

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

Development Application for _____
Name of Applicant

Address of site 67 Marine Parade, 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 20/8/19 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 67 Marine Parade, Avalon

Report Date: 20/8/19

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	67 Marine Parade, 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 67 Marine Parade, Avalon
Report Date: 20/8/19
Author: BEN WHITE
Author's Company/Organisation: WHITE GEOTECHNICAL GROUP PTY LTD

Please mark appropriate box

- ☒ Comprehensive site mapping conducted 2/8/18
(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 3/8/18
- ☒ 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 67 Marine Parade, Avalon

1. Proposed Development

- 1.1** Extend the uphill side of the house.
- 1.2** Construct a new first floor addition.
- 1.3** Details of the proposed development are shown on 16 drawings by Sketch Arc, Project number 1816, drawings numbered DA3 to 11 and 13 to 19, dated 2/8/19.

2. Site Description

- 2.1** The site was inspected on the 10th July, 2019, and previously on the 2nd August, 2018.
- 2.2** This residential property is on the high side of the road and has a W aspect. It is located on the steeply graded lower reaches of a hillslope. The slope rises across the site at an average angle of ~16°. The slope above eases to a sea cliff that drops at near-vertical angles along the upper boundary. The slope below the property eases to moderate angles.
- 2.3** At the road frontage, a concrete driveway runs up the slope to a garage on the downhill side of the house (Photo 1). A dimensioned sandstone block wall up to 2.5m high runs E-W and retains a cut for the driveway (Photo 2). A shallow fill has been added for a lawn area above the cut and is supported by a ~0.6m dimensioned sandstone block wall on its downhill side (Photo 3). Both walls appear well-constructed. The single-storey brick and clad house is supported on brick walls and brick piers (Photo 4). No significant signs of movement were observed in its supporting brick walls or brick piers. A cut has been made into the slope on the uphill side of the

house (Photo 5). The ~3.0m high cut face is through Medium Strength Sandstone that is jointed but considered stable. Small stone walls have been constructed in various locations about the vertical cut face as planter boxes (Photo 6). The slope above consists of outcropping sandstone bedrock that extends to the upper boundary and the cliff edge.

3. Geology

The Sydney 1:100 000 Geological sheet indicates the site is underlain by the Newport Formation of the Narrabeen Group. There is an unusually thick band of sandstone encompassing the steep slope above the house that extends through the otherwise shale-dominated profile.

4. Subsurface Investigation

One auger hole was put down to identify the soil materials. Four Dynamic Cone Penetrometer (DCP) tests were put down to determine the relative density of the overlying soil and the depth to 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 (~RL36.71) – AH1 (Photo 9)

Depth (m)	Material Encountered
0.0 to 0.1	SANDY SOIL , brown, fine to coarse grained with fine trace organic matter, dry.
0.1 to 0.2	SANDY CLAY , orange/brown, fine to medium grained, trace organic matter, dry.
0.2 to 0.9	SANDY CLAY , orange, fine to medium grain, rock fragments with sandstone fragments from grinding auger at base.

End of hole @ 0.9m in weathered sandstone. 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 (~RL36.71)	DCP 2 (~RL36.0)	DCP 3 (~RL34.2)	DCP 4 (~RL34.2)
0.0 to 0.3	6	19	20	10
0.3 to 0.6	8	#	6	#
0.6 to 0.9	15		#	
0.9 to 1.2	12			
1.2 to 1.5	14			
1.5 to 1.8	12			
1.8 to 2.1	20			
2.1 to 2.4	20			
2.4 to 2.7	25			
2.7 to 3.0	23			
3.0 to 3.3	24			
3.3 to 3.6	28			
3.6 to 3.9	#			
	End of test @ 3.6m	Refusal on rock @ 0.3m	Refusal on rock @ 0.6m	Refusal on rock @ 0.3m

#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 @ 3.6m, DCP still very slowly going down.

DCP2 – Refusal on rock @ 0.3m, DCP bouncing off rock surface, orange impact dust on dry tip.

DCP3 – Refusal @ 0.6m, DCP bouncing off rock surface, white impact dust on dry tip.

DCP4 – Refusal @ 0.3m, DCP bouncing off rock surface, orange impact dust on dry tip.

5. Geological Observations/Interpretation

Sandstone bedrock outcrops at the sea cliff face to the E of the property and is visible outcropping down the slope to the house (Photo 7). This is an unusually thick sandstone bed

within the Narrabeen Group of rocks. The rock is overlain by natural sandy soils and sandy clays. In the test locations, rock was encountered at depths of between 0.3 to 3.3m due to the presence of fill (DCP1), but more so the variable and stepped nature of the rock. The bedrock underlying the area of the proposed development is expected to be variably ranging from very low strength to medium strength. 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 rock and through the cracks. 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. As the property encompasses the crest of the hill, any surface flows will be generated on the property and will flow away from the property.

8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed above or beside the property. The moderately graded slope that falls across the property and continues below is a potential hazard (**Hazard One**).

Risk Analysis Summary

HAZARDS	Hazard One
TYPE	The moderate slope that falls across the property and continues below failing and impacting on the property.
LIKELIHOOD	'Unlikely' (10^{-4})
CONSEQUENCES TO PROPERTY	'Medium' (20%)
RISK TO PROPERTY	'Low' (2×10^{-5})
RISK TO LIFE	8.3×10^{-7} /annum
COMMENTS	'ACCEPTABLE' level of risk to life & property.

(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

There is fall to Marine Parade. Roof water from the proposed development is to be piped to the street drainage system through any tanks that may be required by the regulating authorities.

11. Excavations

Apart from those for footings, no excavations are required.

12. Foundations

Shallow piers supported directly off Medium Strength Sandstone are suitable footings for the proposed extension. This ground material is exposed across the uphill side of the property and is expected at shallow depths where the rock is not exposed. A maximum allowable bearing pressure of 800kPa can be assumed for footings on Medium Strength Sandstone.

Naturally occurring vertical cracks (known as joints) commonly occur in sandstone. These are generally filled with soil and are the natural seepage paths through the rock. They can extend to depths of several metres and are usually relatively narrow but can range between 0.1 to 0.8m wide. If a footing falls over a joint in the rock, the construction process is simplified if with the approval of the structural engineer the joint can be spanned or alternatively the footing can be repositioned so it does not fall over the joint.

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. Coastal Bluff/Cliff Stability

The vertical sea cliff on the upper boundary of the property falls from elevations of ~RL51.0 to ~RL5.0 to a rock platform below (Photos 10). The rock platform extends ~45m to the ocean line and has a covering of dislodged joint blocks. The proposed extension will be at a horizontal distance of ~27m from the base of the sea cliff. The lowest elevation of the piers for the proposed extension is expected to be ~RL38.0 so are some 33m above the base of the cliff.

Considering the large width of the rock platform, the large volume of armouring sandstone rubble at the cliff base, and distance and elevation to the proposed works, the current accepted predicted sea level rise for the next century is not expected to lead to significant undercutting that could impact the proposed works.

14. Inspections

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

- All footings are to be inspected and approved by the geotechnical professional while the excavation equipment is still onsite and before steel reinforcing is placed or concrete is poured.

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

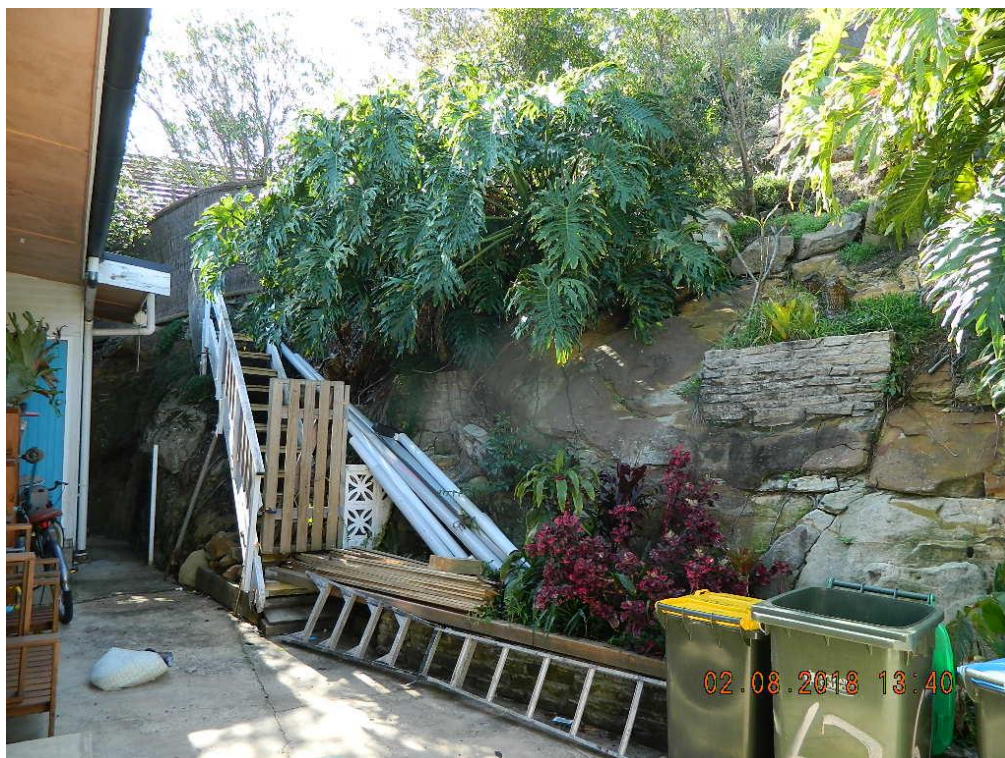


Photo 5

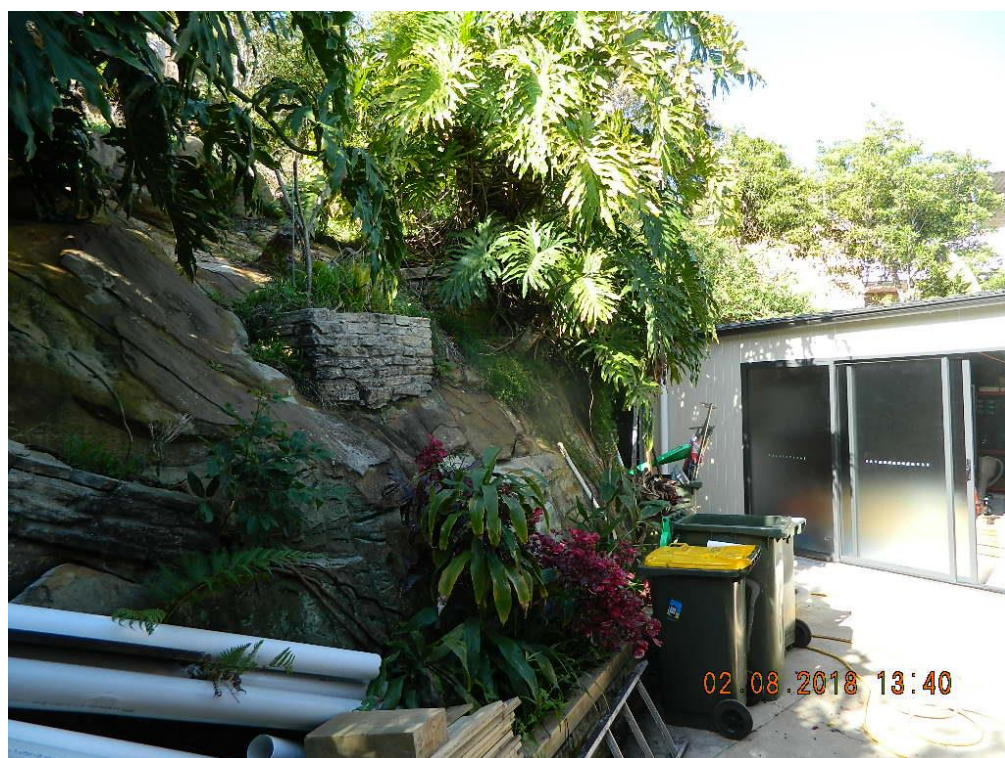


Photo 6



Photo 7



Photo 8



Photo 9: AH1 – Downhole is top to bottom



Photo 10

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.

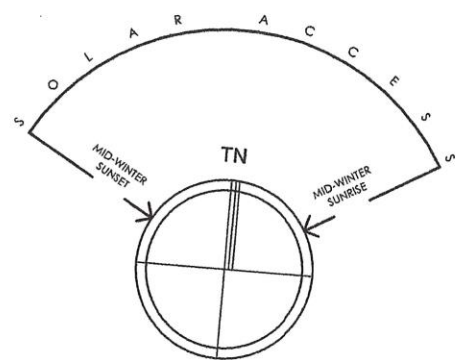
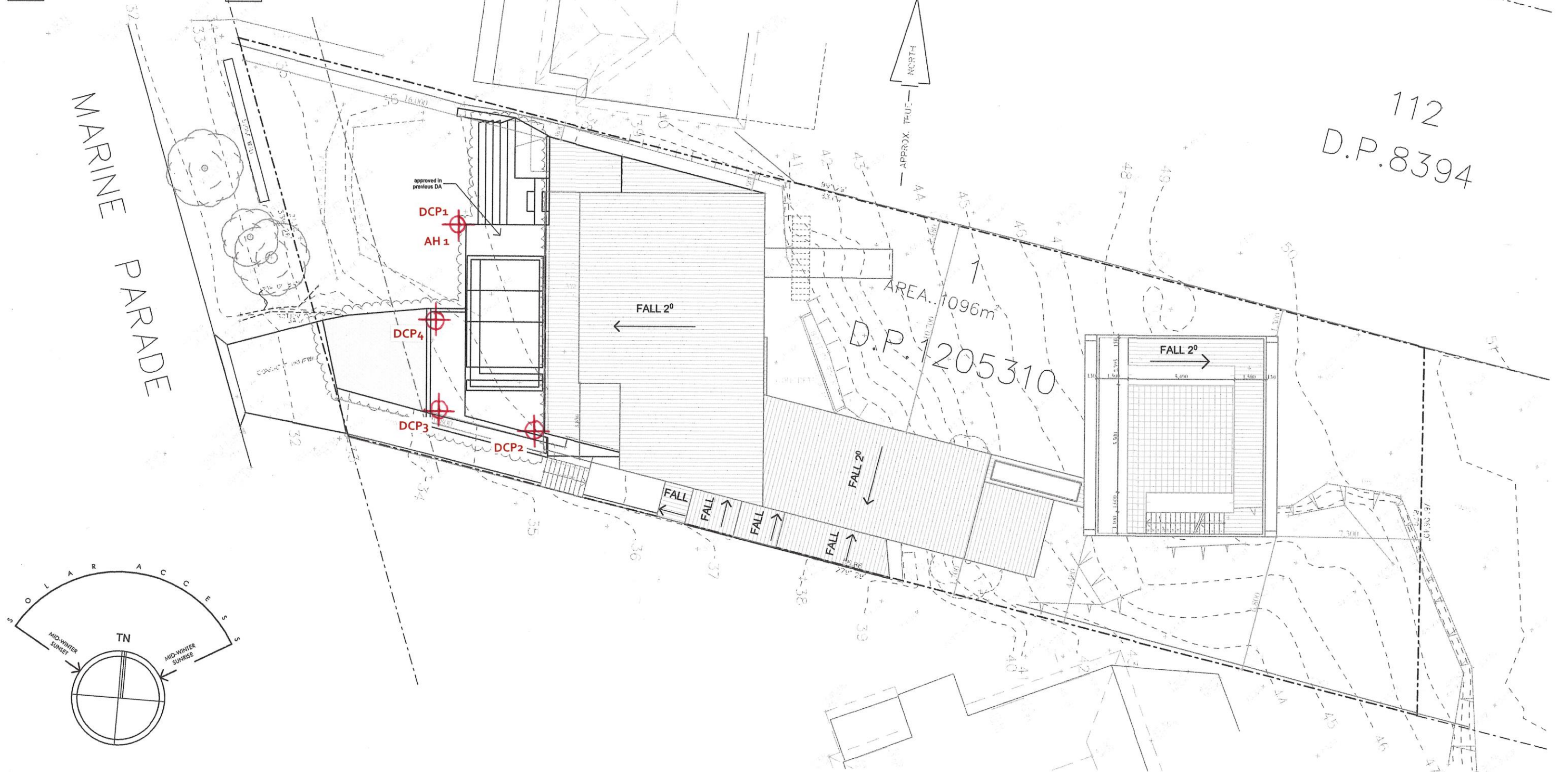
With this in mind, the following points are to be noted:

- 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.

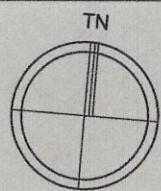
LEGEND

	PROPOSED		EXISTING LEVELS
	PRIVATE OPEN SPACE (EXISTING)		CAR ENTRY POINT
	EXISTING DWELLING		HARDSTAND AREA
	MATERIAL STOCKPILE		BOUNDARY
			WASTE MANAGEMENT



Site Analysis Plan
1:200

sketchArc



DO NOT SCALE DRAWINGS. CHECK ALL DIMENSIONS ON SITE.
FIGURED DIMENSIONS TAKE PRECEDENCE.
The builder shall check and verify all dimensions and verify all errors and omissions to the Architect. Do not scale the drawings.
Drawings shall not be used for construction purposes until issued by the Architect for construction.

REV	DATE	DESCRIPTION

sketchArc
Po Box 377 Manly 1655
m : 0422 521 871
e : power@sketcharc.com.au
w : www.sketcharc.com.au

PROJECT: 67 Marine Pde, Avalon, 2107,
NSW
Additions & Alterations
LOT 1 in DP1205310 - 1096m2

CLIENT:
Private

	Proposed Work
	Demolition
	Existing

STATUS: DA Draft		
DATE: 020819	SCALE: 1:100@A3	PROJECT NUMBER: 1816
STAGE: DA Draft	DRAWN/DESIGNED: PB / MP	
DRAWING NO: DA3		

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials

RL +53,335
Parapet

RL +50,335
Third Floor

RL +46,840
Parapet

RL +43,680
First Floor

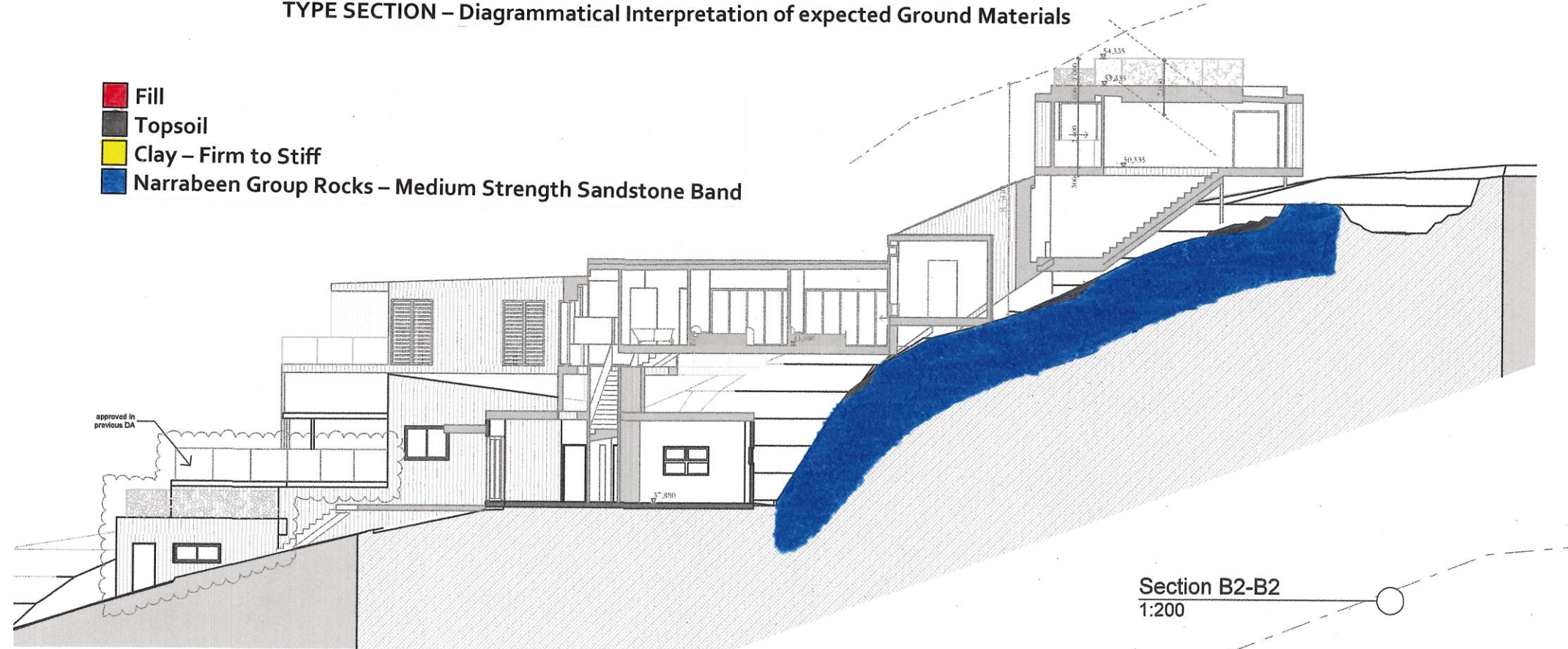
RL +42,660
Existing Ridge

RL +38,570
Ground Floor

RL +34,155
Garage Floor

- Fill
- Topsoil
- Clay – Firm to Stiff
- Narrabeen Group Rocks – Medium Strength Sandstone Band

approved in
previous DA



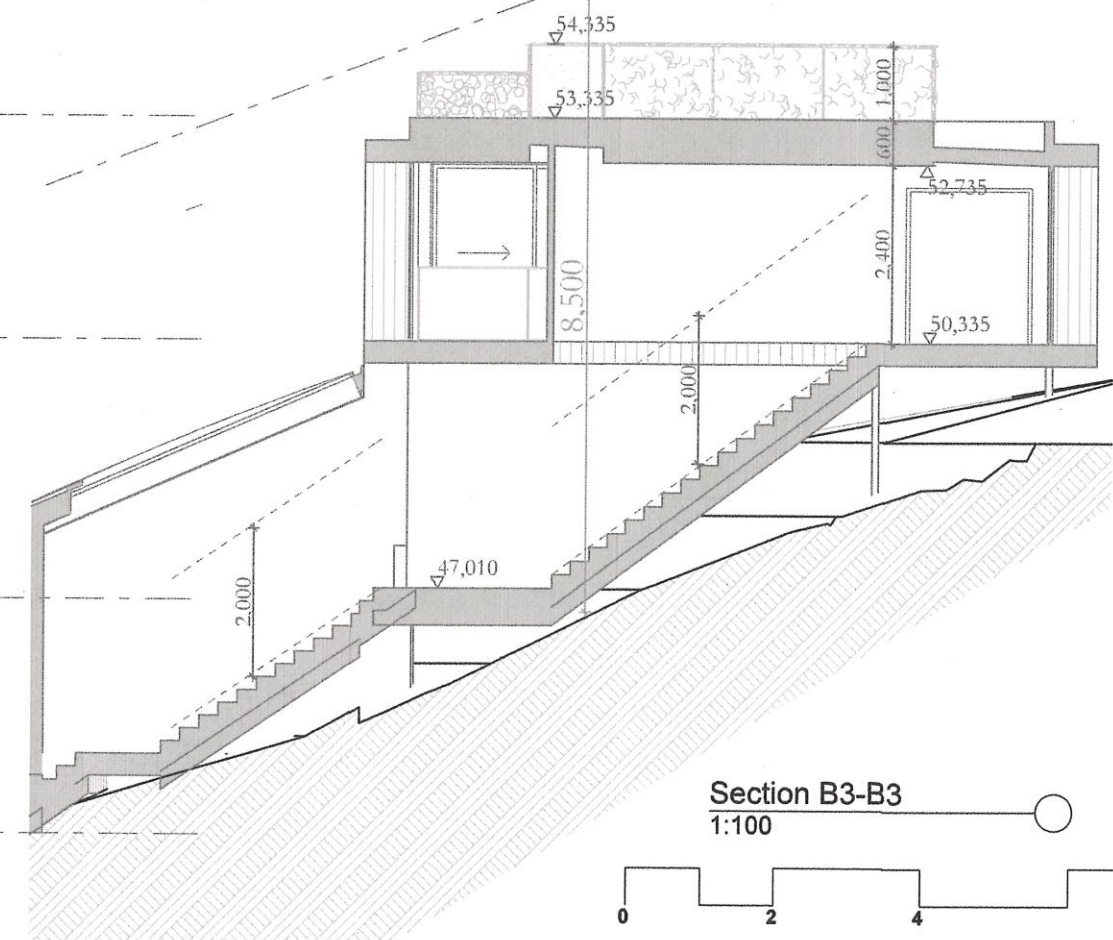
Section B2-B2
1:200

RL +53,335
Parapet

RL +50,335
Third Floor

RL +46,840
Parapet

RL +43,680
First Floor



Section B3-B3
1:100

sketchArc

DO NOT SCALE DRAWINGS. CHECK ALL DIMENSIONS ON SITE.
FIGURED DIMENSIONS TAKE PRECEDENCE.
The builder shall check and verify all dimensions
and verify all errors and omissions to the
Architect. Do not scale the drawings.
Drawings shall not be used for construction
purposes until issued by the
Architect for construction.

REV	DATE	DESCRIPTION

sketchArc
Po Box 377 Manly 1655
m : 0422 521 871
e : power@sketcharc.com.au
w : www.sketcharc.com.au

PROJECT: 67 Marine Pde, Avalon, 2107,
NSW
Additions & Alterations
LOT 1 in DP1205310 - 1096m2

CLIENT:
Private

- Proposed Work
- Demolition
- Existing

STATUS:
DA Draft

DATE: 020819	SCALE: 1:100@A3	PROJECT NUMBER: 1816
STAGE: DA Draft	DRAWN/DESIGNED: PB / MP	ISSUE:
DRAWING NO: DA15		

EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE

