

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	1 Kanimbla Crescent, Bilgola Plateau

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 1 Kanimbla Crescent, Bilgola Plateau
Report Date: 5/05/21
Author : BEN WHITE
Author's Company/Organisation : WHITE GEOTECHNICAL GROUP PTY LTD

Please mark appropriate box

- ☒ Comprehensive site mapping conducted 29/04/21
(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 29/04/21
- ☒ 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 RISK MANAGEMENT POLICY FOR PITTWATER
FORM NO. 1 – To be submitted with Development Application**

Development Application for	Name of Applicant
Address of site	1 Kanimbla Crescent, Bilgola Plateau

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 5/05/21 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 \$2million.
I have:

Please mark appropriate box

- ☒ 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
- ☒ I 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 paragraph 6.0 of the Geotechnical Risk Management Policy for Pittwater - 2009. I confirm 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 am of the opinion that the Development Application only involves Minor Development/Alterations that do not require a Detailed Geotechnical Risk Assessment and hence my report is in accordance with the Geotechnical Risk Management Policy for Pittwater – 2009 requirements for Minor Development/Alterations.
- ☐ Provided the coastal process and coastal forces analysis for inclusion in the Geotechnical Report

Geotechnical Report Details:

Report Title: Geotechnical Report **1 Kanimbla Crescent, Bilgola Plateau**

Report Date: 5/05/21

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 INVESTIGATION:

Additions and Alterations at 1 Kanimbla Crescent, Bilgola Plateau

1. Proposed Development

- 1.1** Construct a first and second floor extension on the downhill side of the house.
- 1.2** Construct a new carport on the uphill side of the property.
- 1.3** Various other internal alterations and additions.
- 1.4** Details of the proposed development are shown on 2 drawings, project number 6818, drawings numbered S01 and S02, dated 17th April 2021.

2. Site Description

- 2.1** The site was inspected on the 29th April, 2021.
- 2.2** This residential property is on the low side of the road and has a SE aspect. The block is located on the moderate to steeply graded upper reaches of a hillslope. The slope falls across the property at angles averaging ~19°.
- 2.3** At the road frontage, a gravel driveway runs to a parking area on the uphill side of the property (Photo 1). The slope between the road frontage and the house has been terraced with a series of stable stack rock retaining walls, reaching ~1.5m high (Photo 2). One of these walls was observed to be partially supported directly onto outcropping Medium Strength Sandstone (Photo 3). The part two-storey brick house is supported on brick walls and steel posts. The supporting walls show no significant signs of movement and the supporting posts stand vertical (Photo 4). A stable stack rock wall reaching ~1.2m high and lining the E neighbouring boundary supports the cut for the neighbouring property. A moderate to steeply sloping lawn falls to the lower boundary. A large dislodged sandstone joint block was observed to be sitting in a stable position on the slope under the W side of the house (Photo 6).

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

Six 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 be an issue for the testing on this site. However, excavation and foundation budgets should always allow for the possibility that the interpreted ground conditions in this report vary from those encountered during excavations. See the appended "Important information about your report" for a more comprehensive explanation. The results are as follows:

GROUND TEST RESULTS ON THE 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 (~RL99.6)	DCP 2 (~RL101.4)	DCP 3 (~RL98.6)	DCP 4 (~RL102.1)	DCP 5 (~RL105.6)	DCP 6 (~RL107.2)
0.0 to 0.3	17	5	1F	Rock Exposed at Surface	3	9F
0.3 to 0.6	#	#	F		3	F
0.6 to 0.9			4		3	4
0.9 to 1.2			60		10	#
1.2 to 1.5			#		9	
1.5 to 1.8					25	
1.8 to 2.1					#	
	Refusal on Rock @ 0.2m	Refusal on Rock @ 0.1m	Refusal on Rock @ 1.15m		Refusal on Rock @ 1.8m	Refusal on Rock @ 0.95m

#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 @ 0.2m, DCP bouncing off rock surface, clean dry tip.

DCP2 – Refusal on rock @ 0.1m, DCP bouncing off rock surface, white impact dust on dry tip.

DCP3 – Refusal on rock @ 1.15m, DCP bouncing off rock surface, dark brown muddy sand streaking down length of DCP, orange and red mottled sandy clay on wet tip.

DCP4 – Rock exposed at the surface.

DCP5 – Refusal on rock @ 1.8m, DCP bouncing off rock surface, white impact dust on dry tip.

DCP6 – Refusal on rock @ 0.95m, DCP bouncing off rock surface, white impact dust on dry tip.

5. Geological Observations/Interpretation

The surface features of the block are controlled by the outcropping and underlying sandstone bedrock that steps down 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 sandy soils and sandy clays that fill the bench step formation. Filling has been placed above and below the

house for landscaping. In the test locations, the depth to rock ranged between 0.1 to 1.8m 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 or better and similar strength rock is expected to underlie the entire site. 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 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 Kanimbla Crescent above.

8. Geotechnical Hazards and Risk Analysis

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

RISK ANALYSIS ON THE NEXT PAGE

Risk Analysis Summary

HAZARDS	Hazard One
TYPE	The moderate to steep slope that falls across the property and continues below failing and impacting on the proposed works.
LIKELIHOOD	'Unlikely' (10^{-4})
CONSEQUENCES TO PROPERTY	'Medium' (15%)
RISK TO PROPERTY	'Low' (2×10^{-5})
RISK TO LIFE	9.1×10^{-7} /annum
COMMENTS	This level of risk is '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

The fall is away from the street. As a bushland reserve is immediately below the property, it is recommended stormwater runoff from the proposed works be piped to a spreader pipe system. This is suitable provided flows are kept close to natural runoff for the site. All stormwater is to be piped through any tanks that may be required by the regulating authorities.

11. Excavations

Apart from those for footings, no excavations are required.

12. Foundations

Due to the steep grade of the slope below the location of the proposed extension, piers potted some 0.3m into Medium Strength Sandstone are suitable footings for the proposed extension to the house. This material is expected at depths up to a maximum of ~1.2m below the current surface. Where footings are over an exposed sloping rock surface, they may be supported off level pads cut into the rock.

Due to the presence of fill and a downslope retaining wall, the proposed carport is to be supported off piers or pads taken to Medium Strength Sandstone. This material is expected at a maximum depth of ~1.0m below the current surface. 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.

13. 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.

14. Inspection

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 or the regulating authorities 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.

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

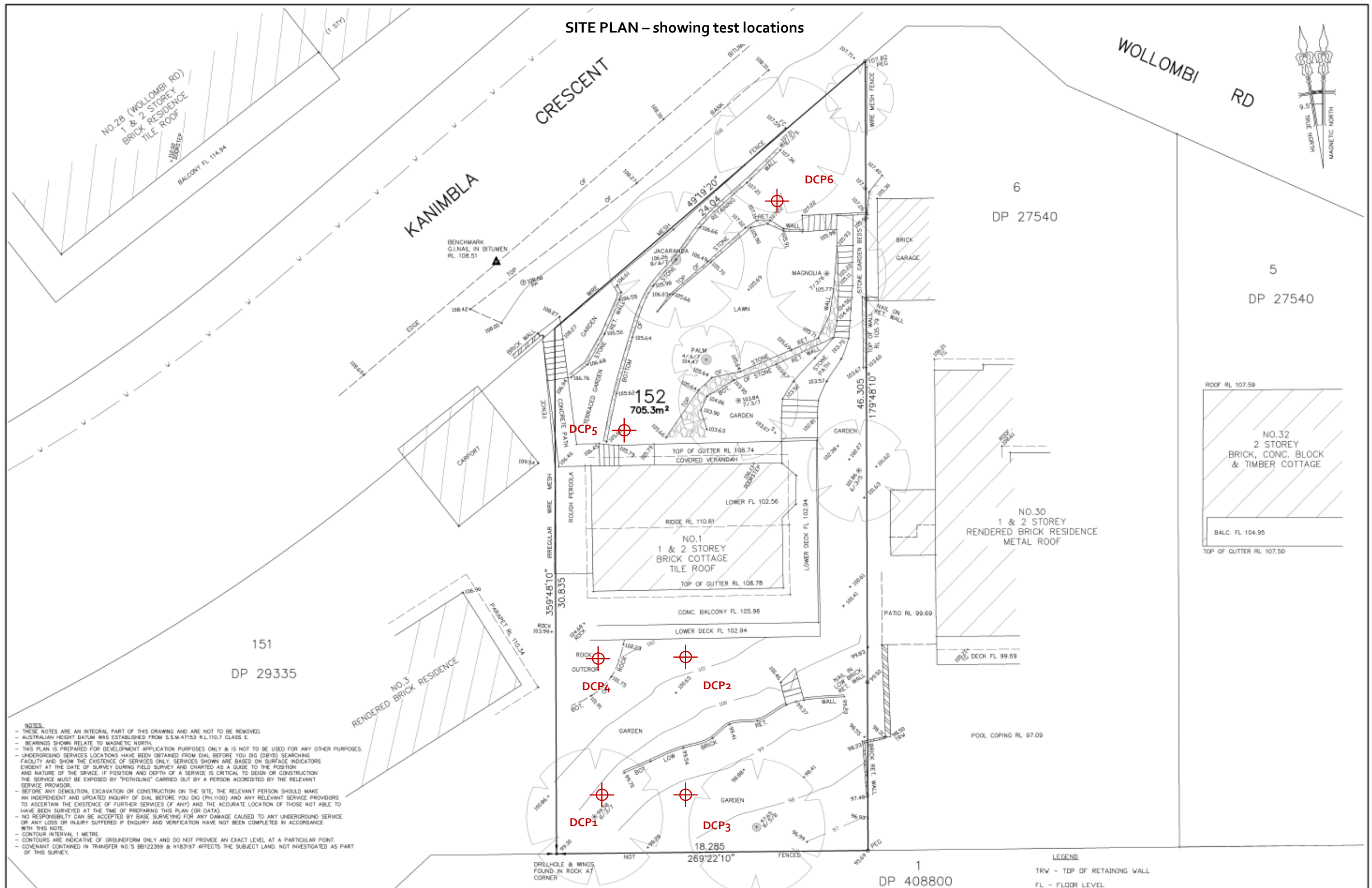
Important Information about Your Report

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



NOTES:

- THESE NOTES ARE AN INTEGRAL PART OF THIS DRAWING AND ARE NOT TO BE REMOVED.
- AUSTRALIAN HEIGHT DATUM WAS ESTABLISHED FROM S.S.M. 47153 R.L. 110.7 CLASS E.
- BEARINGS SHOWN RELATE TO MAGNETIC NORTH.
- THIS PLAN IS PREPARED FOR DEVELOPMENT APPLICATION PURPOSES ONLY & IS NOT TO BE USED FOR ANY OTHER PURPOSES.
- UNDERGROUND SERVICES LOCATIONS HAVE BEEN OBTAINED FROM DIAL BEFORE YOU DIG (DBYD) SEARCHING FACILITY AND SHOW THE EXISTENCE OF SERVICES ONLY. SERVICES SHOWN ARE BASED ON SURFACE INDICATORS EVIDENT AT THE DATE OF SURVEY DURING FIELD SURVEY AND CHARTED AS A GUIDE TO THE POSITION AND NATURE OF THE SERVICE. IF POSITION AND DEPTH OF A SERVICE IS CRITICAL TO DESIGN OR CONSTRUCTION THE SERVICE MUST BE EXPOSED BY "PROBING" CARRIED OUT BY A PERSON ACCREDITED BY THE RELEVANT SERVICE PROVIDER.
- BEFORE ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON THE SITE, THE RELEVANT PERSON SHOULD MAKE AN INDEPENDENT AND UPDATED INQUIRY OF DIAL BEFORE YOU DIG (PH.1100) AND ANY RELEVANT SERVICE PROVIDERS TO ASCERTAIN THE EXISTENCE OF FURTHER SERVICES (IF ANY) AND THE ACCURATE LOCATION OF THOSE NOT ABLE TO HAVE BEEN SURVEYED AT THE TIME OF PREPARING THIS PLAN (OR DATA).
- NO RESPONSIBILITY CAN BE ACCEPTED BY BASE SURVEYING FOR ANY DAMAGE CAUSED TO ANY UNDERGROUND SERVICE OR ANY LOSS OR INJURY SUFFERED IF ENQUIRY AND VERIFICATION HAVE NOT BEEN COMPLETED IN ACCORDANCE WITH THIS NOTE.
- CONTOUR INTERVAL 1 METRE.
- CONTOURS ARE INDICATIVE OF GROUNDFORM ONLY AND DO NOT PROVIDE AN EXACT LEVEL AT A PARTICULAR POINT.
- COVENANT CONTAINED IN TRANSFER NO'S B8122399 & H183197 AFFECTS THE SUBJECT LAND. NOT INVESTIGATED AS PART OF THIS SURVEY.

LEGEND

TRW - TOP OF RETAINING WALL
 FL - FLOOR LEVEL
 TG - TOP OF GUTTER
 HYD - HYDRANT
 PP - POWER POLE
 B/S/D - TREE SPREAD/DIA/HEIGHT
 - W - APPROXIMATE POSITION OF WATER MAIN 100mm PIPE

Base SURVEYING
 Land & Engineering Surveyors
 basesurveying@inet.net.au

Simon Warren
 6 Surfview Ave Forster 2428
 Phone: 0412448259

Date: 4.10.20
 Scale: 1:100 @ A1
 Datum: AHD
 Reference: 17-91A
 Sheet 1 of 1

Prepared for:
JOHN WOOD

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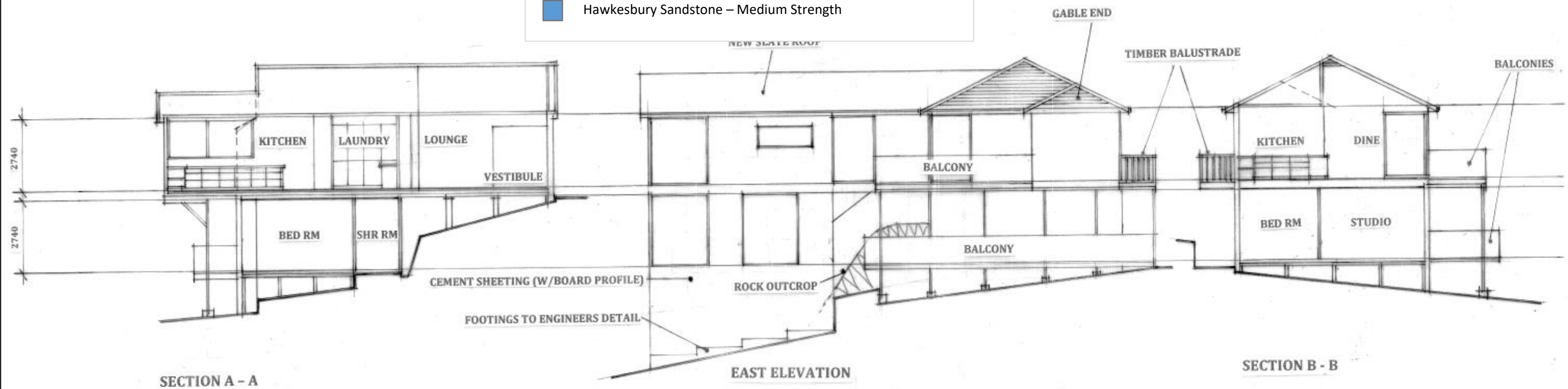
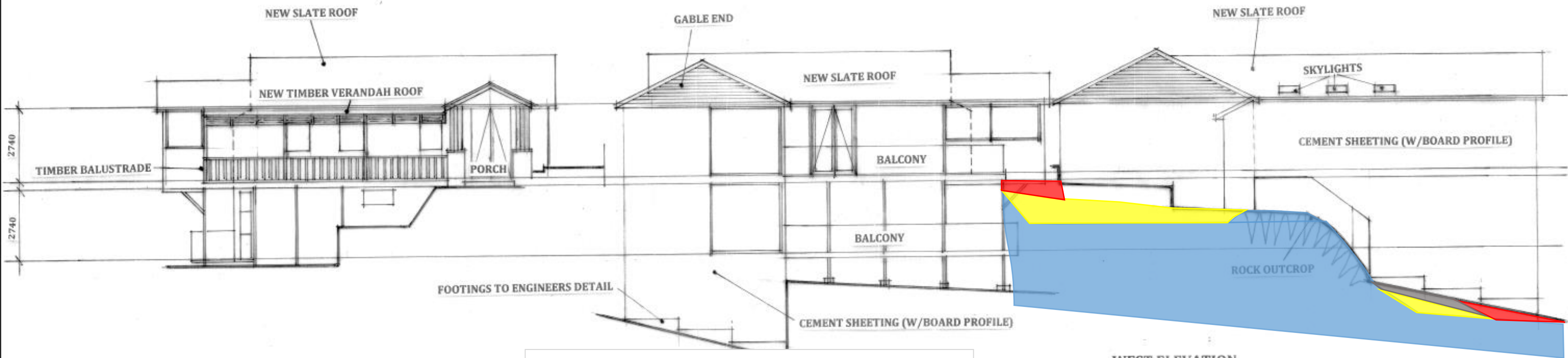
LEVEL & FEATURE SURVEY
 1 KANIMBLA CR, BILGOLA PLATEAU
 LOT 152 IN DP 29335
 LGA: NORTHERN BEACHES



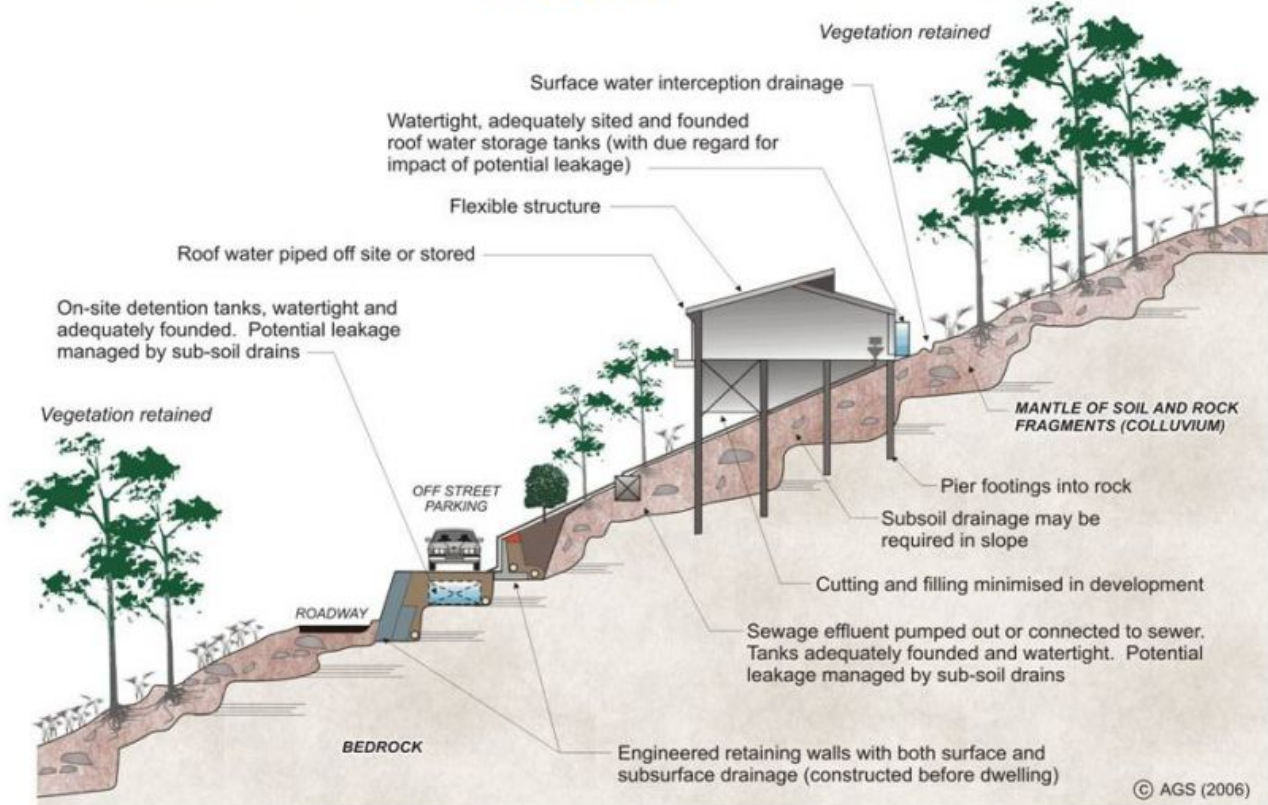
0 1 2 3 4 5 10

THORSTEN HUEBNER
 REGISTERED SURVEYOR

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE

