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

Development Application for _____
Name of Applicant

Address of site 10 Grandview Drive, Newport

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 5/8/19 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 **10 Grandview Drive, Newport**

Report Date: 5/8/19

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 10 Grandview Drive, Newport

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 **10 Grandview Drive, Newport**

Report Date: 5/8/19

Author: BEN WHITE

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

Please mark appropriate box

☒ Comprehensive site mapping conducted **31/7/19**
(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 **31/7/19**

☒ 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 **10 Grandview Drive, Newport**

1. Proposed Development

1.1 Extend existing 2nd story balcony 1m downhill.

1.2 Details of the proposed development are shown on 6 drawings by Open Plan Designz, drawings labelled A10TS, A10SPA, A10NP, A100 to A103 and dated 24/05/19.

2. Site Description

2.1 The site was inspected on the 31st July, 2019 and previously in 2012.

2.2 This residential property is on the low side of the road and has a NE aspect. The block is located on the steeply graded lower reaches of a hillslope. The natural surface falls steeply across the property at angles of ~20°. The slope below the property continues at similar grades before easing 30m below at the toe of the slope. The grade increases above the site before easing as Bilgola plateau is approached some 200m above the property.

2.3 A right of carriageway runs from the road and provides access to a double garage near the upper boundary of the property. The garage can be seen to be supported on sandstone block walls and steel posts (Photo 1). The owner had the original plans available at the time of the inspection and these show the slab is also supported on three piers behind the wall (Photo 2). The sandstone block walls show cracks on the downhill face that rise from the base of the wall between the mortar and step up the face (Photo 3). The cracking appears to be from settlement and potentially tree roots. The wall shows little deflection and has shown no significant signs of movement from the last inspection in 2012, as such the wall is considered stable. Rough cut concrete steps run down the slope to a path and the main entrance

of the house. Downhill of the carport the slope has been terraced using timber and brick retaining walls. The lower brick wall has a slight bow midway along it and has cracked at its S end due to the roots of a tree that has since been cut down (Photo 4).

2.4 The part two story house was built in the 1960's and is in good condition for its age. It is supported by brick walls and piers on concrete strip footings. A number of slightly tilting piers have been replaced subsequent to the previous inspection in 2012. The visible walls and piers stand vertical and show no signs of movement (Photo 5). A cut below the piers in the subfloor area is supported by a double brick retaining wall ~1.3m high. This wall is tilting at a maximum angle of ~5° and is significantly cracked (Photo 6). It does not appear to have moved since our last inspection in 2012 and has stood for some 50 years before that. However the wall is not constructed to current engineering standards and we recommend it be monitored after each extreme rainfall event or on an annual basis, whichever occurs first. If further movement is noted remedial works are to be carried out to bring the structure to current engineering standards.

2.5 Access downhill of the house is by concrete paths either side of the property. A deck extends off the downhill side of the house. Two of the brick piers supporting the deck have been replaced and all stand vertical (Photo 7). The proposed work will extend the upper stories deck and roof by 1m and replace the posts. Beyond the deck a lawn covered slope drops at steep angles to the lower boundary. No signs of slope instability were observed on the grounds.

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 Two 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. The results are as follows:

AUGER HOLE 1 (~RL25.0) **–** AH1 (Photo 8)

Depth (m)	**Material Encountered**
0.0 to 0.2	**TOP SOIL,** sandy soil, dark brown.
0.2 to 0.3	**SILTY SAND**, light brown, medium grained with shale fragments
0.3 to 0.4	**CLAY,** Light brown with mottled orange, friable

Refusal @ 0.4m. No watertable encountered.

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** (~RL25.0)	**DCP 2** (~RL25.0)
0.0 to 0.3	4	2
0.3 to 0.6	9	6
0.6 to 0.9	9	17
0.9 to 1.2	7	16
1.2 to 1.5	13	14
1.5 to 1.8	14	16
1.8 to 2.1	40	32
2.1 to 2.4	#	30
2.4 to 2.7		#
	End of Test @ 2.35m	End of Test @ 2.6m

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

DCP Notes:
DCP1 – Refusal @ 2.35m, bouncing, orange to white impact dust on dry tip.
DCP2 – End of test @ 2.6m, DCP still very slowly going down, maroon fragments on dry tip.

5. Geological Observations/Interpretation

The slope materials are colluvial at the near surface and residual at depth. In the location of the proposed works they consist of a manmade fill over sandy soil and sandy clays. In the test locations, the sandy clays merge into the weathered zone of the underlying shale at an average depth of ~1.8m below the current surface. The weathered zone is interpreted as Extremely Low Strength Shale. It is to be noted that this material can appear as a mottled stiff clay when it is cut up by excavation equipment. See 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 of the clay and rock and through the cracks in the rock. Due to the slope and elevation of the block, the water table in the location is expected to be many metres below the base of the proposed excavation.

7. Surface Water

No evidence of significant surface flows were observed on the property during the inspection. Normal sheet wash from the slope above will be intercepted by the street drainage system for Grandview Drive above.

8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed below or beside the property. The steep land surface that falls across the property and continues above is a potential hazard (**Hazard One**). The tilting double brick retaining wall under the house failing is a potential hazard **(Hazard Two).**

Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

HAZARDS	Hazard One	Hazard Two
TYPE	The steep land surface that falls across the property and continues above failing and impacting on the house and proposed development.	The tilting wall under the house failing.
LIKELIHOOD	'Unlikely' (10^{-4})	'Unlikely' (10^{-4})
CONSEQUENCES TO PROPERTY	'Medium' (15%)	'Medium' (30%)
RISK TO PROPERTY	'Low' (2×10^{-5})	'Medium' (2×10^{-4})
RISK TO LIFE	8.3×10^{-8}/annum	8.3×10^{-6}/annum
COMMENTS	'ACCEPTABLE' level of risk.	'TOLERABLE' level of risk. If the recommendations in **Section 2.4** are followed the risk moves to 'Acceptable'.

(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.

All stormwater generated from the roof extension can be piped through to the existing stormwater system.

11. Excavations.

Apart from those for footings, no excavations are required.

12. Foundations.

If the proposed addition is a flexible structure, and some movement in accordance with a 'Class M' site can be tolerated it can be supported on foundations embedded at least 0.6m from the downhill side of the footing. A maximum allowable bearing pressure of 200kPa can be assumed for footings on firm to stiff clay.

For better quality footings, or where little movement can be tolerated (i.e. the addition is of masonry construction) piers can be taken to Extremely Low Strength Shale. This material is expected at a maximum depth of ~1.8m below the current surface. A maximum allowable bearing pressure of 600kPa can be assumed for footings on Extremely Low Strength Shale.

Ideally, footings should be founded on the same footing material across the structure. Where the footing material changes across the structure construction joints or similar are to be installed to prevent differential settlement, where the structure cannot tolerate such movement.

It is recommended the footings be dug, inspected, and poured in quick succession (ideally the same day if possible). If the footings get wet, they will have to be drained and the soft wet layer of shale on the footing surface will have to be removed before concrete is poured.

If a rapid turnaround from footing excavation to the concrete pour is not possible, a sealing layer of concrete may be added to the footing surface after it has been cleaned.

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.

13. Inspections

The client and builder are to familiarise themselves with the following required inspection as well as council geotechnical policy. We cannot provide geotechnical certification for the owners and Occupation Certificate if the following inspection has 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 double brick tilting retaining wall under the house should be inspected after extreme rainfall events or annually, whichever occurs first.

White Geotechnical Group Pty Ltd.

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

Photo 1

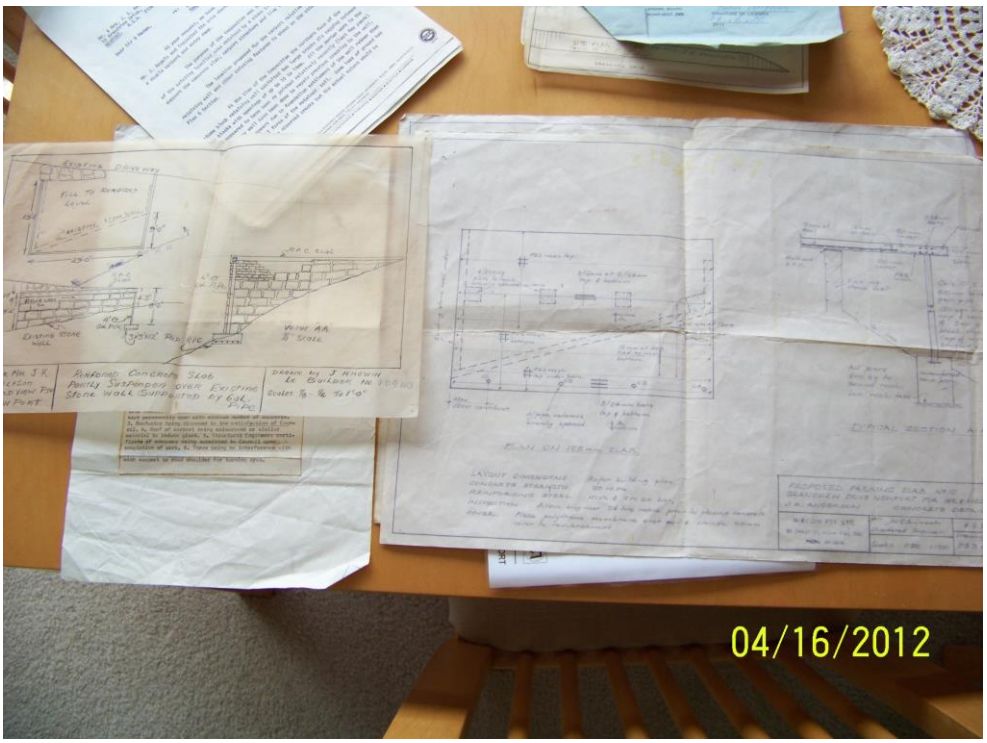


Photo 2

Photo 3

Photo 4

Photo 5

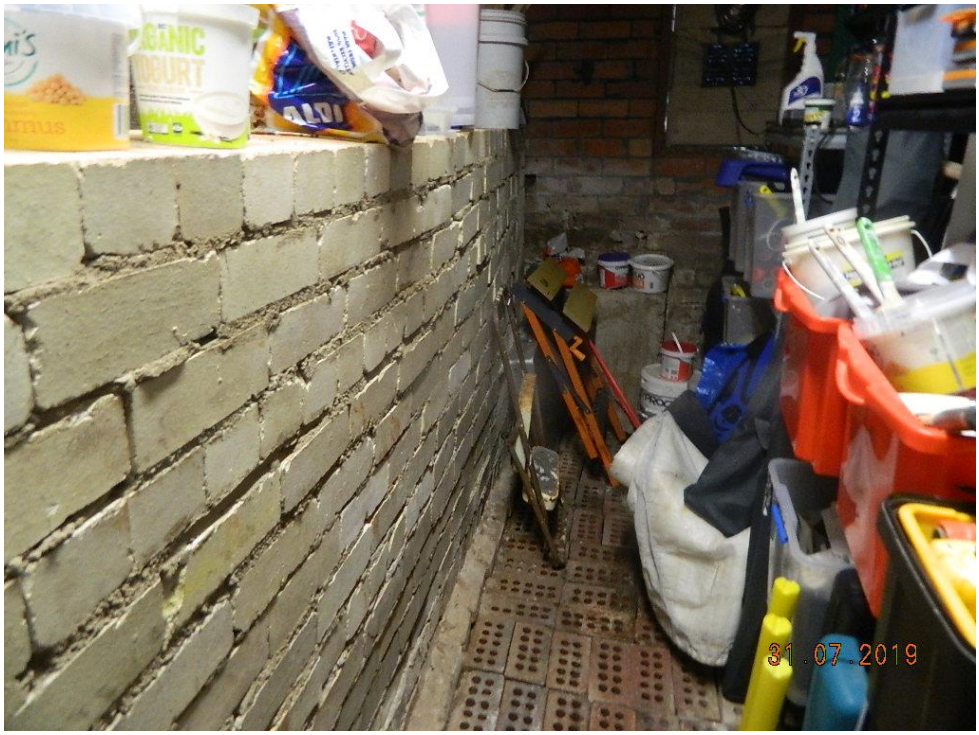


Photo 6

Photo 7

Photo 8 – Ah1

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.

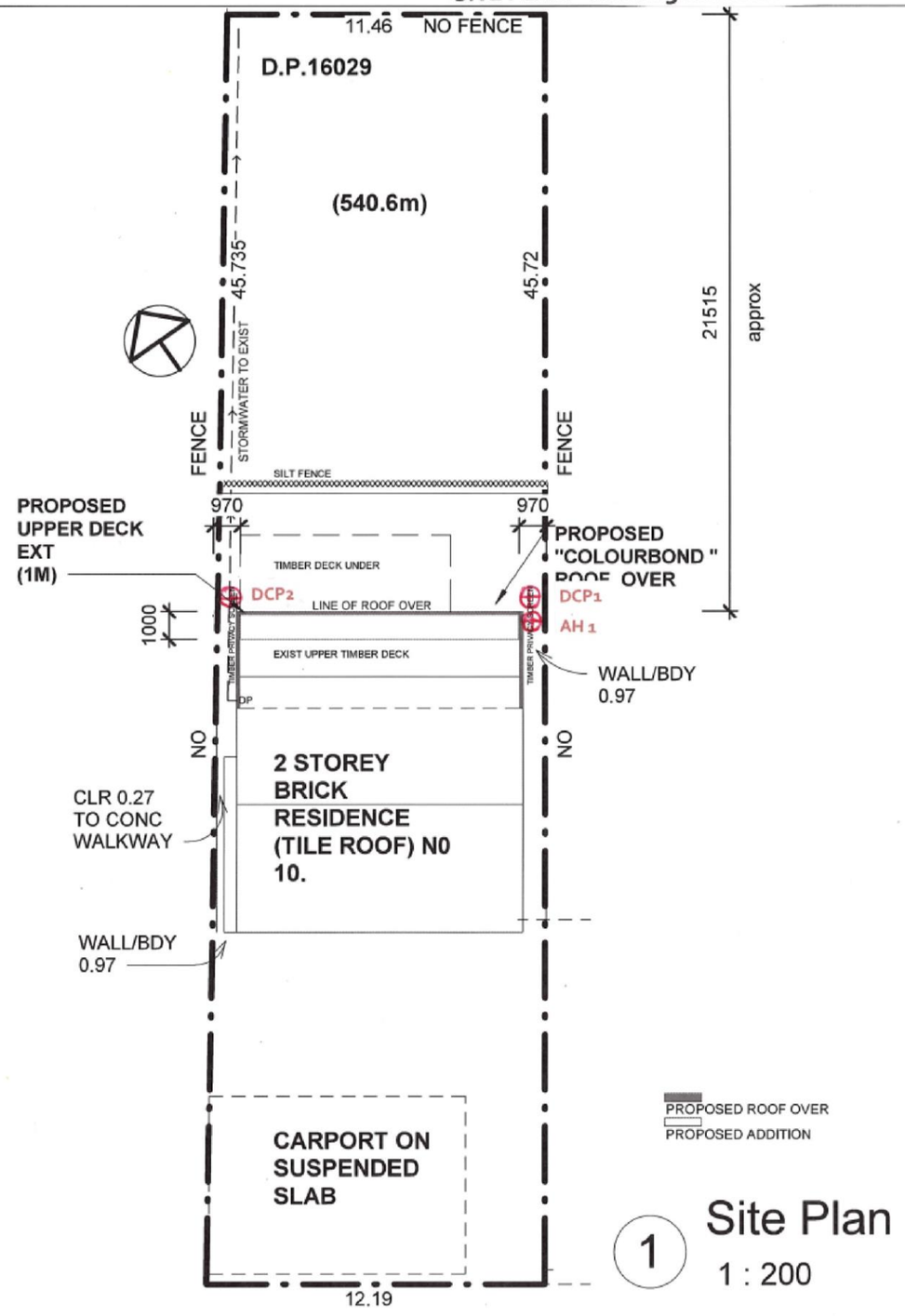
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

- 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.

