GEOTECHNICAL RISK MANAGEMENT POLICY FOR PITTWATER
FORM NO. 1 – To be submitted with Development Application

Development Application for _____
Name of Applicant

Address of site 55 Tasman Road, Avalon

The following checklist covers the minimum requirements to be addressed in a Geotechnical Risk ***Declaration made by geotechnical engineer or engineering geologist or coastal engineer (where applicable) as part of a geotechnical report***

I, Ben White *on behalf of* White Geotechnical Group Pty Ltd
(Insert Name) (Trading or Company Name)

on this the 19/11/19 certify that I am a geotechnical engineer or engineering geologist or coastal engineer as defined by the Geotechnical Risk Management Policy for Pittwater - 2009 and I am authorised by the above organisation/company to issue this document and to certify that the organisation/company has a current professional indemnity policy of at least $10million.

I:
Please mark appropriate box

☒ have prepared the detailed Geotechnical Report referenced below in accordance with the Australia Geomechanics Society's Landslide Risk Management Guidelines (AGS 2007) and the Geotechnical Risk Management Policy for Pittwater - 2009

☒ am willing to technically verify that the detailed Geotechnical Report referenced below has been prepared in accordance with the Australian Geomechanics Society's Landslide Risk Management Guidelines (AGS 2007) and the Geotechnical Risk Management Policy for Pittwater - 2009

☐ have examined the site and the proposed development in detail and have carried out a risk assessment in accordance with Section 6.0 of the Geotechnical Risk Management Policy for Pittwater - 2009. I confirm that the results of the risk assessment for the proposed development are in compliance with the Geotechnical Risk Management Policy for Pittwater - 2009 and further detailed geotechnical reporting is not required for the subject site.

☐ have examined the site and the proposed development/alteration in detail and I am of the opinion that the Development Application only involves Minor Development/Alteration that does not require a Geotechnical Report or Risk Assessment and hence my Report is in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009 requirements.

☐ have examined the site and the proposed development/alteration is separate from and is not affected by a Geotechnical Hazard and does not require a Geotechnical Report or Risk Assessment and hence my Report is in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009 requirements.

☐ have provided the coastal process and coastal forces analysis for inclusion in the Geotechnical Report

Geotechnical Report Details:

Report Title: Geotechnical Report **55 Tasman Road, Avalon**

Report Date: 19/11/19

Author: BEN WHITE

Author's Company/Organisation: **WHITE GEOTECHNICAL GROUP PTY LTD**

Documentation which relate to or are relied upon in report preparation:

Australian Geomechanics Society Landslide Risk Management March 2007.

White Geotechnical Group company archives.

I am aware that the above Geotechnical Report, prepared for the abovementioned site is to be submitted in support of a Development Application for this site and will be relied on by Pittwater Council as the basis for ensuring that the Geotechnical Risk Management aspects of the proposed development have been adequately addressed to achieve an "Acceptable Risk Management" level for the life of the structure, taken as at least 100 years unless otherwise stated and justified in the Report and that reasonable and practical measures have been identified to remove foreseeable risk.

Signature _____

Name Ben White

Chartered Professional Status MScGEOLAusIMM CP GEOL

Membership No. 222757

Company White Geotechnical Group Pty Ltd

GEOTECHNICAL RISK MANAGEMENT POLICY FOR PITTWATER
FORM NO. 1(a) - Checklist of Requirements for Geotechnical Risk Management Report for Development Application

Development Application for _____
Name of Applicant

Address of site 55 Tasman Road, Avalon

The following checklist covers the minimum requirements to be addressed in a Geotechnical Risk Management Geotechnical Report. This checklist is to accompany the Geotechnical Report and its certification (Form No. 1).

Geotechnical Report Details:

Report Title: Geotechnical Report **55 Tasman Road, Avalon**

Report Date: 19/11/19

Author: BEN WHITE

Author's Company/Organisation: WHITE GEOTECHNICAL GROUP PTY LTD

Please mark appropriate box

☒ Comprehensive site mapping conducted **11/11/19**
(date)

☒ Mapping details presented on contoured site plan with geomorphic mapping to a minimum scale of 1:200 (as appropriate)

☒ Subsurface investigation required
- ☐ No Justification _____
- ☒ Yes Date conducted **11/11/19**

☒ Geotechnical model developed and reported as an inferred subsurface type-section

☒ Geotechnical hazards identified
- ☐ Above the site
- ☒ On the site
- ☐ Below the site
- ☐ Beside the site

☒ Geotechnical hazards described and reported

☒ Risk assessment conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
- ☒ Consequence analysis
- ☒ Frequency analysis

☒ Risk calculation

☒ Risk assessment for property conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009

☒ Risk assessment for loss of life conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009

☒ Assessed risks have been compared to "Acceptable Risk Management" criteria as defined in the Geotechnical Risk Management Policy for Pittwater - 2009

☒ Opinion has been provided that the design can achieve the "Acceptable Risk Management" criteria provided that the specified conditions are achieved.

☒ Design Life Adopted:
- ☒ 100 years
- ☐ Other _____
specify

☒ Geotechnical Conditions to be applied to all four phases as described in the Geotechnical Risk Management Policy for Pittwater - 2009 have been specified

☒ Additional action to remove risk where reasonable and practical have been identified and included in the report.

☐ Risk assessment within Bushfire Asset Protection Zone.

I am aware that Pittwater Council will rely on the Geotechnical Report, to which this checklist applies, as the basis for ensuring that the geotechnical risk management aspects of the proposal have been adequately addressed to achieve an "Acceptable Risk Management" level for the life of the structure, taken as at least 100 years unless otherwise stated, and justified in the Report and that reasonable and practical measures have been identified to remove foreseeable risk.

Signature _____

Name Ben White

Chartered Professional Status MScGEOLAusIMM CP GEOL

Membership No. 222757

Company White Geotechnical Group Pty Ltd

GEOTECHNICAL INVESTIGATION:

Alterations and Additions at **55 Tasman Rd, Avalon**

1. Proposed Development

1.1 Remove existing carport and covered deck.

1.2 Construct a new concrete driveway and a new garage.

1.3 Construct a new studio on the N side of the house and a new living room on the E side of the house.

1.4 Construct a new pool on the E side of the property by excavating to a maximum depth of ~2.3m.

1.5 Details of the proposed development are shown on 12 drawings prepared by Jacqueline Brown, drawings numbered BH-01-DA to BH-12-DA, dated August to October 2019.

2. Site Description

2.1 The site was inspected on the 11th November, 2019.

2.2 This residential property is on the high side of the road and has an E aspect. It is located on the gently graded lower reaches of a hillslope. The natural slope rises along the property at angles of <5°. The slope above and below the property continues at similar angles.

2.3 Between the road frontage and the house is a gently sloping lawn and gravel driveway (photo 1). The single-storey brick and timber clad house (photo 2) is supported on brick piers that are in good condition and show no significant signs of movement (photo 3). A gently sloping lawn extends from the E side of the house to the E boundary (Photo 4).

3. Geology

The Sydney 1:100 000 Geological sheet indicates the site is underlain by the Newport Formation of the Narrabeen Group. This is described as interbedded laminite, shale, and quartz to lithic quartz sandstone.

4. Subsurface Investigation

One auger hole was put down to identify the soil materials. Five Dynamic Cone Penetrometer (DCP) tests were put down to determine the relative density of the overlying soil and the depth to weathered rock. The locations of the tests are shown on the site plan. It should be noted that a level of caution should be applied when interpreting DCP test results. The test will not pass through hard buried objects so in some instances it can be difficult to determine whether refusal has occurred on an obstruction in the profile or on the natural rock surface. This is not expected to be an issue for the testing on this site and the results are as follows:

AUGER HOLE 1 – AH1 (~RL12.7) (Photo 5)

Depth (m)	Material Encountered
0.0 to 0.5	**SILTY SAND,** grey, fine to medium grained.
0.5 to 0.7	**SAND**, brown, fine to medium grained, dry.

End of hole @ 0.7m in sand. No watertable encountered.

DCP TEST RESULTS ON NEXT PAGE

DCP TEST RESULTS – Dynamic Cone Penetrometer					
Equipment: 9kg hammer, 510mm drop, conical tip.				Standard: AS1289.6.3.2 - 1997	
Depth(m) Blows/0.3m	**DCP 1 (~RL11.9)**	**DCP 2 (~RL12.4)**	**DCP 3 (~RL12.8)**	**DCP 4 (~RL12.7)**	**DCP 5 (~RL12.5)**
0.0 to 0.3	10	4	3	4	4
0.3 to 0.6	20	10	21	25	10
0.6 to 0.9	22	15	45	45	45
0.9 to 1.2	42	40	#	#	#
1.2 to 1.5	55	#			
1.5 to 1.8	#				
	End of Test @ 1.5 m	End of Test @ 1.0 m	End of Test @ 0.8 m	End of Test @ 0.7 m	End of Test @ 0.7 m

#refusal/end of test. F=DCP fell after being struck showing little resistance through all or part of the interval.

DCP Notes:

DCP1 – End of test @ 1.5m, DCP still very slowly going down, clean dry tip.
DCP2 – End of test @ 1.0m, DCP still very slowly going down, wet muddy tip.
DCP3 – End of test @ 0.8m, DCP still very slowly going down, clean dry tip.
DCP4 – End of test @ 0.7m, DCP still very slowly going down, clean dry tip.
DCP5 – End of test @ 0.7m, DCP still very slowly going down, damp muddy tip.

5. Geological Observations/Interpretation

The site is underlain by loose topsoil over Medium Dense to Dense Sands. Loose Sands occupy the top ~0.3m of the profile, before these become Medium Dense to 0.9m and Dense below that. The testing did not penetrate below 1.5m due to the density of the sand, but we think it likely the shale profile is in close proximity and probably not more than 1.0m below the extent of the testing. See the Type Section attached for a diagrammatical representation of the expected ground materials.

6. Groundwater

Normal ground water seepage is expected to move over the buried surface where the density of the sand changes significantly or where clay content increases.

Due to the slope and elevation of the block, the water table is expected to be many metres below the base of the proposed excavation.

7. Surface Water

No evidence of surface flows were observed on the property during the inspection. It is expected that normal sheet wash will move onto the site from above the property during heavy down pours.

8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed above, below, or beside the property. The proposed excavation is a potential hazard until retaining structures are in place (**Hazard One**).

Risk Analysis Summary

HAZARDS	Hazard One
TYPE	The proposed excavation collapsing onto the work site and impacting the neighbouring property to the E before the retaining structure is in place.
LIKELIHOOD	'Possible' (10^{-3})
CONSEQUENCES TO PROPERTY	'Medium' (15%)
RISK TO PROPERTY	'Moderate' (2×10^{-4})
RISK TO LIFE	5.3×10^{-5}/annum
COMMENTS	This level of risk to life and property is 'UNACCEPTABLE'. To move risk to 'ACCEPTABLE' levels the recommendations in **Section 13** are to be followed.

(See Aust. Geomech. Jnl. Mar 2007 Vol. 42 No 1, for full explanation of terms)

9. Suitability of the Proposed Development for the Site

The proposed development is suitable for the site. No geotechnical hazards will be created by the completion of the proposed development provided it is carried out in accordance with the requirements of this report and good engineering and building practice.

10. Stormwater

No significant stormwater will be created by the proposed works.

11. Excavations

An excavation to a maximum depth of ~2.3m is required to construct the pool. It is expected to be through mostly Medium Dense to Dense Sand. Extremely low strength shale may be encountered near the base of the excavation. It is envisaged that excavations through sand and extremely low strength shale can be carried out with a bucket.

12. Vibrations

Possible vibrations generated during excavations through sand and extremely low strength shale will be below the threshold limit for building damage.

13. Excavation Support Requirements

The proposed excavation for the pool will be taken to a maximum depth of ~2.2m. It will be set back ~2.5m from the E common boundary, and ~3.5m from the S common boundary.

The sand and shale portions of the proposed pool excavation will stand at near-vertical angles for short periods of time until the pool structure is installed, provided the cut batters are kept from becoming saturated.

The excavation face is to be inspected by the geotechnical consultant during the later stages of the excavation, but while the excavator and operator are still on site to ensure the ground materials are in line with our expectations and to ensure that no temporary support is required.

All unsupported cut batters are to be covered to prevent access of water in wet weather and loss of moisture in dry weather. Upslope runoff is to be diverted from the cut faces by sandbag mounds or other diversion works. The materials and labour to construct the pool structure are to be organised so on completion of the excavation they can be constructed as soon as possible. The excavation is to be carried out during a dry period. No excavations are to commence if heavy or prolonged rainfall is forecast.

If seepage is noted moving through the excavation face or if the cut batters remain unsupported for more than a few days before the commencement of pool construction they are to be temporarily supported with typical pool shoring such as braced sheet metal or similar until the pool structure is in place.

All excavation spoil is to be removed from site or be supported by engineered retaining walls.

14. Retaining Structures

For cantilever or singly propped retaining structures it is suggested the design be based on a triangular distribution of lateral pressures using the parameters shown in Table 1.

Table 1 – Likely Earth Pressures for Retaining Structures

Unit	Earth Pressure Coefficients		
	Unit weight (kN/m^3)	'Active' K_a	'At Rest' K_0
Sandy Soil	20	0.40	0.55
Extremely Low Strength Shale	22	0.25	0.35

For rock classes refer to Pells et al "Design Loadings for Foundations on Shale and Sandstone in the Sydney Region". Australian Geomechanics Journal 1978.

It is to be noted that the earth pressures in Table 1 assume a level surface above the structure, do not account for any surcharge loads and assume retaining structures are fully drained.

All retaining structures are to have sufficient back-wall drainage and be backfilled immediately behind the structure with free-draining material (such as gravel). This material is to be wrapped in a non-woven Geotextile fabric (i.e. Bidim A34 or similar), to prevent the drainage from becoming clogged with silt and clay. If no back-wall drainage is installed in retaining structures the full hydrostatic pressures are to be accounted for in the retaining structure design.

15. Foundations

The extensions for the house and proposed garage can be supported on spread footings taken to at least 0.4m below the surface into the Medium Dense Sand. The proposed pool is expected to be seated in the Dense Sand or better, which is suitable for the pool. A maximum allowable bearing pressure of 150kPa can be assumed for footings supported on the undisturbed Medium Dense Sands of the natural profile.

The proposed driveway can be supported directly off the surface materials after the topsoil has been stripped. Assume a maximum allowable bearing pressure of 100kPa for the near surface sands. The footing excavations in sand will need to be shored with form ply or similar to prevent batter collapse.

Footing walls in sand are to be shored with timber to prevent loose material falling onto the foundation surface. The base of the excavation should be compacted as the excavation will loosen the upper sands. This can be carried out with a hand-held plate compactor. Water may be used to assist in compaction in sand but footing materials should be kept damp but not saturated. As a guide to the level of compaction required a density index of >85% is to be achieved, correlating to a very dense sand.

NOTE: If the contractor is unsure of the footing material required, it is more cost effective to get the geotechnical consultant on site at the start of the footing excavation to advise on footing depth and material. This mostly prevents unnecessary over-excavation in clay like shaly rock but can be valuable in all types of geology.

16. Inspections

The client and builder are to familiarise themselves with the following required inspections as well as council geotechnical policy. We cannot provide geotechnical certification for the owner or the regulating authorities if the following inspections have not been carried out during the construction process.

- All footings are to be inspected and approved by the geotechnical consultant while the excavation equipment is still onsite and before steel reinforcing is placed or concrete is poured.
- The excavation face is to be inspected by the geotechnical consultant during the later stages of the excavation, but while the excavator and operator are still on site to ensure the ground materials are in line with our expectations and to ensure that no temporary support is required.

White Geotechnical Group Pty Ltd.

Ben White M.Sc. Geol.,
AusIMM., CP GEOL.
No. 222757
Engineering Geologist

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5:AH1 – Downhole is from top to bottom.

Important Information about Your Report

It should be noted that Geotechnical Reports are documents that build a picture of the subsurface conditions from the observation of surface features and testing carried out at specific points on the site. The spacing and location of the test points can be limited by the location of existing structures on the site or by budget and time constraints of the client. Additionally, the test themselves, although chosen for their suitability for the particular project, have their own limiting factors. The testing gives accurate information at the location of the test, within the confines of the test's capability. A geological interpretation or model is developed by joining these test points using all available data and drawing on previous experience of the geotechnical consultant. Even the most experienced practitioners cannot determine every possible feature or change that may lie below the earth. All of the subsurface features can only be known when they are revealed by excavation. As such, a Geotechnical report can be considered an interpretive document. It is based on factual data but also on opinion and judgement that comes with a level of uncertainty. This information is provided to help explain the nature and limitations of your report.

With this in mind, the following points are to be noted:

- If upon the commencement of the works the subsurface ground or ground water conditions prove different from those described in this report, it is advisable to contact White Geotechnical Group immediately, as problems relating to the ground works phase of construction are far easier and less costly to overcome if they are addressed early.

- If this report is used by other professionals during the design or construction process, any questions should be directed to White Geotechnical Group as only we understand the full methodology behind the report's conclusions.

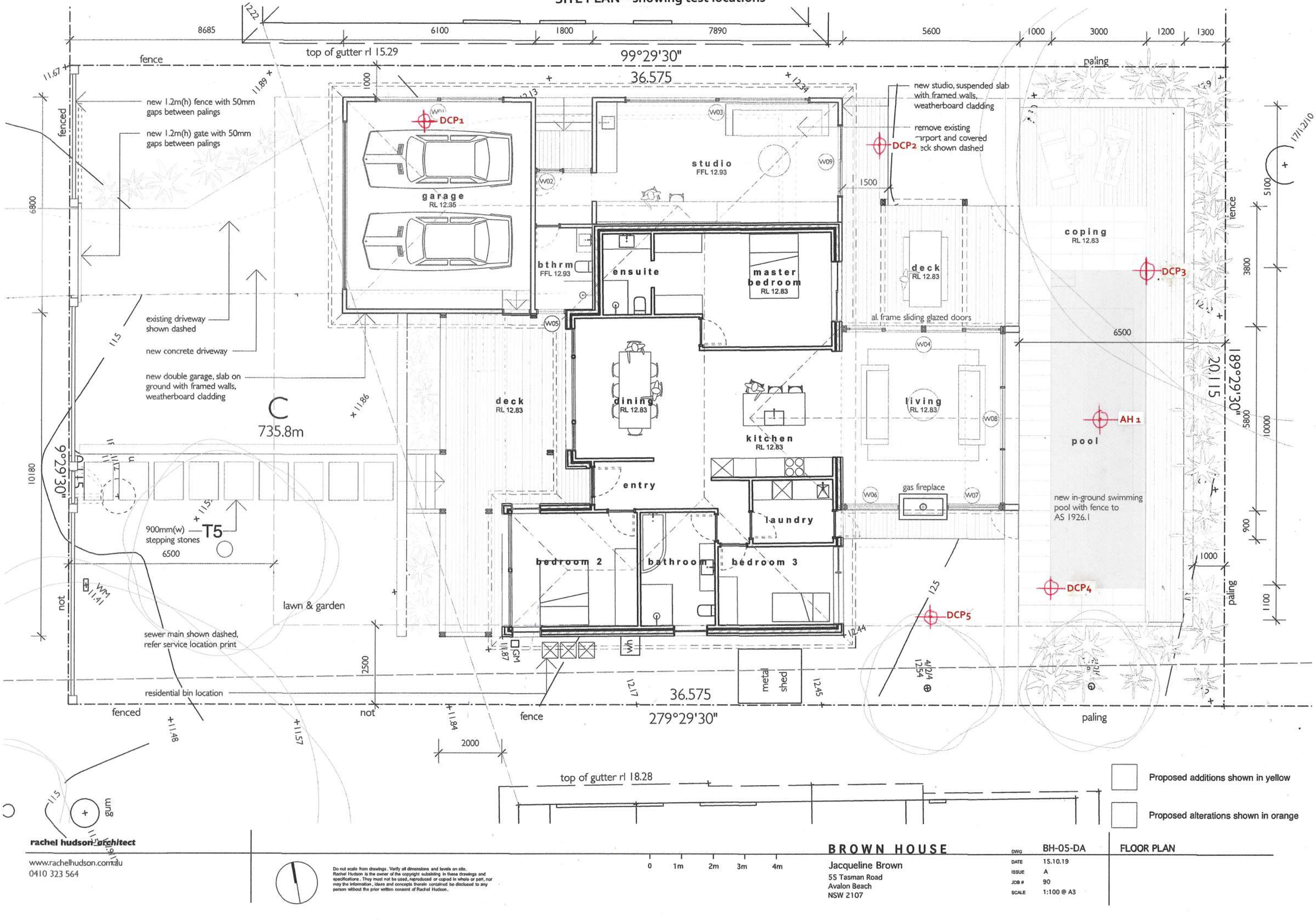
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

- This report should not be applied to any other project other than that outlined in section 1.0.

- This report is to be read in full and should not have sections removed or included in other documents as this can result in misinterpretation of the data by others.

- It is common for the design and construction process to be adapted as it progresses (sometimes to suit the previous experience of the contractors involved). If alternative design and construction processes are required to those described in this report, contact White Geotechnical Group. We are familiar with a variety of techniques to reduce risk and can advise if your proposed methods are suitable for the site conditions.

SITE PLAN – showing test locations



Proposed additions shown in yellow

Proposed alterations shown in orange

rachel hudson architect

www.rachelhudson.com.au
0410 323 564

0 1m 2m 3m 4m

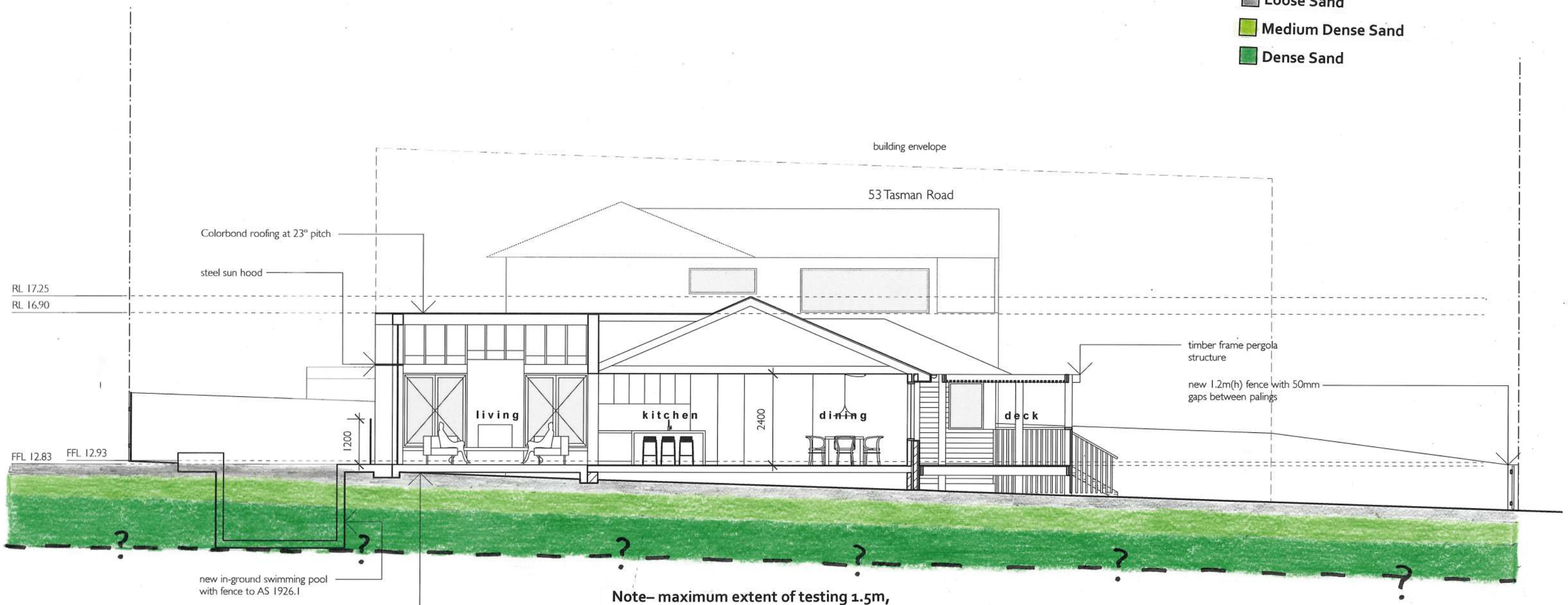
BROWN HOUSE

Jacqueline Brown
55 Tasman Road
Avalon Beach
NSW 2107

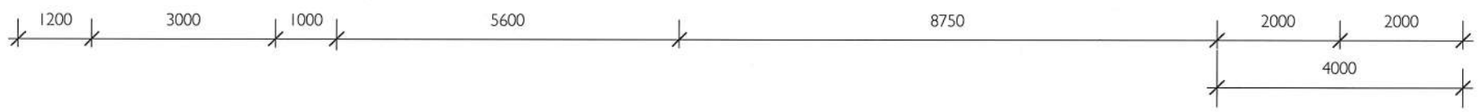
DWG	BH-05-DA
DATE	15.10.19
ISSUE	A
JOB #	90
SCALE	1:100 @ A3

FLOOR PLAN

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



Note– maximum extent of testing 1.5m, due to the high density of the sand.



rachel hudson *architect*

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0 1m 2m 3m 4m

BROWN HOUSE

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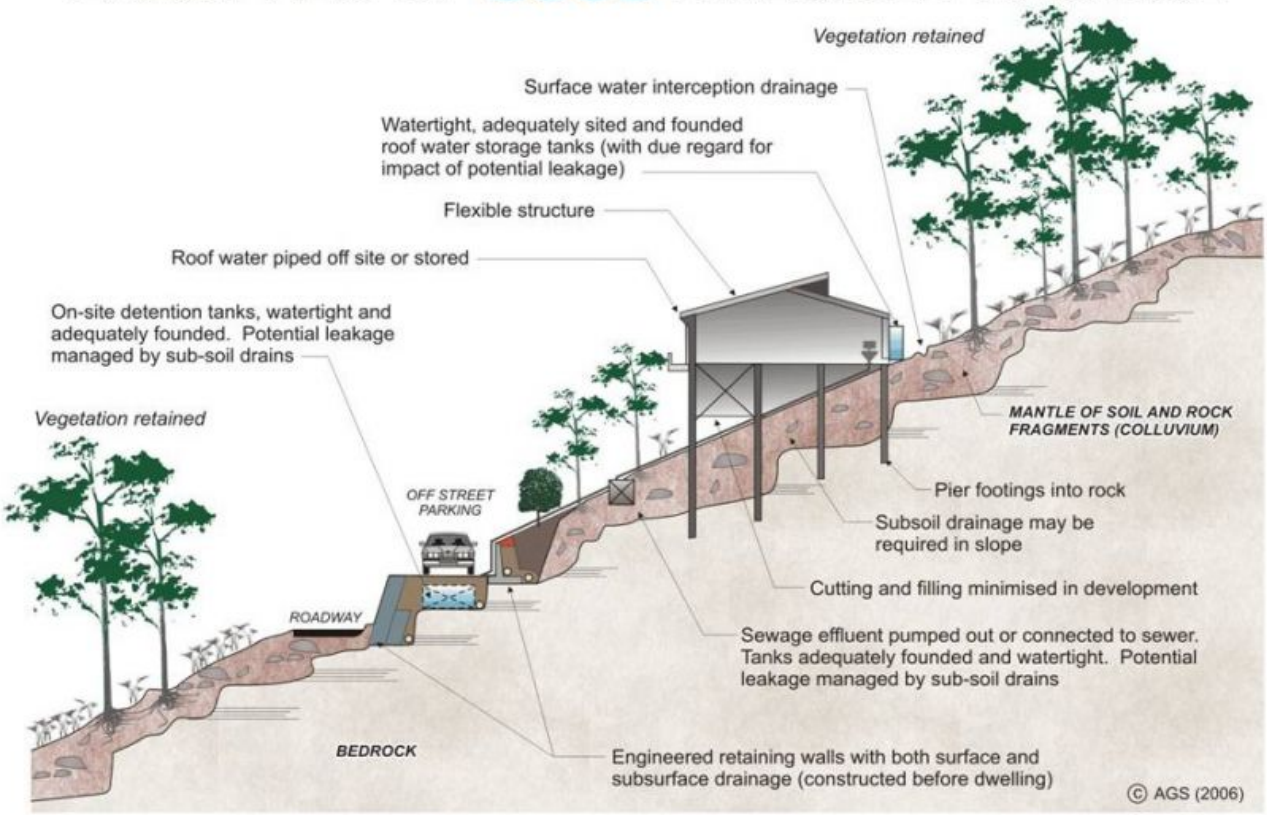
DWG	BH-12-DA
DATE	09.08.19
ISSUE	A
JOB #	90
SCALE	1:100 @ A3

SECTION BB

EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE