:

I ..... John-Paul Cumming..... being responsible for the proposed work, am satisfied that the works described above are not Certifiable Works, as defined within the *F 1(/ 0%#" %4/ . / 01$/ % G#" u3(0>%&' (%** H1%* that I have answered the above questions with all due diligence and have read and understood the Guidelines for TasWater CCW Assessments.

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

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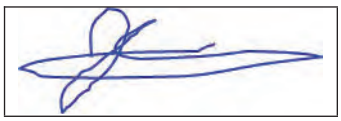
Designer:	John-Paul Cumming		11/07/2022

CERTIFICATE OF QUALIFIED PERSON – ASSESSABLE ITEM

Section 321

To: Hellfire Bluff
55 Craigs Hill Road
Boomer Bay 7177

Form **55**

Qualified person details:

Qualified person: John-Paul Cumming

Address: 29 Kirksway Place
Battery Point 7004

Phone No: 03 6223 1839

Fax No:

Licence No: AO999

Email address: jcumming@geosolutions.net.au

Qualifications and Insurance details: Certified Professional Soil Scientist (CPSS stage 2)

Speciality area of expertise: AS2870-2011 Foundation Classification

Details of work:

Address: 55 Craigs Hill Road
Boomer Bay 7177

Lot No:

Certificate of title No: 122640/1

The assessable item related to this certificate: Classification of foundation Conditions according to AS2870-2011

Certificate details:

Certificate type: Foundation Classification

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

building work, plumbing work or plumbing installation or demolition work ☒

or

a building, temporary structure or plumbing installation: ☐

In issuing this certificate the following matters are relevant –

Documents:	The attached soil report for the address detailed above in 'details of Work'
Relevant calculations:	Reference the above report.
References:	AS2870:2011 residential slabs and footings AS1726:2017 Geotechnical site investigations CSIRO Building technology file – 18.

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Site Classification consistent with AS2870-2011.

3' 65/ %&#" 160% 9 (?(6#2

The classification applies to the site as inspected and does not account for future alteration to foundation conditions as a result of earth works, drainage condition changes or variations in site maintenance.

I, John-Paul Cumming certify the matters described in this certificate.

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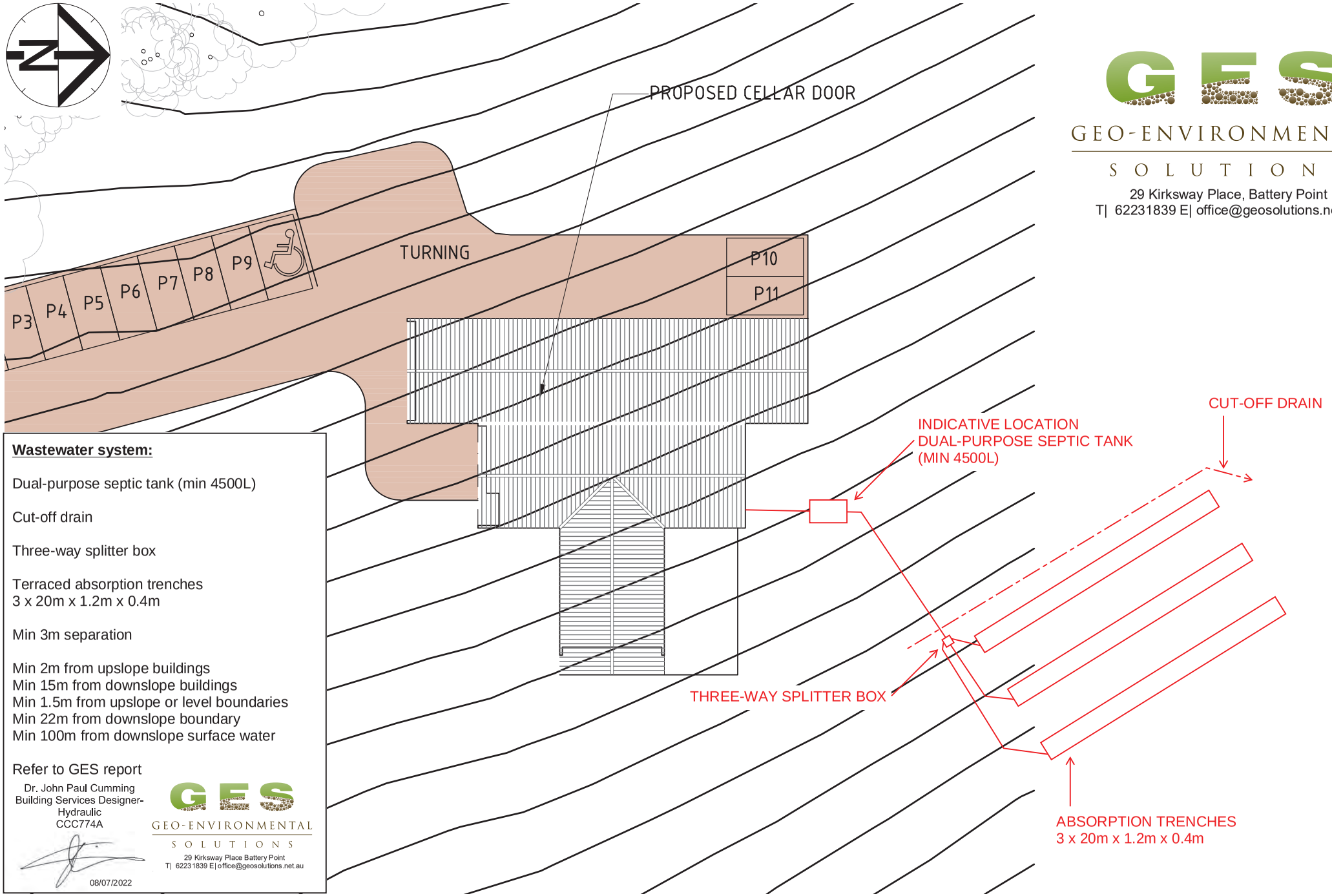
Qualified person:

J5156

11/07/2022



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29 Kirksway Place, Battery Point
T| 62231839 E| office@geosolutions.net.au

Wastewater system:

Dual-purpose septic tank (min 4500L)

Cut-off drain

Three-way splitter box

Terraced absorption trenches
3 x 20m x 1.2m x 0.4m

Min 3m separation

Min 2m from upslope buildings
Min 15m from downslope buildings
Min 1.5m from upslope or level boundaries
Min 22m from downslope boundary
Min 100m from downslope surface water

Refer to GES report

Dr. John Paul Cumming
Building Services Designer-Hydraulic
CCC774A

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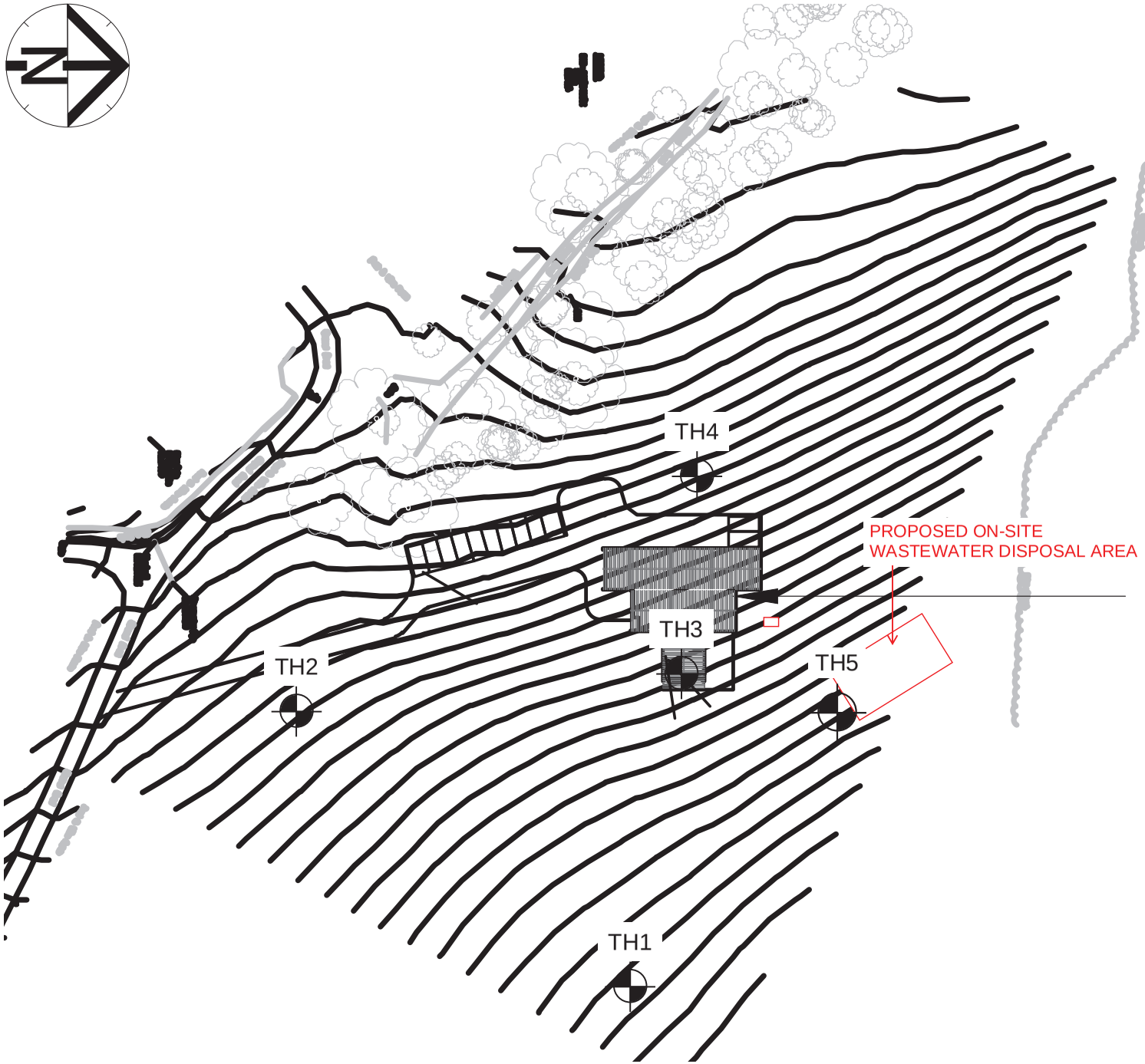
GEO-ENVIRONMENTAL
SOLUTIONS
29 Kirksway Place Battery Point
T| 62231839 E| office@geosolutions.net.au

08/07/2022

Do not scale from these drawings. Dimensions to take precedence over scale.	Client Name and Address: Hellfire Bluff 55 Craig's Hill Road, Boomer Bay 7177	C.T.: 122640/1 PID: 1687342	Date: 08/07/2022	On-Site Wastewater Management Plan	1:250 @ A3	Sheet 1 of 1 Drawn by: EF



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Wastewater system:

Dual-purpose septic tank (min 4500L)

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3 x 20m x 1.2m x 0.4m

Min 3m separation

Min 2m from upslope buildings
Min 15m from downslope buildings
Min 1.5m from upslope or level boundaries
Min 22m from downslope boundary
Min 100m from downslope surface water

Refer to GES report

Dr. John Paul Cumming
Building Services Designer-Hydraulic
CCC774A

08/07/2022

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Approximate Test Hole Location

Do not scale from these drawings. Dimensions to take precedence over scale.	Client Name and Address: Hellfire Bluff 55 Craig's Hill Road, Boomer Bay 7177	C.T.: 122640/1 PID: 1687342	Date: 08/07/2022	On-Site Wastewater Management Plan	1:1000 @ A3	Sheet 1 of 1 Drawn by: EF

Design notes:

1. Absorption trench dimensions of up to 20m long by 0.425m deep by 1.2m wide.
2. Base of trenches to be excavated level and smearing and compaction avoided.
3. Lower 400mm of bed to be filled with 20mm drainage aggregate and slotted 100mm distribution pipes packed into upper 100mm of aggregate
4. Final finished surface with sandy loam from on site to be 100 mm above natural surface to allow for settlement.
5. Construction on slopes up to 20% to allow trench depth range 700mm upslope edge to 425mm on down slope edge.
6. On slopes over 5% the sandy loam cover should be 75-100mm above natural with a toes no less than 500mm in length to avoid surface water accumulation (up slope ag drain also recommended to divert surface water flows).
7. The distribution pipe grid must be absolutely level to allow even distribution of effluent around the absorption area – it is recommended that the level be verified by running water into the system before backfilling and commissioning the trench
8. The slotted 90-100mm PVC distribution pipes must be slotted at "8 and 4 o'clock" when looking at the pipe section end-on, with the slots running level along the horizontal length of the pipe – please see figure 2 – or commercially available pre-slotted PVC pipe utilised
9. All works on site to comply with AS3500 and Tasmanian Plumbing code.

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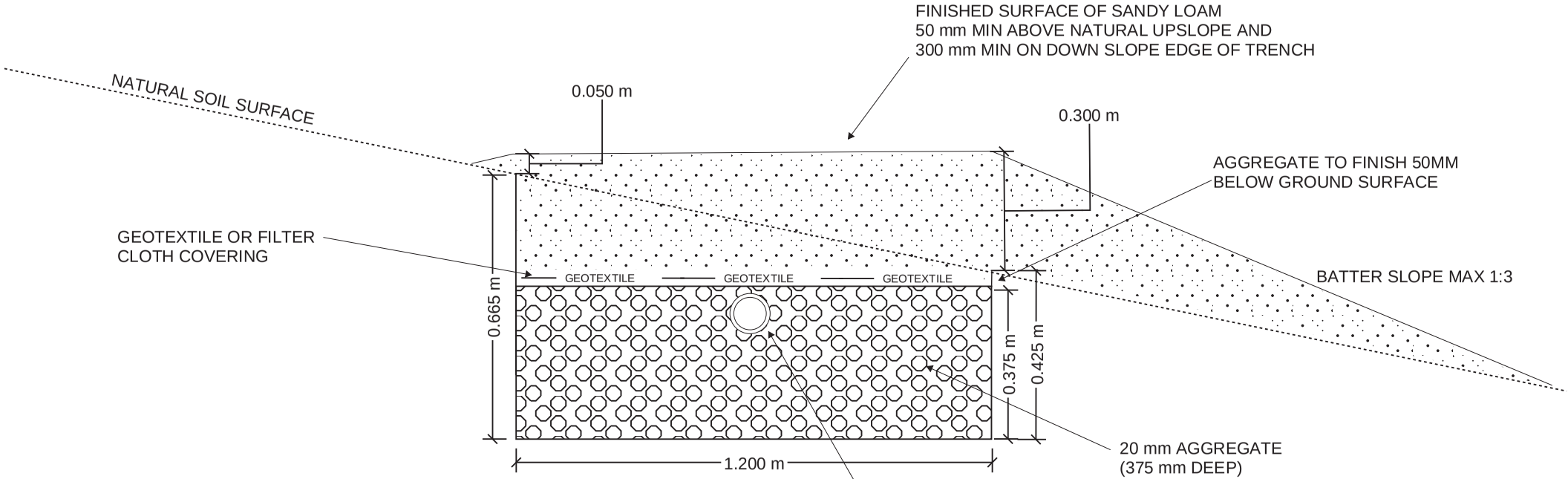

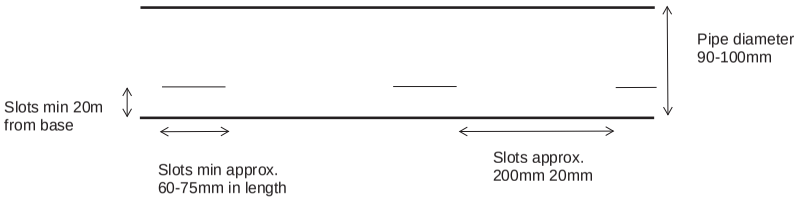

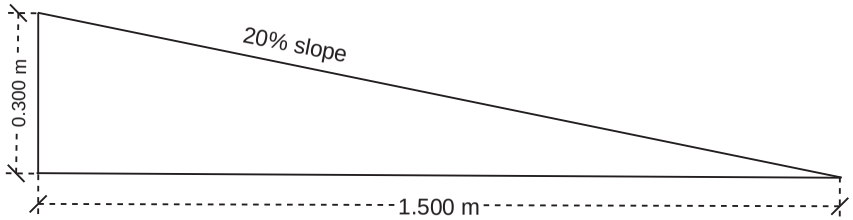

Cross section:

Slotted 90-100mm distribution pipe-slots at "8 and 4 O'clock "

Do not scale from these drawings. Dimensions to take precedence over scale.	Geo-Environmental Solutions		Date: Jun 2020	Terraced Absorption Trench Detail	Sheet 1 of 1

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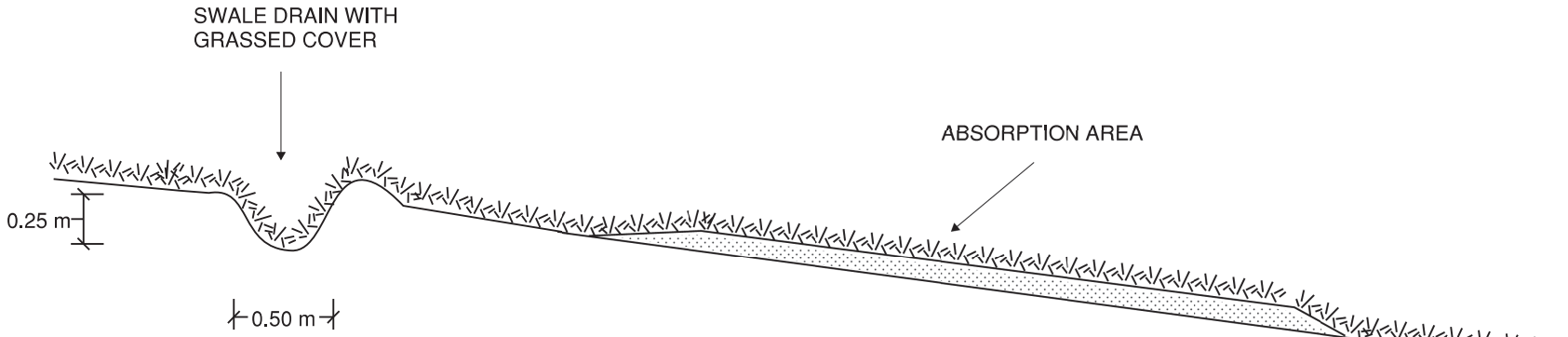
TYPICAL GRASSED SWALE DRAIN CROSS-SECTION

SWALE DRAIN TO BE MIN 0.5M WIDE BY MIN 0.25M DEEP

GRASS COVER TO BE MAINTAINED TO SLOW WATER FLOW AND MINIMSE EROSION



Do not scale from these drawings. Dimensions to take precedence over scale.	Geo-Environmental Solutions		Date: June 2017	Grassed swale drain typical cross-section	Sheet 1 of 1 Drawn by PL

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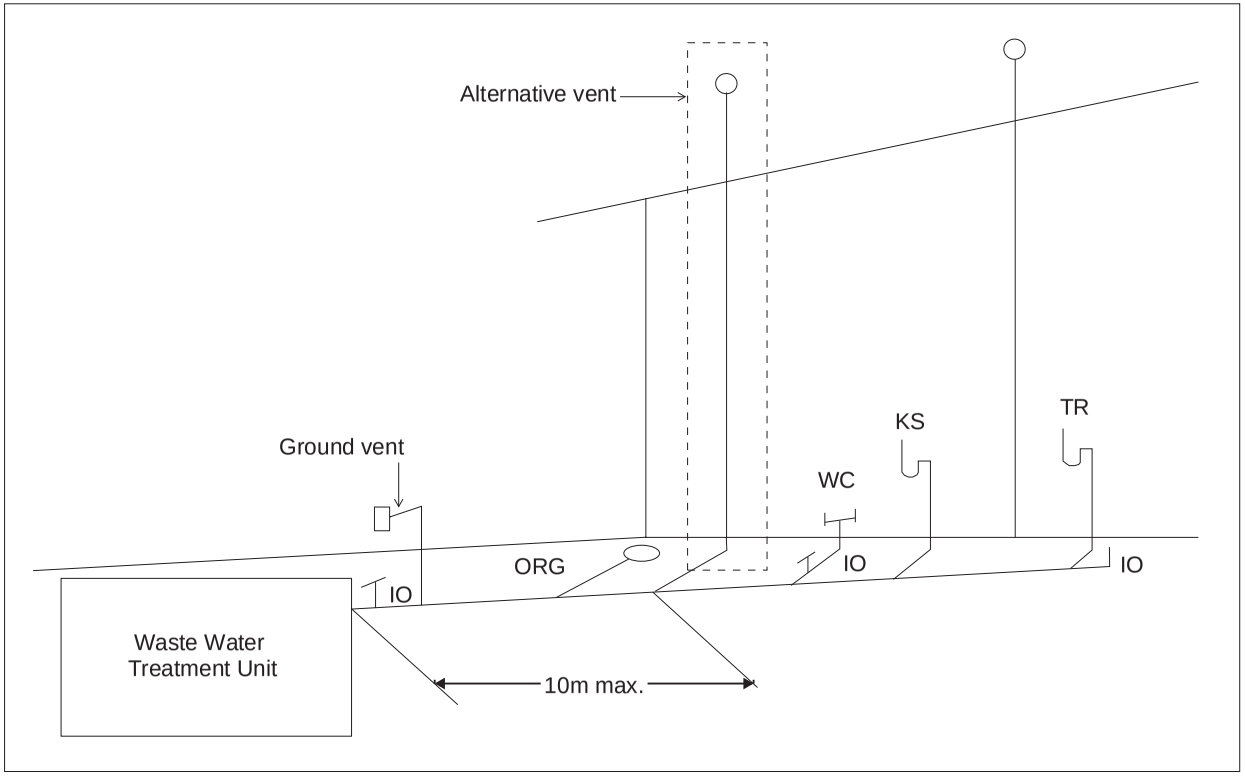

Tas Figure H101.2 Alternative Venting Arrangements

Vents must terminate in accordance with AS/NZS 3500.2

Alternative venting to be used by extending a vent to terminate as if an upstream vent, with the vent connection between the last sanitary fixture or sanitary appliance and the on-site wastewater management system. Use of a ground vent in not recommended

Inspection openings must be located at the inlet to an on-site wastewater management system treatment unit and the point of connection to the land application system and must terminate as close as practicable to the underside of an approved inspection opening cover installed at the finished surface level

Access openings providing access for desludging or maintenance of on-site wastewater management system treatment unites must terminate at or above finished surface level

Alternative vent is the preferred arrangement where possible.

Do not scale from these drawings. Dimensions to take precedence over scale.				Tas Figure H101.2 Alternative Venting Arrangements		Sheet 1 of 1

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GEO-ENVIRONMENTAL

SOLUTIONS

LANDSLIDE RISK ASSESSMENT

55 Craig's Hill Road, Boomer Bay, TAS 7177

CLIENT

Hellfire Bluff

October 2022

Sorell Council
Development Application: Response to Request for Information - 55 Craigs Hill Road, Boomer Bay.pdf
Date Received: 10/ 03 / 2023
Plans Referenced: P2

Geo-Environmental Solutions P/L 29 Kirksway Place Battery Point, 7004. Ph 6223 1839 Fax 6223 4539

Tables

Figures

1 Introduction

Geo-Environmental Solutions Pty Ltd (GES) were contracted by Hellfire Bluff to prepare a geotechnical assessment to assess landslide hazard management for a proposed distillery at Boomer Bay, TAS which lays within the Sorell Council Interim Planning Scheme mapped low landslide hazard zone. The proposed development is located at cadastral title (CT – 122640/1) at Craig's Hill Road, Boomer Bay 7177 (The Site). GES are to undertake a landslide risk assessment and management report relating to the proposed development in conjunction with the requirements of the Landslide Hazard Code, part of the Sorell Interim Planning Scheme.

GES have undertaken this assessment through using site observations and investigation, photographs and publicly available datasets. Estimations are determined by approximation with regional information applied where appropriate to site specific information. Data collection and site-specific modelling was undertaken in assessment of the site.

2 Objectives

The objective of the site investigation is to:

- Identify the requirements of the Landslide Hazard Code;
- Conduct a landslide risk assessment of the cutting in accordance with the Australian Geomechanics Society (AGS) *Landslide Risk Management (2007) guidelines';*
- Identify which codes need to be addressed in terms of landslip and identify the relevant performance criteria relevant to the project which need addressing;
- Used borehole drilling information, geological mapping and site inspections to determine site physical conditions and cutting observations;
- Where applicable, provide recommendations on remediation of the earthworks to ensure safe slope management.

3 Site Details

3.1 Project Area Land Title

The land studied in this report is defined by the following title reference:

- CT 122640/1 (Figure 1 and Figure 2)

This parcel of land is referred to as the 'Site' and/or the 'Project Area' in this report.

Figure 1 Regional Location of Project Area (The LIST)

Figure 2 Local Project Area Setting (The LIST)

3.2 Australian Building Code Board

This report presents a summary of the overall site risk to landslide hazards. This assessment has been conducted for the year 2072 which is representative of a 'normal' 50-year building design life category.

Per the Australian Building Code Board (ABCB 2015), when addressing building minimum design life:

> *'The design life of buildings should be taken as 'Normal" for all building importance categories unless otherwise stated.'*
>
> As per Table 3-1, the building design life is 50 years for a normal building.

Table 3-1 Design life of building and plumbing installations and their components

Building Design Life Category	*Building Design Life (years)*	*Design life for components or sub systems readily accessible and economical to replace or repair (years)*	*Design life for components or sub systems with moderate ease of access but difficult or costly to replace or repair (years)*	*Design life for components or sub systems not accessible or not economical to replace or repair (years)*
Short	1 < dl < 15	5 or dl (if dl<5)	dl	dl
Normal	50	5	15	50
Long	100 or more	10	25	100

Note: Design Life (dl) in years

3.3 The Tasmanian Building Regulations 2016

Building in hazardous areas

As outlined in the Department of Justice web site:

http://www.justice.tas.gov.au/building/building-and-plumbing/building_in_hazardous

Hazardous areas include areas which are bushfire prone, comprise reactive soils or substances, or are subject to coastal erosion, coastal flooding, riverine flooding, and landslip.

59. Landslip hazard areas

- For the purposes of the Act, land is a landslip hazard area if –
- the land is shown on a planning scheme overlay map as being land that is within a landslip hazard area; and
- the land is classified as land within a hazard band of a landslip hazard area.
- For the purposes of the definition of hazardous area in section 4(1) of the Act –
- classification under a landslip determination as being land that is within a hazard band of a landslip hazard area is a prescribed attribute; and
- a landslip hazard area is a hazardous area.

60. Works in landslip hazard areas

1. A person must not perform work in a landslip hazard area unless he or she is authorised to do so under the Act.
2. A responsible person for work being performed in a landslip hazard area must ensure that the work is being performed in accordance with the Act and the landslip determination.
3. A person performing work in a landslip hazard area must ensure that the work complies with the Act and the landslip determination.

61. Significant works in landslip areas

(i) In this regulation – significant work includes the following work:

- excavation equal to or greater than one metre in depth, including temporary excavations for the installation or maintenance of services and pipes;
- excavation or depositing of material greater than 100 cubic metres, whether or not the material is sourced on the site or imported;
- felling, or removal, of vegetation, over a contiguous area greater than 1 000 square metres;
- the collection, pooling or storage of water in a dam, pond, tank or swimming pool with a volume greater than 45 000 litres;
- removal, redirection or introduction of drainage for surface water or subsoil water;
- discharge of stormwater, sewage, water storage overflow or other wastewater.

(ii) A person must not perform significant work as part of permit work, or notifiable plumbing work, in a landslip hazard area unless the relevant permit authority has authorised the significant work in writing.

(iii) A person must not perform significant work as part of notifiable building work or notifiable demolition work, in a landslip hazard area unless the relevant building surveyor for the notifiable work has authorised the significant work in writing.

(iv) A person must not perform significant work not covered by sub regulation (2) or (3) in a landslip hazard area unless –

- the person has written authorisation under sub regulation (2) or (3) to perform the work; or
- the relevant general manager has given written authorisation for the work.

(v) For the avoidance of doubt, a written authorisation by a permit authority, or building surveyor, under this regulation may form part of a document issued or given under the Act by the permit authority, or building surveyor, in respect of the relevant work.

3.4 Interim Planning Scheme Overlays

3.4.1 Landslide Overlay

The proposed distillery, car park and the north portion of bench terrace are situated within the low landslide hazard overlay as defined by the Interim Planning Scheme Landslide Hazard Overlay Mapping (MRT 2013) Figure 3.

Figure 3 Landslide Overlay of the Site (The LIST)

3.5 Proposed Works

The site is located about 27km east of the town of Sorell. The development area is in the west portion of the site, which is approx. 92.89ha in size and accessed from the south via Craigs Hill Road. The proposed development consists of construction of a distillery (~404.46m^2) a restaurant area (~242.13m^2) with the deck (~ 113.23m^2). The proposed development is to be excavated into the hillside to achieve FFL of 82.1m AHD. The proposed cuts of the slope will be benched to create a stepped terrace. Plans have been provided to GES dated on 12/07/2022.

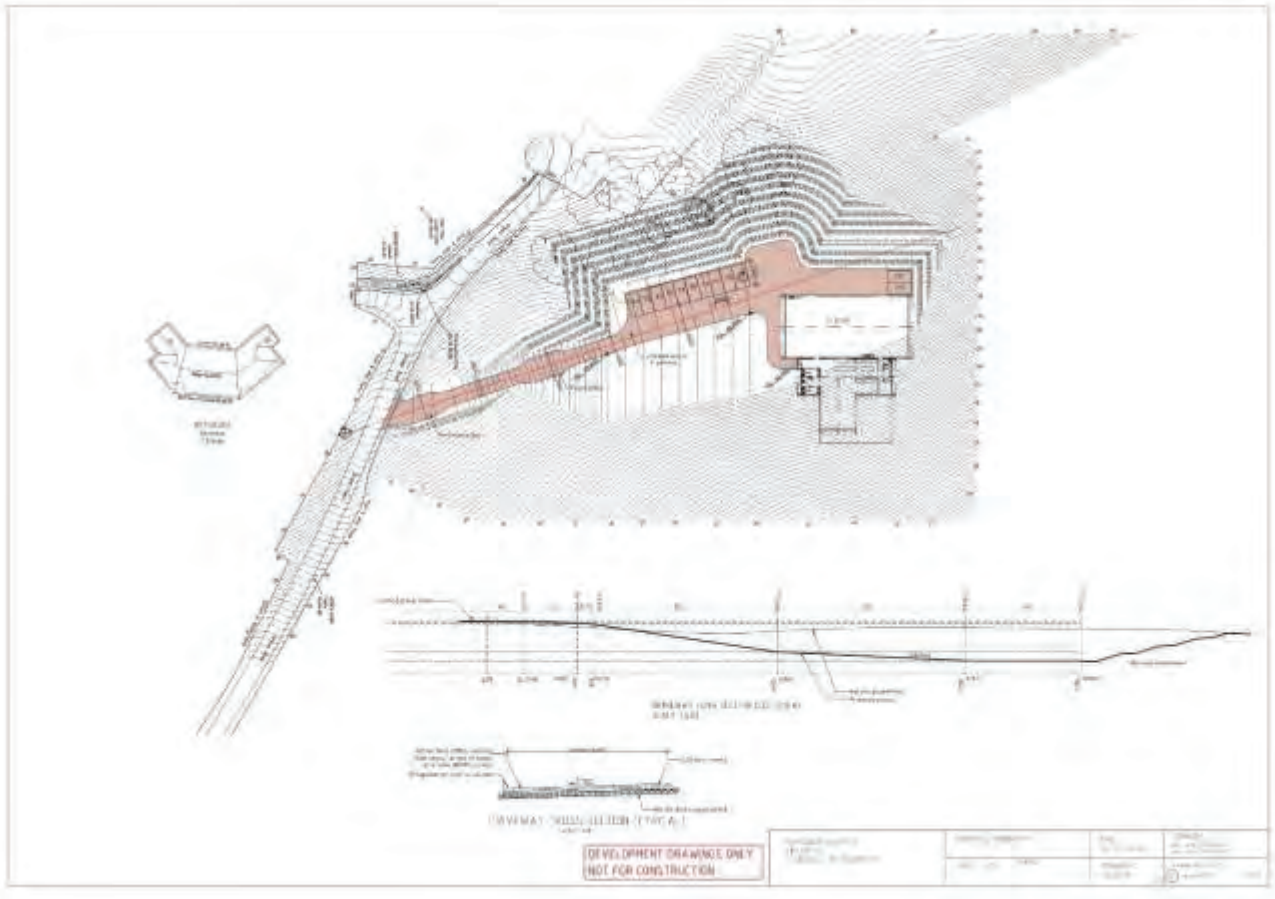


Figure 4 Site Plan showing the proposed works

3.5.1 Development & Works Acceptable Solutions

Where applicable, the need for further performance criteria compliance is outlined in Appendix 1

3.5.2 Landslip Hazard Code (LHC)

Given that the proposed development resides in the Landslip Hazard Area and there are no acceptable solutions for 'buildings and works within a landslip hazard area' or 'major works' is in a low Landslip Hazard Area, the E3.7.1 P1 and E3.7.3 P1 performance criteria will need to be addressed.

3.5.3 Development Performance Criteria

The following performance criteria need to be addressed:

- *E3.7.1 P1*
- *E3.7.3 P1*

4 Site Mapping

4.1 Geology

Based on the MRT 1:50,000 Mineral Resources Tasmania (MRT) Geology of Tasmania (Map Sheet: Sorell, Series Sheet: 8412S), the site geology comprises of the following geological units:

- Triassic Sedimentary Units of the Upper Parmeener Group (Map Units: Rs/ Rsm) – Shale and Mudstone (**Figure 5**).

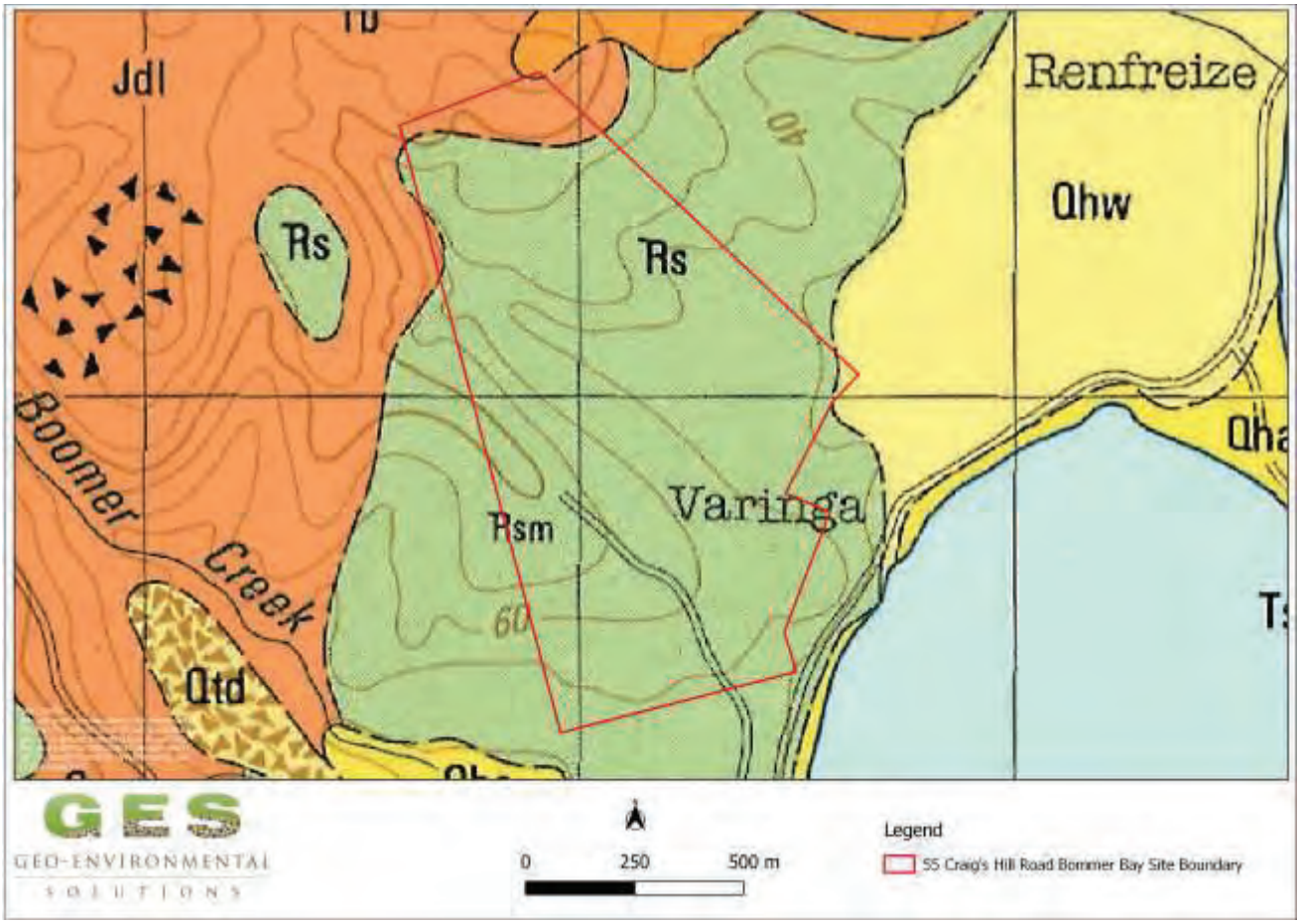


Figure 5. Geological Map of Site (Extract from MRT 1:50,000 Geology Map of Sorell)

4.2 *Site Geomorphology*

The proposed development area is located on the southeast facing slope associated with the southern extent of Allanbys Hill. The proposed development is situated approximately on 83 to 78 m AHD. The slope is various from moderate to steep grade and sloping downhill from the site. The slope of the site is approximately 9-12° and only south some parts fall to 12-20°. Figure 6 presents a slope angle map of the site showing areas of slope angles which has been generated using QGIS software based on the Greater Hobart LiDAR 2013.

Figure 7 depicts the cross – section profile A-A' at the site and displays the proposed development with cuts.

Figure 6 Slope Angle Model generated using Greater Hobart 2013 LiDAR data

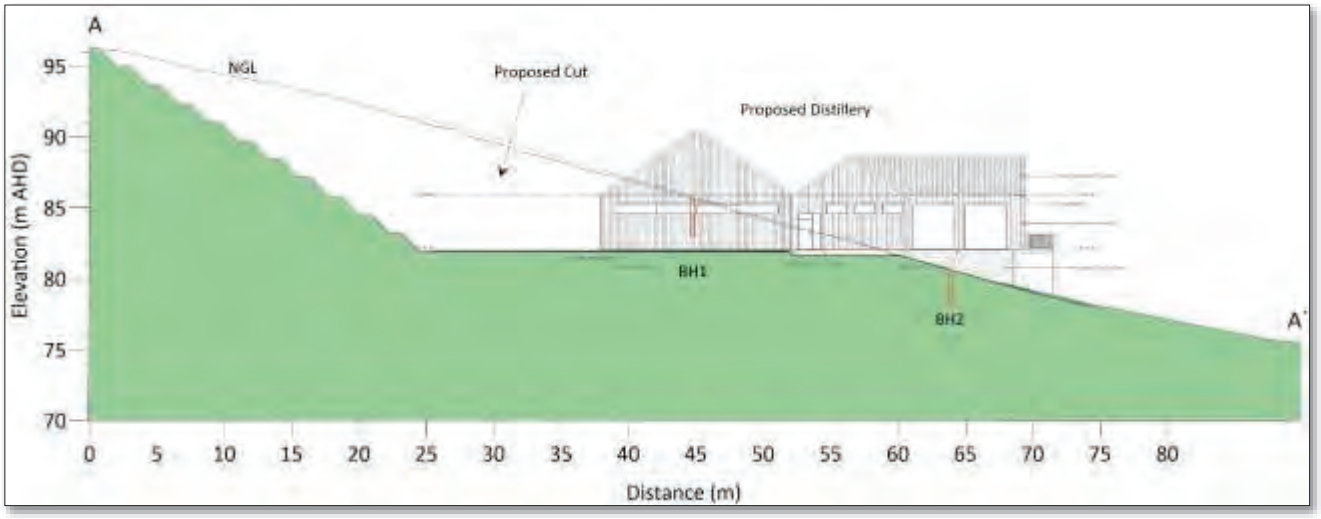


Figure 7 Cross Section profile A-A` at the site. The profile was generated from Greater Hobart 2013 LiDAR data

4.3 Site Investigation

The site investigation was conducted by GES for the purposes of collecting data for this report. A number of bore holes were completed to identify the distribution and variation of the soil materials at the site. Table 1 presents soil profile conditions. The soil consists of sand topsoil overlying sandy clay subsoils derived from weathered Triassic sandstone. The soils on site were not identified as dispersive.

Table 1 Summary of BH 01 and BH 02 sub-surface conditions

BH 1 Depth (m)	*BH 2 Depth (m)*	Horizon	Description
0.00 – 0.30	*0.00 – 0.40*	*A1*	*Dark Grey* ***SAND (SP),*** *single grain structure, slightly moist, loose consistency, gradual to boundary to*
0.30 – 1.50	*0.40 – 1.60*	*A2*	*White Grey* ***SAND (SP),*** *single grain structure, slightly moist, loose consistency, gradual to boundary to*
1.50 – 1.70	*1.60 – 1.80*	*A3*	*Orange* ***SAND (SP),*** *trace clay, single grain, slight moist, medium dense consistency, gradual boundary*
1.70 – 2.50	*1.80 – 2.60*	*A4*	*Sandy* ***CLAY (CI****), medium plasticity, slightly moist, stiff consistency, to refusal on assumed sandstone rock*

4.4 Site Classification AS2870 – 2011

According to AS2870-2011 (construction) the site is classified as Class P, landslide hazard risk at the site. As such, foundation design and construction must adhere to this classification and be socketed within the underlying bedrock (including internal piers). Site soils are expected to exhibit a Ys range of 0-20mm building design should account for heave associated to this Ys range.

5 Landslide Hazard Analysis

5.1.1 Landslide Characteristics

Based on the slope characteristics including site geology, slope geometry and slope angles, MRT landslide mapping/inventory and site observations, the following scenarios have been identified as potential slope failure mechanisms for the site:

- Scenario 1 – Shallow slide failure within underlying soil up to approx. 2.5m deep, within or immediately below the proposed dwelling.
- Scenario 2 – Shallow translational slide win cuttings upslope of the proposed development, caused by overstepping of natural soil slopes, with no allowance for drainage

Slope failure within scenario 1 and scenario 2 are unlikely however the consequence of a failure of this nature is major as it would undermine the foundation of the dwelling. Thus, the resultant untreated risk is Moderate.

As such, the resultant hazards without treatment are Moderate. Scenarios 1-2 are represented in Table 2 below.

6.1.2 Frequency Analysis

Table 2 presents the frequency analysis for the identified slope failure mechanisms. Terminology used is in accordance with the Australian Geomechanics Society (AGS) guidelines for landslide risk management (2007a,b,c,d).

Table 2 Frequency analysis for landslide hazards 1 – 2

Scenario	Failure Mechanism	Unit Affected	Observed in the field	Potential Size	Potential Velocities	Water Content	Current Likelihood	Treated Likelihood
Scenario 1	Shallow slide failure within natural soils beneath, or immediately downslope of the proposed dwelling.	Natural sandy CLAY sub-soils.	No	Small with potential regression upslope towards dwelling	Very slow to rapid	Wet/ saturated	Possible	Unlikely
Scenario 2	Shallow translational slide -cuts	Over-steepened sandy CLAY sub-soils	No	Small	Very slow to rapid	Wet/ saturated	Possible	Unlikely

5.2 Risk Analysis

5.2.1 Risk to Property

Risk has been considered for the proposed development pre- and post-construction. Without suitable management of site vegetation, foundation depths, safe batter angles, fill compaction, site stormwater and wastewater management, the site is considered **Moderate** risk. Treated risk may be reduced to low with the implementation of recommendations for cut batters, retaining walls and dwelling foundations being socketed into the underlying sandstone bedrock.

Table 3 Consequence analysis for landslide hazards

Scenario	Issue	Current Risk			Recommended risk treatment	Residual Risk following implementation of risk treatment		
		Likelihood of occurrence	Consequence to property	Level of risk to property		Likelihood of occurrence	Consequence to property	Level of risk to property
Scenario 1	Shallow Slide Failure	Possible	Medium	Moderate	Foundations for the dwelling should be **socketed into the underlying sandstone bedrock located at approx. 2.6 mbgs** and designed to accommodate for an anticipated **Ys range of 0 – 20mm**. This recommendation applies to the **entire building foundations, including internals**. Competent bedrock **should be confirmed by the site engineer or GES** prior to construction of footings. A cut-off v-drain above the cutting and a graded toe drain immediately below the cutting face to prevent water ponding on the driveway and above the proposed dwelling. Good hillside construction practices should be adopted as per Australian Geoguide LR8; All earthworks should be conducted in accordance with AS3798-2007.	Unlikely	Medium	Low

Scenario 2	Shallow Translational Failure	Possible	Medium	Moderate	All earthworks should be conducted in accordance with AS3798-2007. Cut slopes to the north of the development should be constructed using the following slope angles: Residual Soils – 1V : 2 H; and Weathered Sandstone - 1V : 1H. Alternatively, slopes can be retained using suitably engineered retaining walls. All cuttings should include a cut-off v-drain above the cutting and a graded toe drain immediately below the cutting face. Good hillside construction practices should be adopted as per Australian Geoguide LR8;	Unlikely	Minor	Low

5.2.2 Risk to Life

Risk to life is considered acceptable given the treated likelihood and consequence of a shallow failure within the unconsolidated soil material within the cutting and failure of the residual soils for the proposed development (Table 4).

Table 4 Consequence analysis for landslide hazards – Life – Post-treatment

Hazard	Scenario 1	Scenario 2
Factor	Shallow Slide Failure	Shallow Translational Failure - Cut
Likelihood	Unlikely	Unlikely
Indicative Annual Probability	0.001	0.001
Use of Affected Structure/Site	Site soils immediately below building platform of the proposed dwelling on the steep slopes.	Area adjacent to cutting
Probability of Spatial Impact	Should foundations be socketed into the underlying sandstone bedrock – minimal damage anticipated. = 0.2	0.2
Proportion of Time	Estimated 12 hours a day. = 0.5	Estimated 12 hours a day. = 0.5
Probability of Not Evacuating	Soils around pile/pier foundations should exhibit signs of stress (cracking) allowing time to evacuate. = 0.2	Residual soils above cuttings should exhibit signs of stress (tension cracking prior to failure), resulting in time for evacuation and/or remediation. = 0.1
Vulnerability	Building unlikely to collapse. = 0.2	Building/structure unlikely to collapse. = 0.2
Risk for Person Most at Risk	4.0×10^{-7}	1.0×10^{-7}
Risk Evaluation	Acceptable	Acceptable

Note 1: It has been assumed that each person has an equal probability of death for each of the hazards.

Societal Risk has not been assessed for the development.

6 Conclusions and Recommendations

Based on the observations made during the investigation and the outcome of the hazard analysis the following conclusions are made:

- The site is underlain by the Tertiary (Map Units: Rs) – shale and mudstone
- The proposed development is within the Low Landslide Hazard overlay
- The proposed development is situated on moderate to steep slopes of approx. 12°-20°
- Untreated risk to property at the site is Moderate for the assessed landslide hazard and proposed cut/fill excavation works without appropriate controls;
- Treatment of the assessed hazards can decrease the risk to property to Low and Acceptable;
- Foundations for the dwelling should be socketed into the underlying sandstone bedrock located at approx. 2.6 mbgs and designed to accommodate for an anticipated Ys range of 0 – 20mm. This recommendation applies to the entire building foundations, including internals. Competent bedrock should be confirmed by the site engineer or GES prior to construction of footings.
- A cut-off v-drain above the cutting and a graded toe drain immediately below the cutting face to prevent water ponding on the driveway and above the proposed dwelling.
- All earthworks should be conducted in accordance with AS3798-2007.
- Cut slopes to the north of the development should be constructed using the following slope angles:
    - Residual Soils – 1V : 2 H; and
    - Weathered Sandstone - 1V : 1H.
- Alternatively, slopes can be retained using suitably engineered retaining walls.
- All construction and earthworks on site should be adequately designed in accordance with the good hillside construction practices as outlined in the Australian Geomechanics Society (AGS) Geoguide LR8.
- The proposed development is considered acceptable in terms of risk to property and life and will satisfy Code E3 code of the Sorell Interim Planning Scheme.

J Traynor BSc (hons)

Engineering Geologist

References

AGS (2007a). Guideline for Landslide Susceptibility, Hazard and Risk Zoning. Australian Geomechanics, Vol 42 No 1 March 2007

AGS (2007b). Commentary on Guideline for Landslide Susceptibility, Hazard and Risk Zoning. Australian Geomechanics, Vol 42 No 1 March 2007

AGS (2007c). Practice Notes Guidelines for Landslide Risk Management. Australian Geomechanics Vol 42 No 1 March 2007

AGS (2007d). Commentary on Practice Notes Guidelines for Landslide Risk Management. Australian Geomechanics Vol 42 No 1 March 2007

AGS (2007e). The Australian Geoguides for Slope Management and Maintenance. Australian Geomechanics Vol 42 No 1 March 2007

Calver, C.R. (compiler) 2010. Digital Geological Atlas 1:25 000 Scale Series. Sheet 5225 Hobart. Mineral Resources Tasmania.

Appendix 1 Acceptable & Performance Solutions

Landslip Code Areas

Standard	Code	Acceptable Solution		Performance Criteria
Use	E3.6.1 Hazardous Use	A1	Hazardous use relates to an alteration or intensification of an approved use.	P1
		A2	No acceptable solution.	P2
	E3.6.2 Vulnerable Use	A1	Vulnerable use is for visitor accommodation.	P1
		A2	No acceptable solution.	P2
Development	E3.7.1 Buildings and Works, other than Minor Extensions	A1	No Acceptable solution	P1
	E3.7.2 Minor Extensions	A1	Buildings and works for minor extensions must comply with the following: (a) be in a Medium Landslide Hazard Area.	P1
	E3.7.3 Major Works	A1	No acceptable solution.	P1
Subdivision	E3.8.1 Subdivision	A1	No Acceptable solution	P1
		A2	Subdivision is not prohibited by the relevant zone standards.	P2

Appendix 2 Qualitative Risk Assessment Tables

Likelihood & Consequence Index

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), stabilisation 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 Risk Matrix

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.

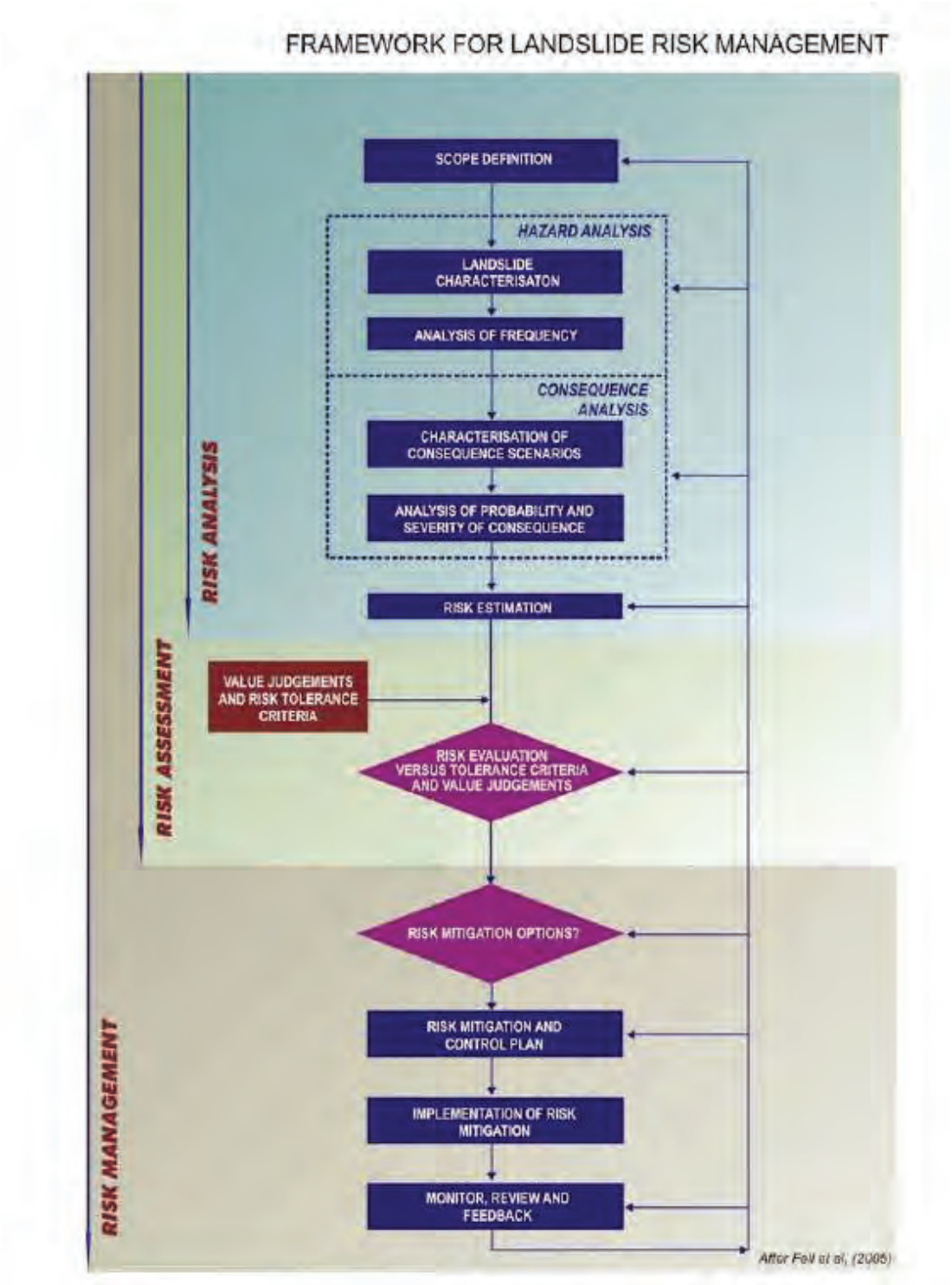
Note: (7) The implications for a particular situation are to be determined by all parties to the risk assessment and may depend on the nature of the property at risk; these are only given as a general guide.

Appendix 3 Qualitative Risk Assessment

Performance Criteria E3.7.1 P1 **Buildings and works must satisfy all of the following:**	**Relevance**	**Management Options**	**Managed (treated) Risk Assessment**			**Further Assessment Required**
			Consequence	**Likelihood**	**Risk**	
(a) no part of the buildings and works is in a High Landslide Hazard Area;	N/A					
(b) the landslide risk associated with the buildings and works is either: (i) acceptable risk (means a risk society is prepared to accept as it is. That is; without management or treatment); or (ii) capable of feasible and effective treatment through hazard management measures, so as to be tolerable risk. The residual tolerable risk may be assessed using either qualitative or qualitative methods in the landslide risk assessment either: (a) if using the AGS qualitative risk assessment method apply the "As Low As Reasonably Possible (ALARP)" principle with the residual tolerable risk level no higher than a "moderate" risk level under the AGS 2007(c) risk method; or (b) if using the AGS quantitative risk assessment method then the tolerable loss of life for the person most at risk as suggested by the AGS 2007(c) to be: (i) if existing slope / existing development: 10-4 / annum; (ii) if new constructed slope / new development / existing landslide: 10-5 / annum.	Capable of feasible and effective treatment through hazard management measures	Refer to recommendations	Medium Minor	Unlikely	Low	No

Performance Criteria E3.7.3 P1 **Major works must satisfy all of the following (same as 3.7.1 P1):**	**Relevance**	**Management Options**	**Managed (treated) Risk Assessment**			**Further Assessment Required**
			Consequence	**Likelihood**	**Risk**	
(a) no part of the works is in a High Landslide Hazard Area;	N/A					
(b)the landslide risk associated with the works is either: (i) acceptable risk; or (ii) capable of feasible and effective treatment through hazard management measures, so as to be tolerable risk.	Capable of feasible and effective treatment through hazard management measures	Refer to recommendations	Minor Medium	Unlikely	Low	No

Appendix 4 Framework for Landslide Risk Management



Source: Reproduced without amendment from AGS (2007a). Guideline for Landslide Susceptibility, Hazard and Risk Zoning. Australian Geomechanics, Vol 42 No 1 March 2007

[1] The five AGS documents are:
AGS (2007a). Guideline for Landslide Susceptibility, Hazard and Risk Zoning. Australian Geomechanics, Vol 42 No 1 March 2007
AGS (2007b). Commentary on Guideline for Landslide Susceptibility, Hazard and Risk Zoning. Australian Geomechanics, Vol 42 No 1 March 2007
AGS (2007c). Practice Notes Guidelines for Landslide Risk Management. Australian Geomechanics Vol 42 No 1 March 2007
AGS (2007d). Commentary on Practice Notes Guidelines for Landslide Risk Management. Australian Geomechanics Vol 42 No 1 March 2007
AGS (2007e). The Australian Geoguides for Slope Management and Maintenance. Australian Geomechanics Vol 42 No 1 March 2007

Appendix 5 Types of Landslide Movement

PRACTICE NOTE GUIDELINES FOR LANDSLIDE RISK MANAGEMENT 2007

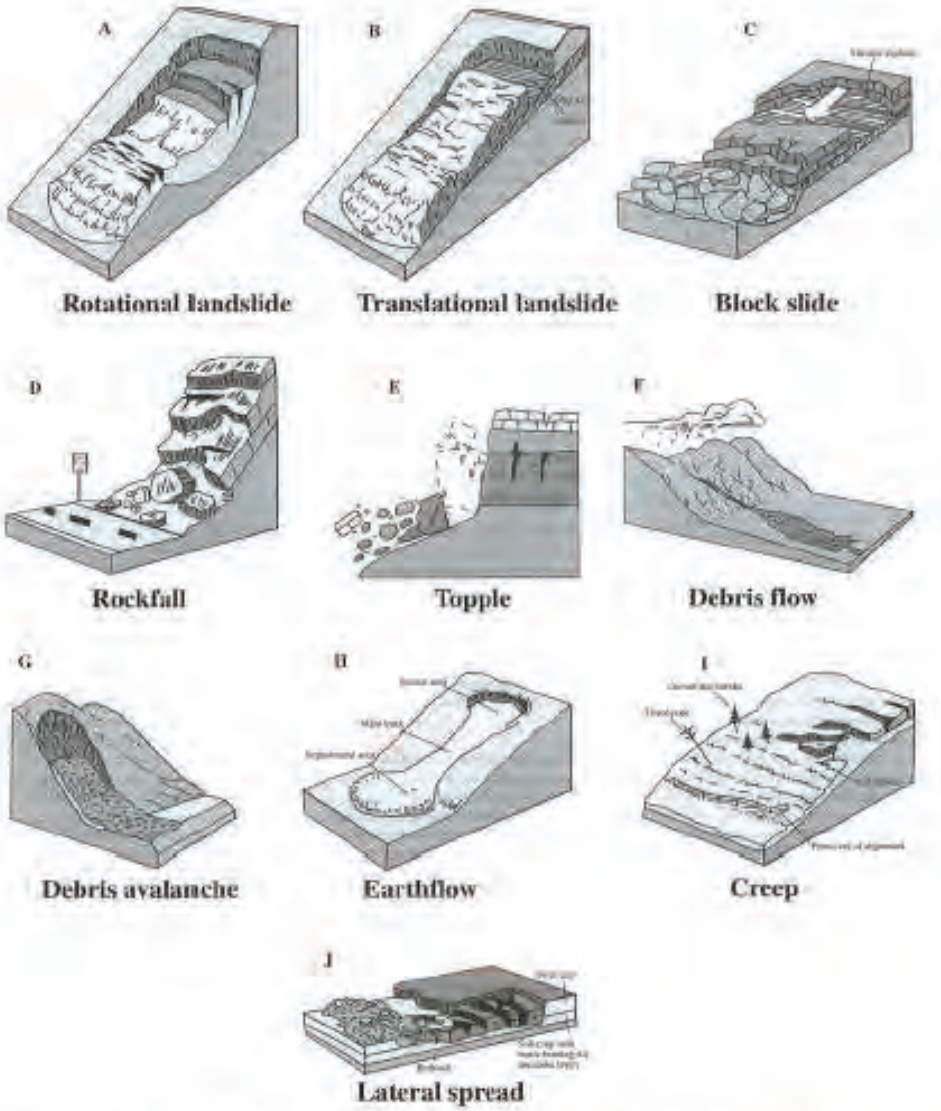


Figure B1: These schematics illustrate the major types of landslide movement.
(From US Geological Survey Fact Sheet 2004-3072, July 2004, with kind permission for reproduction.)

The nomenclature of a landslide can become more elaborate as more information about the movement becomes available. To build up the complete identification of the movement, descriptors are added in front of the two-term classification using a preferred sequence of terms. The suggested sequence provides a progressive narrowing of the focus of the descriptors, first by time and then by spatial location, beginning with a view of the whole landslide, continuing with parts of the movement and finally defining the materials involved. The recommended sequence, as shown in Table B2, describes activity (including state, distribution and style) followed by descriptions of all movements (including rate, water content, material and type). Definitions of the terms in Table B2 are given in Cruden & Varnes (1996).

APPENDIX B - LANDSLIDE TERMINOLOGY

The following provides a summary of landslide terminology which should (for uniformity of practice) be adopted when classifying and describing a landslide. It has been based on Cruden & Varnes (1996) and the reader is recommended to refer to the original documents for a more detailed discussion, other terminology and further examples of landslide types and processes.

Landslide

The term ***landslide*** denotes "the movement of a mass of rock, debris or earth down a slope". The phenomena described as landslides are not limited to either the "land" or to "sliding", and usage of the word has implied a much more extensive meaning than its component parts suggest. Ground subsidence and collapse are excluded.

Classification of Landslides

Landslide classification is based on Varnes (1978) system which has two terms: the first term describes the material type and the second term describes the type of movement.

The material types are ***Rock***, ***Earth*** and ***Debris***, being classified as follows:-

The material is either rock or soil.

Rock: is "a hard or firm mass that was intact and in its natural place before the initiation of movement."

Soil: is "an aggregate of solid particles, generally of minerals and rocks, that either was transported or was formed by the weathering of rock in place. Gases or liquids filling the pores of the soil form part of the soil."

Earth: "describes material in which 80% or more of the particles are smaller than 2 mm, the upper limit of sand sized particles."

Debris: "contains a significant proportion of coarse material; 20% to 80% of the particles are larger than 2 mm and the remainder are less than 2 mm."

The terms used should describe the displaced material in the landslide before it was displaced.

The types of movement describe how the landslide movement is distributed through the displaced mass. The five kinematically distinct types of movement are described in the sequence ***fall***, ***topple***, ***slide***, ***spread*** and ***flow***.

The following table shows how the two terms are combined to give the landslide type:

Table B1: Major types of landslides. Abbreviated version of Varnes' classification of slope movements (Varnes, 1978).

TYPE OF MOVEMENT		TYPE OF MATERIAL		
		BEDROCK	ENGINEERING SOILS	
			Predominantly Coarse	Predominantly Fine
FALLS		Rock fall	Debris fall	Earth fall
TOPPLES		Rock topple	Debris topple	Earth topple
SLIDES	ROTATIONAL	Rock slide	Debris slide	Earth slide
	TRANSLATIONAL			
LATERAL SPREADS		Rock spread	Debris spread	Earth spread
FLOWS		Rock flow (Deep creep)	Debris flow (Soil creep)	Earth flow
COMPLEX	Combination of two or more principle types of movement			

Figure B1 gives schematics to illustrate the major types of landslide movement. Further information and photographs of landslides are available on the USGS website at http://landslides.usgs.gov.

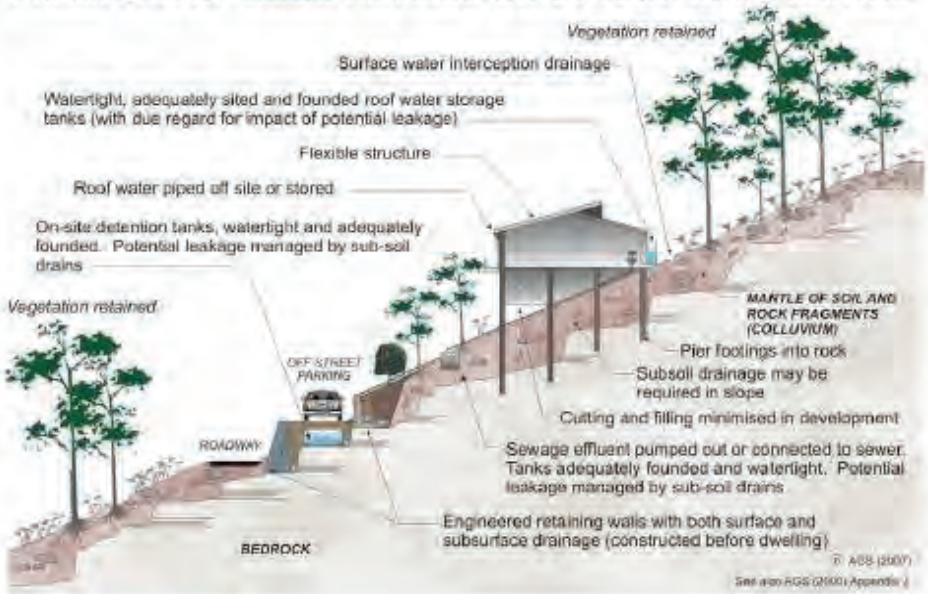
Appendix 6 Examples of Good Hillside Construction Practice

AUSTRALIAN GEOGUIDE LR8 (CONSTRUCTION PRACTICE)

HILLSIDE CONSTRUCTION PRACTICE

Sensible development practices are required when building on hillsides, particularly if the hillside has more than a low risk of instability (GeoGuide LR7). Only building techniques intended to maintain, or reduce, the overall level of landslide risk should be considered. Examples of good hillside construction practice are illustrated below.

EXAMPLES OF GOOD HILLSIDE CONSTRUCTION PRACTICE



WHY ARE THESE PRACTICES GOOD?

Roadways and parking areas - are paved and incorporate kerbs which prevent water discharging straight into the hillside (GeoGuide LR5).

Cuttings - are supported by retaining walls (GeoGuide LR6).

Retaining walls - are engineer designed to withstand the lateral earth pressures and surcharges expected, and include drains to prevent water pressures developing in the backfill. Where the ground slopes steeply down towards the high side of a retaining wall, the disturbing force (see GeoGuide LR6) can be two or more times that in level ground. Retaining walls must be designed taking these forces into account.

Sewage - whether treated or not is either taken away in pipes or contained in properly founded tanks so it cannot soak into the ground.

Surface water - from roofs and other hard surfaces is piped away to a suitable discharge point rather than being allowed to infiltrate into the ground. Preferably, the discharge point will be in a natural creek where ground water exits, rather than enters, the ground. Shallow, lined, drains on the surface can fulfil the same purpose (GeoGuide LR5).

Surface loads - are minimised. No fill embankments have been built. The house is a lightweight structure. Foundation loads have been taken down below the level at which a landslide is likely to occur and, preferably, to rock. This sort of construction is probably not applicable to soil slopes (GeoGuide LR3). If you are uncertain whether your site has rock near the surface, or is essentially a soil slope, you should engage a geotechnical practitioner to find out.

Flexible structures - have been used because they can tolerate a certain amount of movement with minimal signs of distress and maintain their functionality.

Vegetation clearance - on soil slopes has been kept to a reasonable minimum. Trees, and to a lesser extent smaller vegetation, take large quantities of water out of the ground every day. This lowers the ground water table, which in turn helps to maintain the stability of the slope. Large scale clearing can result in a rise in water table with a consequent increase in the likelihood of a landslide (GeoGuide LR5). An exception may have to be made to this rule on steep rock slopes where trees have little effect on the water table, but their roots pose a landslide hazard by dislodging boulders.

Possible effects of ignoring good construction practices are illustrated on page 2. Unfortunately, these poor construction practices are not as unusual as you might think and are often chosen because, on the face of it, they will save the developer, or owner, money. You should not lose sight of the fact that the cost and anguish associated with any one of the disasters illustrated, is likely to more than wipe out any apparent savings at the outset.

ADOPT GOOD PRACTICE ON HILLSIDE SITES

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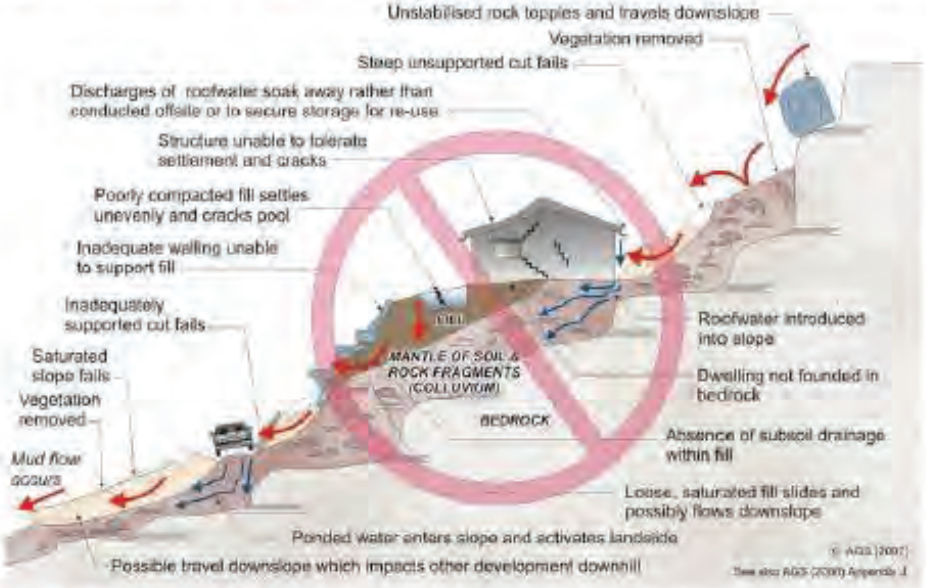
AUSTRALIAN GEOGUIDE LR8 (CONSTRUCTION PRACTICE)

EXAMPLES OF **POOR** HILLSIDE CONSTRUCTION PRACTICE



WHY ARE THESE PRACTICES POOR?

Roadways and parking areas - are unsurfaced and lack proper table drains (gutters) causing surface water to pond and soak into the ground.

Cut and fill - has been used to balance earthworks quantities and level the site leaving unstable cut faces and added large surface loads to the ground. Failure to compact the fill properly has led to settlement, which will probably continue for several years after completion. The house and pool have been built on the fill and have settled with it and cracked. Leakage from the cracked pool and the applied surface loads from the fill have combined to cause landslides.

Retaining walls - have been avoided, to minimise cost, and hand placed rock walls used instead. Without applying engineering design principles, the walls have failed to provide the required support to the ground and have failed, creating a very dangerous situation.

A heavy, rigid, house - has been built on shallow, conventional, footings. Not only has the brickwork cracked because of the resulting ground movements, but it has also become involved in a man-made landslide.

Soak-away drainage - has been used for sewage and surface water run-off from roofs and pavements. This water soaks into the ground and raises the water table (GeoGuide LR5). Subsoil drains that run along the contours should be avoided for the same reason. If felt necessary, subsoil drains should run steeply downhill in a chevron, or herring bone, pattern. This may conflict with the requirements for effluent and surface water disposal (GeoGuide LR9) and if so, you will need to seek professional advice.

Rock debris - from landslides higher up on the slope seems likely to pass through the site. Such locations are often referred to by geotechnical practitioners as "debris flow paths". Rock is normally even denser than ordinary fill, so even quite modest boulders are likely to weigh many tonnes and do a lot of damage once they start to roll. Boulders have been known to travel hundreds of metres downhill leaving behind a trail of destruction.

Vegetation - has been completely cleared, leading to a possible rise in the water table and increased landslide risk (GeoGuide LR5).

DON'T CUT CORNERS ON HILLSIDE SITES - OBTAIN ADVICE FROM A GEOTECHNICAL PRACTITIONER

More information relevant to your particular situation may be found in other Australian GeoGuides:

- GeoGuide LR1 - Introduction
- GeoGuide LR2 - Landslides
- GeoGuide LR3 - Landslides in Soil
- GeoGuide LR4 - Landslides in Rock
- GeoGuide LR5 - Water & Drainage
- GeoGuide LR6 - Retaining Walls
- GeoGuide LR7 - Landslide Risk
- GeoGuide LR8 - Effluent & Surface Water Disposal
- GeoGuide LR10 - Coastal Landslides
- GeoGuide LR11 - Record Keeping

The Australian GeoGuides (LR series) are a set of publications intended for property owners; local councils; planning authorities; developers; insurers; lawyers and, in fact, anyone who lives with, or has an interest in, a natural or engineered slope, a cutting, or an excavation. They are intended to help you understand why slopes and retaining structures can be a hazard and what can be done with appropriate professional advice and local council approval (if required) to remove, reduce, or minimise the risk they represent. The GeoGuides have been prepared by the Australian Geomechanics Society, a specialist technical society within Engineers Australia, the national peak body for all engineering disciplines in Australia, whose members are professional geotechnical engineers and engineering geologists with a particular interest in ground engineering. The GeoGuides have been funded under the Australian governments' National Disaster Mitigation Program.

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Appendix 7 Site Photographs

Natural Value Assessment for Proposed Distillery - 55 Craigs Hill Road, Boomer Bay

Property:	**55 Craigs Hill Road, Boomer Bay**
Date:	10th October 2022
Attention:	Ruby Daly, Nikki Kemp – Taylor and Beeson Building Pty Ltd

Enviro-dynamics has been engaged by the proponent to provide an assessment of the proposed distillery at 55 Craigs Hill Road, Boomer Bay which contains a Biodiversity protection area (BPA) overlay under the *Sorrell Interim Planning Scheme 2015.*

A site visit was carried out on the 28th September 2022 to assess the area where the proposed development will be situated, including the surrounding vegetation.

Biodiversity protection overlay

As can be seen in Figure 1, LISTmap shows part of the property as having a BPA to the south of the proposed distillery location. This layer is covering a section of *Eucalyptus amygdalina* on sandstone (DAS) which is a threatened vegetation community under the *Nature Conservation Act 2002.*

The proposed works and development will have no impact, directly or indirectly on this BPA.

Eucalyptus amygdalina on sandstone threatened community

There has been a small amount of DAS mapped to the west of the proposed development which is not included within the BPA (Figure 1); however this vegetation will be retained as it forms an important wind break for the distillery and agricultural land.

This section of forest falls outside of the bushfire hazard management area, and as such there will be no impacts on the natural values.

Sorell Council
Development Application: Response to Request for Information - 55 Craigs Hill Road, Boomer Bay.pdf
Date Received: 10/ 03 / 2023
Plans Referenced: P2

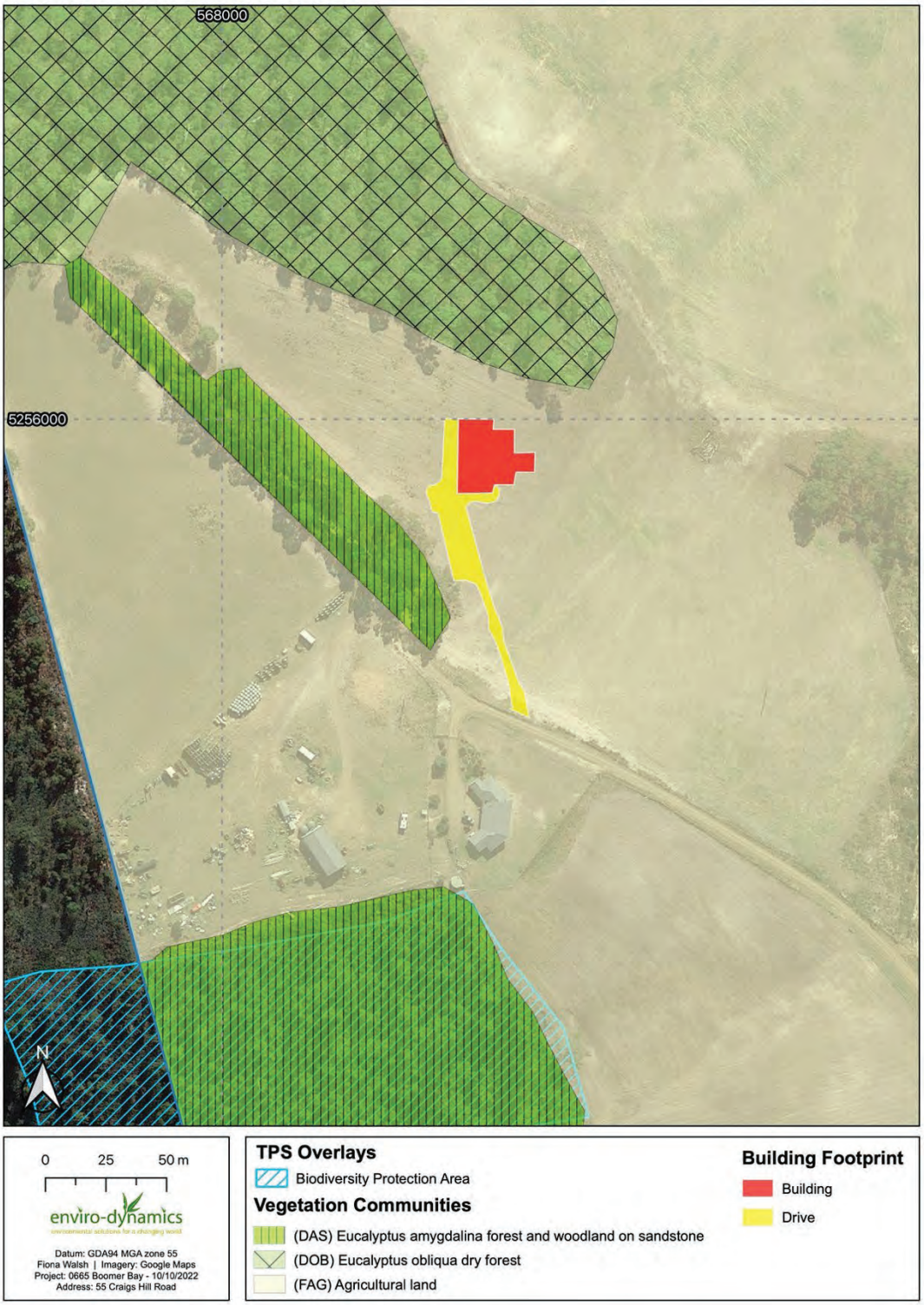

Figure 1. Proposed development in relation to Veg communities and Biodiversity overlay

Development Impacts

The development will not have any impact on the BPA to the south, nor to the threatened vegetation community to the west.

A small area of *Eucalyptus obliqua* dry forest (DOB) (<400m^2) situated to the north of the distillery is within the required bushfire hazard management area. Vegetation in this area will need to be modified to reduce the fuel level. This will require clearing of the understory vegetation and thinning of some trees. This is not a threatened vegetation community and does not contain any threatened species habitat. This impact will be minimal.

Conclusion

The proposed development at 55 Craigs Hill Road has been situated within an agricultural paddock and does not require the clearing of any vegetation within the Biodiversity Protection Area or threatened vegetation outside the BPA.

Impacts to native vegetation will be restricted to a small area of DOB forest to the north of the distillery which need to be modified to reduce fuel levels.

The site is relatively weed free and no declared weeds were located within the vicinity of the development. To ensure there is no risk of importing weeds into the site it is recommended to follow the best practise prescriptions as laid out in the Weed *and Disease Planning and Hygiene Guidelines - Preventing the spread of weeds and diseases in Tasmania* (DPIPWE, Stewart and Askey-Doran, 2015)

Should you require any further information please don't hesitate to contact me.

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