

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

Development Application for \_\_\_\_\_  
Name of Applicant

Address of site 1 Livistona Lane, Palm Beach

*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 28/4/25 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 1 Livistona Lane, Palm Beach

Report Date: 23/4/25

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

MScGEOL AIG., RPGeo

Membership No.

10306

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	<u>1 Livistona Lane, Palm Beach</u>

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 <u>1 Livistona Lane, Palm Beach</u>
Report Date: <u>23/4/25</u>
Author: <u>BEN WHITE</u>
Author's Company/Organisation: <u>White Geotechnical Group Pty Ltd</u>

**Please mark appropriate box**

- ☒ Comprehensive site mapping conducted 23/4/25  
(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 23/4/25
- ☒ 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 MScGEOL AIG., RPGeo  
Membership No. 222757  
Company White Geotechnical Group Pty Ltd



## **GEOTECHNICAL INVESTIGATION:**

### **New Decking at 1 Livistona Lane, Palm Beach**

#### **1. Proposed Development**

- 1.1** Demolish and replace the existing decking around the house and construct a new awning and pergola above.
- 1.2** Details of the proposed development are shown on 8 drawings prepared by AF Design, Project number 250106, drawings numbered A001 to A008. All revision A. All dated 10/04/25.

#### **2. Site Description**

- 2.1** The site was inspected on the 23<sup>rd</sup> April, 2025.
- 2.2** This residential property is on the high side of the road and has a NE aspect. It is located on the moderate to steeply graded middle-upper reaches of a hillslope. The natural slope below the house rises moderately at an average angle of  $\sim 16^\circ$  before increasing at steep angles to the upper common boundary at angles of  $\sim 24^\circ$ . The slope above the property increases in grade. The slope below the property decreases in grade.
- 2.3** At the road frontage, a concrete driveway runs up and across the slope to a carport between the road frontage and the house (Photo 1). Cuts and fills for the driveway and landscaping in this location are terraced in stable retaining walls of dry stack stone composition reaching  $\sim 1.0\text{m}$  high. A cut for the carport on the uphill side is supported by stable retaining walls of mortared and dry stack sandstone, and concrete crib construction reaching  $\sim 1.8\text{m}$  high (Photo 2). Cracking through the mortar was observed in some locations (Photo 2). To maintain ongoing stability, these walls require occasional maintenance which may involve re-mortaring/restacking. Fill

for formwork for the concrete terrace between the carport and the house is supported by a stable brick retaining wall reaching ~1.6m high (Photo 3). The part three-story timber clad house is supported on brick walls. No significant signs of movement were observed in the visible supporting walls. A cut for the ground floor of the house has been taken through Low to Medium Strength Sandstone which outcrops and steps up the slope (Photo 4). Similar strength rock was also observed in a cut face on the S neighbouring property (Photo 5). The outcropping rock was observed to be free from significant geological defects that could affect its stability. The steeply graded slope between the uphill side of the house and the uphill common boundary is a terraced garden (Photo 6). The terraces are supported by retaining walls of sandstone block, sandstone flagging and mortared sandstone construction reaching up to ~1.8m high (Photo 7). Some of these walls have been constructed with a tilt back into the slope. Cracking through the mortar was observed in places. However, these walls are also considered stable subject to ongoing maintenance.

### **3. Geology**

The Sydney 1:100 000 Geological Sheet indicates the site is underlain by Hawkesbury Sandstone. It is described as a medium to coarse grained quartz sandstone with very minor shale and laminite lenses.

### **4. Subsurface Investigation**

One hand Auger Hole (AH) was put down to identify the soil materials. Seven Dynamic Cone Penetrometer (DCP) tests were put down to determine the relative density of the overlying soil and the depth to bedrock. The locations of the tests are shown on the site plan attached. 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 have been an issue for this site. But due to the possibility that the actual ground conditions vary from our interpretation there should be allowances in

the excavation and foundation budget to account for this. We refer to the appended “Important Information about Your Report” to further clarify. The results are as follows:

## AUGER HOLE 1 (~RL38.1) – AH1 (Photo 8)

Depth (m)	Material Encountered
0.0 to 0.4	<b>TOPSOIL</b> , clayey soil, brown, Very Soft to Soft, damp, fine to coarse grained, sandstone fragments included.

Refusal @ 0.4m on rock. Auger grinding. No water table 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 (~RL34.5)	DCP 2 (~RL38.1)	DCP 3 (~RL35.3)	DCP 4 (~RL35.3)	DCP 5 (~RL37.2)	DCP 6 (~RL39.0)	DCP 7 (~RL40.0)
0.0 to 0.3	14	2	10	5	Rock Exposed at Surface	Rock Exposed at Surface	Rock Exposed at Surface
0.3 to 0.6	7	4	#	#			
0.6 to 0.9	6	#					
0.9 to 1.2	20						
1.2 to 1.5	#						
1.5 to 1.8							
	Refusal on Rock @ 1.1m	Refusal on Rock @ 0.4m	Refusal on Rock @ 0.2m	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 – Refusal on Rock @ 1.1m, DCP bouncing off rock surface, white impact dust on dry tip, yellow and grey sandy clay in collar above tip.

DCP2 – Refusal on Rock @ 0.4m, DCP bouncing off rock surface, white impact dust on dry tip, yellow and grey sandy clay in collar above tip.

DCP3 – Refusal on Rock @ 0.2m, DCP bouncing off rock surface, white impact dust on dry tip.

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

DCP5 – Very Low to Medium Strength Sandstone exposed at cut for house.

DCP6 – Medium Strength Sandstone exposed at surface.

DCP7 – Medium Strength Sandstone exposed at surface.

## 5. Geological Observations/Interpretation

The surface features of the block are controlled by the outcropping and underlying sandstone bedrock that steps up the property forming sub-horizontal benches between the steps. Where the grade is steeper, the steps are larger and the benches narrower. Where the slope eases, the opposite is true. Where the rock is not exposed, it is overlain by shallow soils over clays that fill the bench step formation. Filling has been placed above and below the house for landscaping to a height of ~1.8m. In the test locations, where the rock is not exposed, it was encountered at depths of between 0.2m to 1.1m below the current surface, being slightly deeper due to the presence of fill and the stepped nature of the underlying bedrock. The outcropping sandstone on the property is estimated to be Medium Strength, with some areas of Low Strength Rock. This material was exposed in a cut face on the S neighbouring property at the time of inspection (Photo 5). Medium Strength Sandstone is expected to underlie the proposed works, as all the DCP tests bounced at refusal. 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 site elevation, the water table is expected to be many metres below the proposed works.

## 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. This will move down the slope at a relatively high velocity due to the steep slope.

Should the owners be aware, or if at a later time, become aware that overland flows enter the property during prolonged heavy rainfall, our office is to be contacted so appropriate

drainage advice can be provided and drainage installed to intercept the flows. It is a condition of the risk assessment in **Section 8** that this be done.

## 8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed beside the property. The moderate to steeply graded slope that rises across the property increasing in grade above and decreasing in grade below is a potential hazard (**Hazard One**).

### Risk Analysis Summary

HAZARDS	Hazard One
TYPE	The moderate to steeply graded slope that rises across the property and continues above at increasing angles and below at decreasing angles failing and impacting on the proposed works.
LIKELIHOOD	'Unlikely' ( $10^{-4}$ )
CONSEQUENCES TO PROPERTY	'Medium' (15%)
RISK TO PROPERTY	'Low' ( $2 \times 10^{-5}$ )
RISK TO LIFE	$9.1 \times 10^{-7}$ /annum
COMMENTS	This level of risk is 'ACCEPTABLE', provided the recommendations in <b>Section 7 &amp; 14</b> are 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

The fall is to Livistona Lane. Roof water from the 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. Site Classification

The site classification is Class A in accordance with AS2870-2011.

## 13. Foundations

Any new footings for the proposed decking may be supported on pads or piers taken to Medium Strength Sandstone or better. Where this material is not exposed, it is expected at depths of between ~0.2m and ~1.1m below the current surface. Where footings are over an exposed sloping rock surface, they may be supported off level pads cut or formed on the rock surface and fixed with suitable bar grouted / epoxied 0.4m into the rock.

A maximum allowable bearing pressure of 1000kPa 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.

## 14. Site Maintenance/Remedial Works

Where slopes approach or exceed 20°, such as on this site, it is prudent for the owners to occasionally inspect the slope (say annually or after heavy rainfall events, whichever occurs



first). Should any of the following be observed: movement or cracking in retaining walls, cracking in any structures, cracking or movement in the slope surface, tilting or movement in established trees, leaking pipes, or newly observed flowing water, or changes in the erosional process or drainage regime, then a geotechnical consultant should be engaged to assess the slope. We can carry out these inspections upon request. The risk assessment in **Section 8** is subject to this site maintenance being carried out.

## 15. Geotechnical Review

The structural plans are to be checked and certified by the geotechnical engineer as being in accordance with the geotechnical recommendations. On completion, a Form 2B will be issued. This form is required for the Construction Certificate to proceed.

## 16. Inspections

The client and builder are to familiarise themselves with the following required inspection as well as council geotechnical policy. We cannot provide certification for the Occupation Certificate or the owner 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 and contractors are still onsite and before steel reinforcing is placed or concrete is poured.

White Geotechnical Group Pty Ltd.

Reviewed By:



Nathan Gardner B.Sc. (Geol. & Geophys. & Env. Stud.)  
AIG., RPGeo Geotechnical & Engineering.  
No. 10307  
Engineering Geologist & Environmental Scientist.



Ben White M.Sc. Geol.,  
AIG., RPGeo Geotechnical & Engineering.  
No. 10306  
Engineering Geologist.



Photo 1





Photo 2



Photo 3





Photo 4



Photo 5





Photo 6



Photo 7





Photo 8 – downhole is 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.

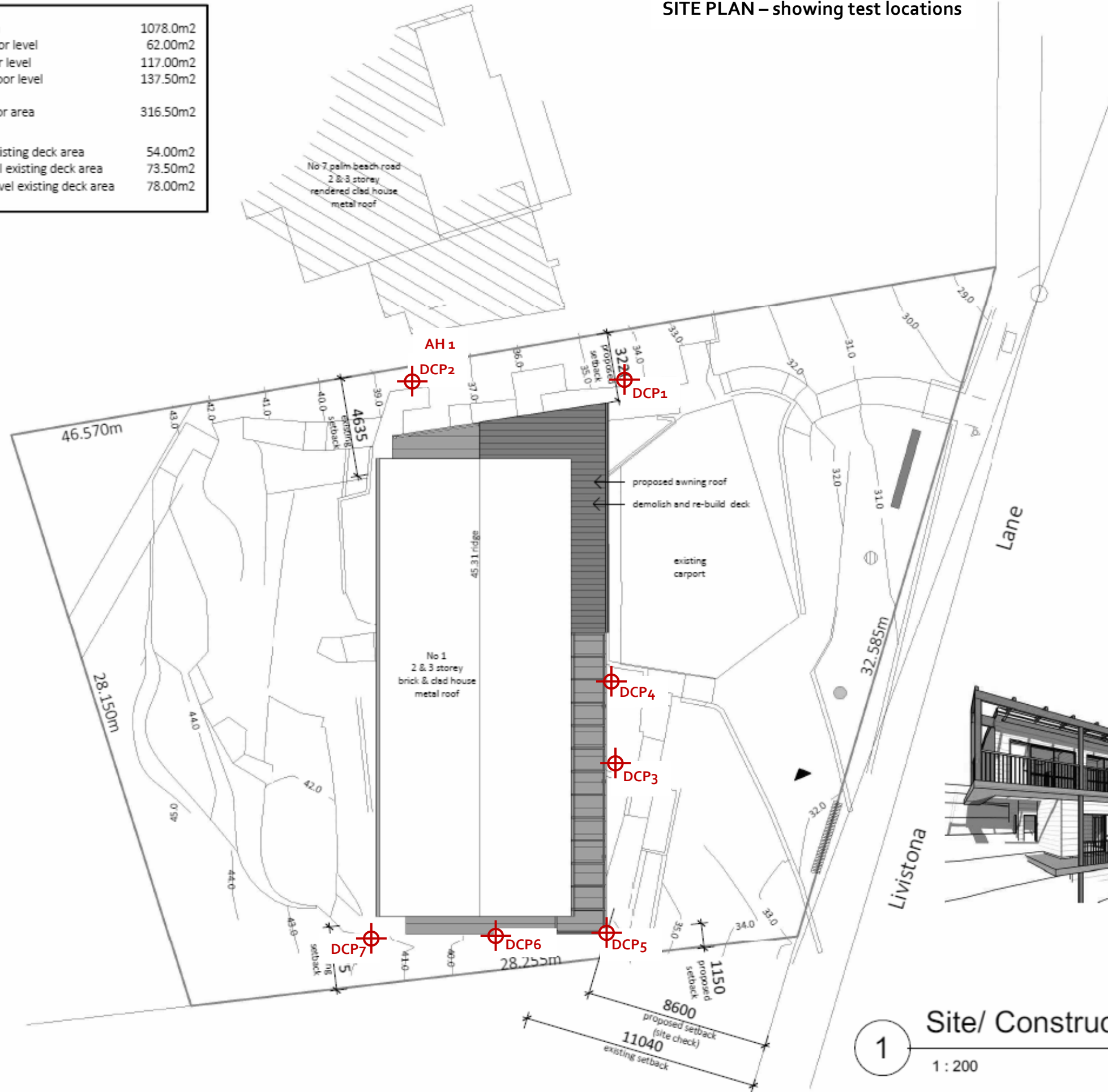
With this in mind, the following points are to be noted:

- 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.

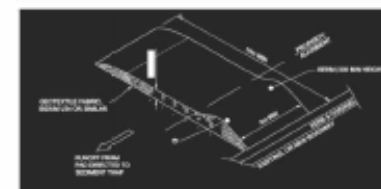
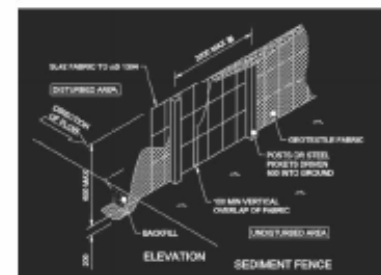


site area	1078.0m <sup>2</sup>
lower floor level	62.00m <sup>2</sup>
mid floor level	117.00m <sup>2</sup>
upper floor level	137.50m <sup>2</sup>
total floor area	316.50m <sup>2</sup>
lower existing deck area	54.00m <sup>2</sup>
mid level existing deck area	73.50m <sup>2</sup>
upper level existing deck area	78.00m <sup>2</sup>

## SITE PLAN – showing test locations



Legend	
	bd
	ct
	wms
	sms
	ssf
	va

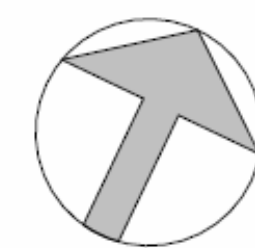


NOTES	
1. GENERAL	
2. SITE PREP	
3. DEMOLITION	
4. CONSTRUCTION	
5. FINISHES	
6. LANDSCAPE	
7. UTILITIES	
8. SECURITY	
9. ENVIRONMENTAL	
10. OTHER	



## Site/ Construction Management Plan

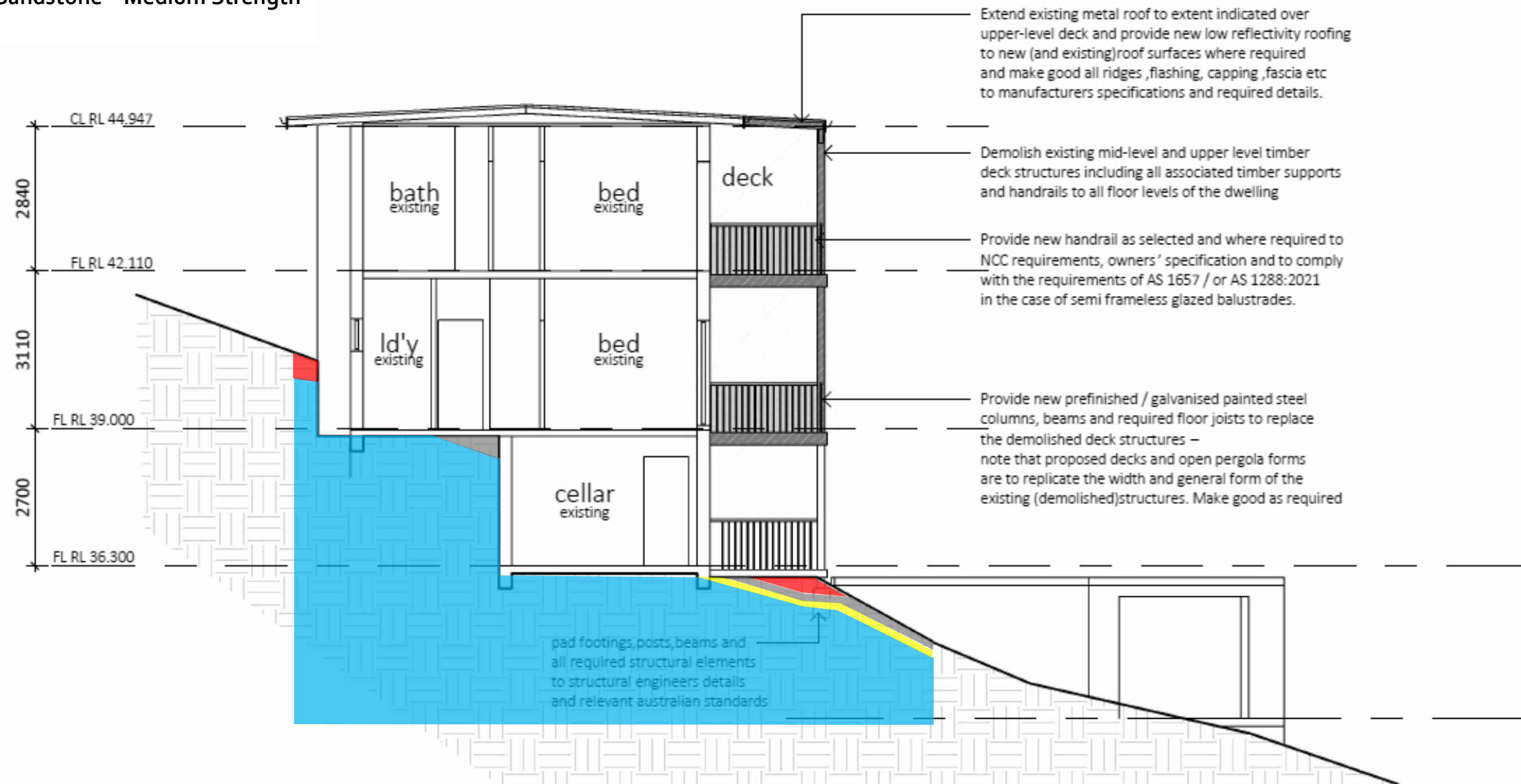
1  
1 : 200



<b>AF Design</b> Building design & documentation MOBILE 0417 6999690 EMAIL af.design@bigpond.com	REV	DATE	DESCRIPTION	BY	CHK	All dimensions are to be checked on site prior to work commencement. Verify all boundary setbacks by survey where required. Levels shown are approximate only and are to be verified on site prior to work commencement. Use figure dimensions in all cases in preference to measurements scaled off the drawings. All window sizes are nominal and should be checked by the builder prior to ordering. This design is the property of AF Design Pty. and should not be reproduced wholly or in part without their written permission.	<b>Demolish existing decks x2 construct new decks within existing footprint with part roof/awning over upper level.</b>  <b>1 Livistona Lane</b> <b>Palm Beach NSW Lot 41, DP 1039370</b>	<b>Site Plan</b> SCALE: 1:200 @ A3 DATE: Jan 25 DRAWN: ASV CHECKED: AF APPROVED: AF SHEET: A3 PROJECT No: 250106 DWG No: A001 REV: A		
	A	10/04/25	Development Application Issue	AV	AF					

Expected Ground Materials

- Fill
- Topsoil
- Clay
- Hawkesbury Sandstone – Medium Strength



1 Section  
1 : 100

<div>AF Design</div> <div>Building design &amp; documentation</div> <div>MOBILE 0417 6999690    EMAIL <a href="mailto:af.design@bigpond.com">af.design@bigpond.com</a></div>					<div>All dimensions are to be checked on site prior to work commencement. Verify all boundary setbacks by survey where required. Levels shown are approximate only and are to be verified on site prior to work commencement. Use figure dimensions in all cases in preference to measurements scaled off the drawings.</div> <div>All window sizes are nominal and should be checked by the builder prior to ordering. This design is the property of AF Design Pty. and should not be reproduced wholly or in part without their written permission.</div>	PROJECT DESCRIPTION	Demolish existing decks x2 construct new decks within existing footprint with part roof/awning over upper level.		3D Images		
	SCALE: 1:100 @ A3	DATE: Jan 25									
	DRAWN: ASV		CHECKED: AF								
	APPROVED: AF		SHEET: A3								
	PROJECT No: 250106		DWG No: A007			REV: A					
	PROJECT ADDRESS		1 Livistona Lane Palm Beach NSW Lot 41, DP 1039370								
REV	DATE	DESCRIPTION	BY	CHK							
A	10/04/25	Development Application Issue	AV	AF							



# EXAMPLES OF **GOOD** HILLSIDE PRACTICE



# EXAMPLES OF **POOR** HILLSIDE PRACTICE