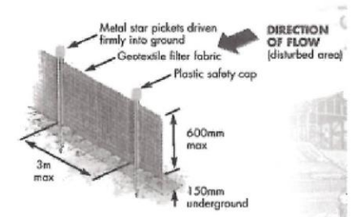
SITE PLAN – showing test locations



1 Site Plan
1 : 200

SEDIMENT FENCE INSTALLATION

Advantages. It is a simple strategy that is easily installed, shifted or removed. Sediment fences work well and, if maintained, will last for the duration of the construction stage.



Construction Notes

1. Construct sediment fences as close as possible to follow the contours of the site.
2. Drive 1.5 metre long posts into ground, maximum 3 metres apart.
3. Staple to 40 mm square hardwood posts or wire tied to steel posts.
4. Dig a 150 mm deep trench along the up-slope line of the fence for the bottom of the fabric to be entrenched.
5. Backfill trench over base of fabric and compact on both sides.

OPEN SPACE CALCULATION

TOTAL SITE AREA	**540.6 SQM**
EXISTING RESIDENCE	93 SQM
PROPOSED DECK EXT	10 SQM
PROPOSED ROOF OVER	29 SQM
OSC AND FSR UNCHANGED	

NOTES

* NO CUT AND FILL
* STORMWATER TO EXISTING
* NO TREES TO BE REMOVED

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ROBERT PAUL *Dip.Arch.Tech*

BUILDING DESIGNERS AUSTRALIA

OPEN PLAN DESIGNZ

ABN16 932 894 631

No.	Description	Date

PROPOSED ALTERATIONS
10 GRANDVIEW DRIVE
NEWPORT 2106
LOT: 96 DP: 16029
GRAHAME AND KIM WALLING

Site Plan and Analysis

Project number	10 Grandview NP	A10SPA	
Date	Issue Date		
Drawn by	Author		
Checked by	RP	Scale	1 : 200

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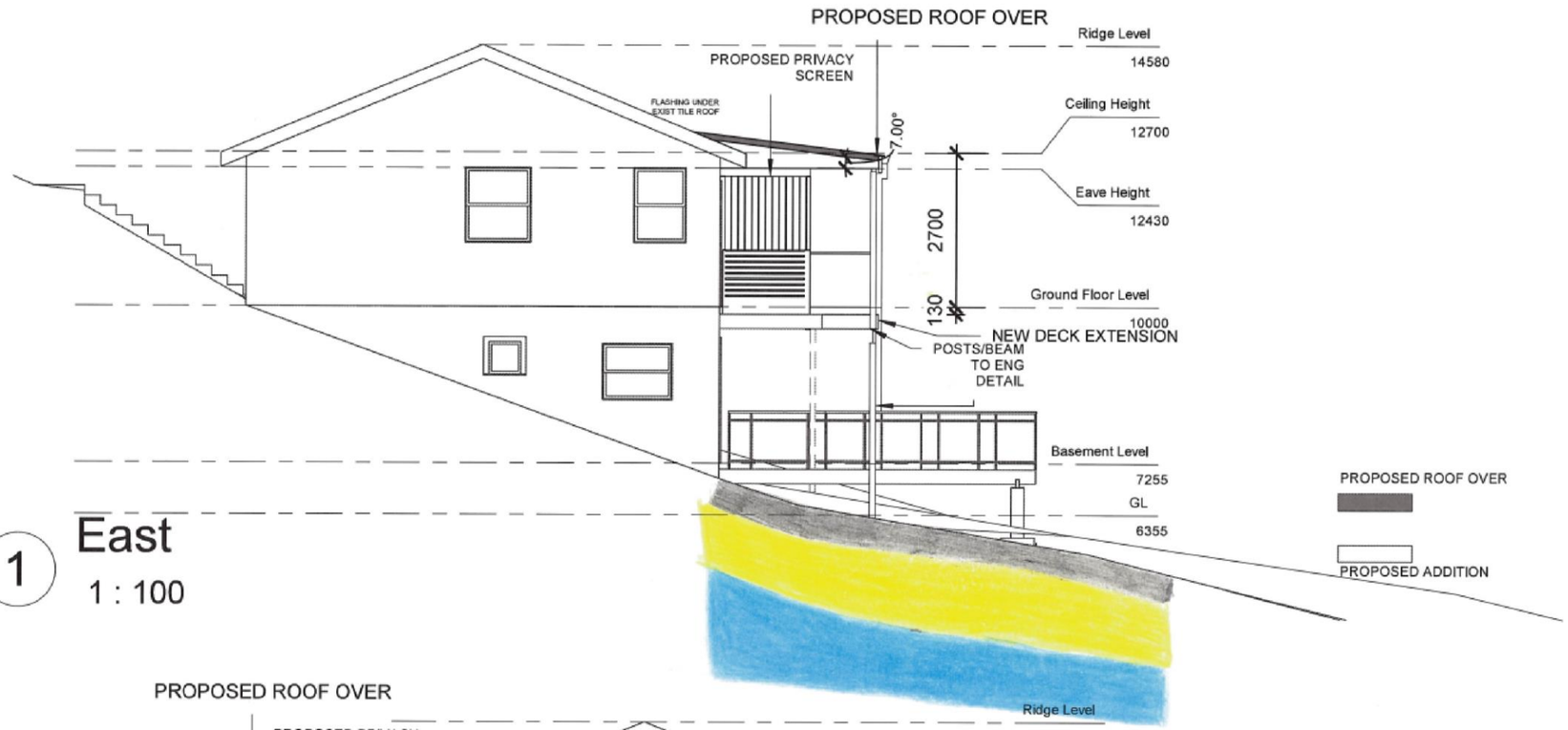
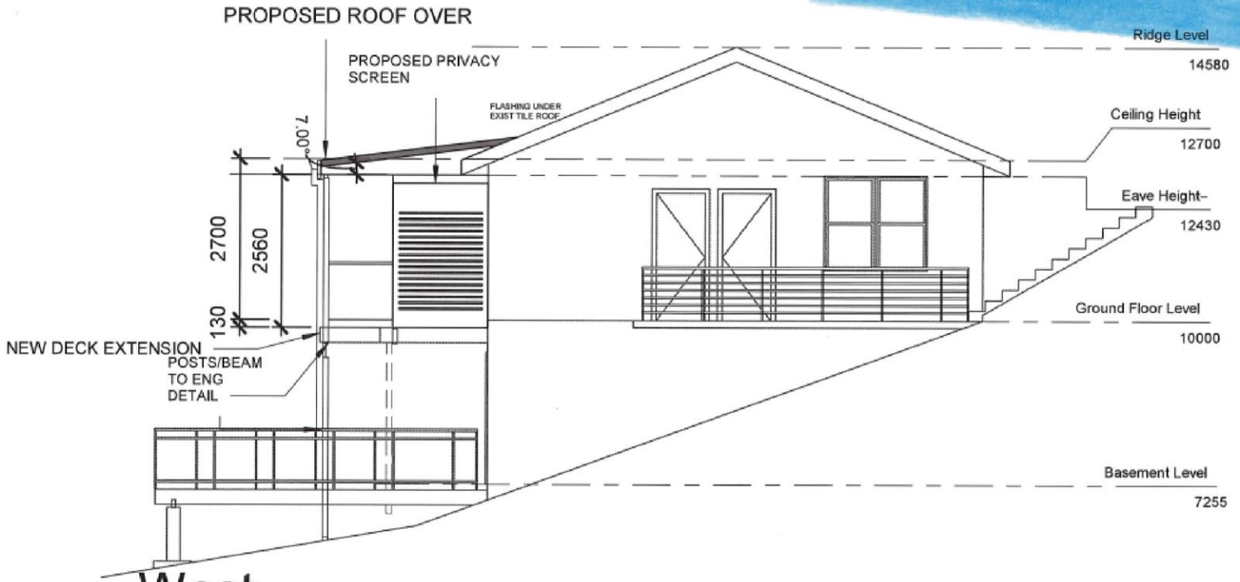
TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



1 East
1 : 100



2 West
1 : 100

- Fill
- Topsoil
- Firm to Stiff Clay
- Narrabeen Group Rocks – Very low to low Strength Shale - after being cut up by excavation equipment can resemble a stiff to hard clay.

ALL LEVELS NOMINATED ONLY

ROBERT PAUL *Dip.Arch.Tech*

bda BUILDING DESIGNERS AUSTRALIA

OPEN PLAN DESIGNZ

ABN16 932 894 631

No.	Description	Date

PROPOSED ALTERATIONS
10 GRANDVIEW DRIVE
NEWPORT 2106
LOT: 96 DP: 16029
GRAHAME AND KIM WALLING

Elevations East and West

Project number	10 Grandview NP	A102	
Date	Issue Date		
Drawn by	RP		
Checked by	RP	Scale	1 : 100

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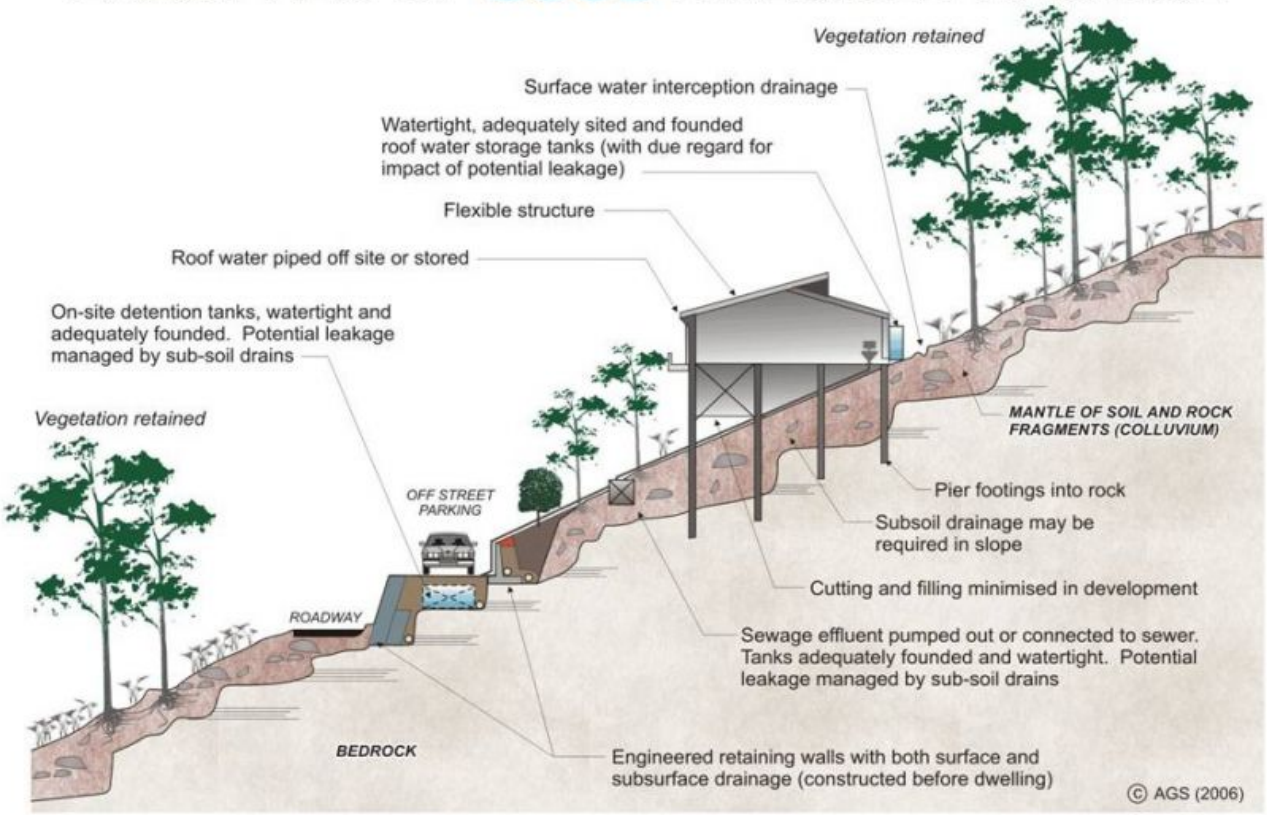
EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE