

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

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

Address of site 130 Irrubel Road, 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 24/12/21 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 \$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 130 Irrubel Road, Newport  
Report Date: 24/12/21  
  
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 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>130 Irrubel Road, Newport</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>130 Irrubel Road, Newport</u>
Report Date: <u>24/12/21</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 20/12/21  
(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 20/12/21
- ☒ 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 INVESTIGATION:**

New Pool at **130 Irrubel Road, Newport**

### **1. Proposed Development**

- 1.1** Install a new pool by excavating to a maximum depth of ~1.8m.
- 1.2** Details of the proposed development are shown on 7 drawings prepared by Jamie King Landscape Architect, project number 22043, drawings numbered Sht-101 to Sht-106 and Sht-201, Issue C, dated 19/11/21.

### **2. Site Description**

- 2.1** The site was inspected on the 20<sup>th</sup> December, 2021.
- 2.2** This residential property is on the high side of the road and has a SE aspect. The block runs longways to the N so the slope is a cross fall. It is located on the gentle to moderately graded lower reaches of a hillslope. The natural slope falls across the property at an average angle of ~10°. The slope above the property continues at similar angles. The slope below the property eases to gentle angles.
- 2.3** At the road frontage a concrete driveway runs up the slope to a garage beside the house (Photo 1). A low rendered masonry retaining wall supports the fill for the upper portion of the driveway. Between the road frontage and the house is a gently sloping lawn. The two storey rendered masonry and timber clad house is supported by masonry walls (Photos 1 & 2). The external supporting walls show no significant signs of movement. A timber deck and lawn and garden areas extend off the N side of the house (Photos 2 & 3). The fills for the lawn and garden areas are supported by low timber retaining walls (Photo 4). A timber retaining wall ~1.6m high along the W common boundary supports fill on the W neighbouring property (Photo 5). The wall is tilting at up to ~13° downslope. See '**Section 16 Remedial Works**'. Apart from the

tilting retaining wall supporting fill, no signs of slope instability were observed on the property.

### 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. This is expected to have occurred for DCP1. 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 (~RL10.7) – AH1 (photo 6)

Depth (m)	Material Encountered
0.0 to 1.3	<b>FILL</b> , sandy soil, dark brown, moist, fine to medium grained.
1.3 to 1.5	<b>SAND</b> , grey brown, moist, fine to medium grained.
1.5 to 1.6	<b>SANDY CLAY</b> , orange, moist, firm.

End of Hole @ 1.6m in firm sandy clay. No watertable encountered.

<b>DCP TEST RESULTS – Dynamic Cone Penetrometer</b>		
Equipment: 9kg hammer, 510mm drop, conical tip.		Standard: AS1289.6.3.2 -1997
<b>Depth(m) Blows/0.3m</b>	<b>DCP 1 (~RL10.7)</b>	<b>DCP 2 (~RL10.7)</b>
0.0 to 0.3	10	4
0.3 to 0.6	15	3
0.6 to 0.9	6	3
0.9 to 1.2	#	11
1.2 to 1.5		14
1.5 to 1.8		15
1.8 to 2.1		17
2.1 to 2.4		24
2.4 to 2.7		25
2.7 to 3.0		#
	Refusal @ 0.7m	End of Test @ 2.7m

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

### **DCP Notes:**

DCP1 – Refusal @ 0.7m, DCP bouncing, white impact dust on dry tip.

DCP2 –End of Test @ 2.7m, DCP still very slowly going down, grey brown sand on moist tip.

## **5. Geological Observations/Interpretation**

The slope materials are colluvial at the near surface and residual at depth. In the test locations, the ground materials consist of fill and sand over sandy clays. Fill provides level platforms for lawn and garden areas on the N side of the house. The clays merge into the weathered zone of the under lying rock at a depth of ~2.4m below the current surface. It is interpreted that DCP1 hit refusal on the fill. The weathered zone of the underlying rock is interpreted as Extremely Low Strength Shale. It is to be noted that this material is a soft rock and 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 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 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.

## 8. Geotechnical Hazards and Risk Analysis

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

**RISK ANALYSIS SUMMARY ON NEXT PAGE**

## Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

HAZARDS	Hazard One	Hazard Two
TYPE	The gentle to moderately graded slope that falls across the property and continues above failing and impacting on the property.	The proposed excavation for the pool collapsing onto the worksite and undercutting the existing deck (Photo 2) during the excavation process.
LIKELIHOOD	'Unlikely' ( $10^{-4}$ )	'Possible' ( $10^{-3}$ )
CONSEQUENCES TO PROPERTY	'Medium' (12%)	'Medium' (20%)
RISK TO PROPERTY	'Low' ( $2 \times 10^{-5}$ )	'Moderate' ( $2 \times 10^{-4}$ )
RISK TO LIFE	$8.3 \times 10^{-7}$ /annum	$3.7 \times 10^{-6}$ /annum
COMMENTS	This level of risk is 'ACCEPTABLE'.	This level of risk to life and property is 'UNACCEPTABLE'. To move the risk to 'ACCEPTABLE' levels, the recommendations in <b>Section 13</b> are to be followed.

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

## 9. Suitability of the Proposed Development for the Site

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

## 10. Stormwater

No significant stormwater runoff will be created by the proposed development.

## 11. Excavations

An excavation to a maximum depth of ~1.8m is required to install the proposed pool. The excavation is expected to be through fill and sand over sandy clay.

It is envisaged that excavations through fill, sand and clay can be carried out with an excavator and bucket.

## **12. Vibrations**

It is expected the proposed excavation will be carried out with an excavator and bucket and the vibrations produced will be below the threshold limit for building or infrastructure damage.

## **13. Excavation Support Requirements**

An excavation to a maximum depth of ~1.8m is required to install the proposed pool. The excavation is set back ~0.8m from the existing timber deck (Photo 2).

The timber posts supporting the N edge of the deck are to be propped and supported with beams, prior to the excavation commencing.

As the majority of the excavation is through fill and sand it is recommended the cut batters be temporarily supported as the excavation is progressed with typical pool shoring such as braced form ply or similar until the pool structure is in place. See the site plan attached for the minimum extent of the required shoring shown in blue.

Upslope runoff is to be diverted from the cut faces by sandbag mounds or other diversion works. The excavation is to be carried out during a dry period. No excavations are to commence if heavy or prolonged rainfall is forecast.

All excavation spoil is to be removed from site following the current Environmental Protection Agency (EPA) waste classification guidelines.

## **14. Retaining Structures**

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



**Table 1 – Likely Earth Pressures for Retaining Structures**

Unit	Earth Pressure Coefficients			
	Unit weight (kN/m <sup>3</sup> )	'Active' K <sub>a</sub>	'At Rest' K <sub>0</sub>	Passive
Fill, Topsoil, Sand	20	0.40	0.55	N/A
Residual Clays	20	0.35	0.45	K <sub>p</sub> = 2.0 ultimate
Extremely Low Strength Shale	22	0.25	0.35	K <sub>p</sub> = 2.5 ultimate

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

It is to be noted that the earth pressures in Table 1 assume a level surface above the structure, do not account for any surcharge loads and assume retaining structures are fully drained. No passive resistance should be assumed for the top 0.4m to account for any disturbance from the excavation. Passive pressures are 'ultimate' so should have a suitable safety factor applied. Rock strength and relevant earth pressure coefficients are to be confirmed on site by the geotechnical consultant.

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

## 15. Foundations

The proposed pool is to be supported on piers embedded into Extremely Low Strength Shale. This ground material is expected at depths from ~1.0m to ~2.4m below the current surface, being deeper in the filled area. A maximum allowable bearing pressure of 600kPa can be

assumed for footings on Extremely Low Strength Shale. It should be noted that this material is a soft rock and a rock auger will cut through it so the builders should not be looking for refusal to end the footings.

As the bearing capacity of shale reduces when it is wet we recommend 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 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 professional on site at the start of the footing excavation to advise on footing depth and material. This mostly prevents unnecessary over excavation in clay like shaly rock but can be valuable in all types of geology.

## 16. Remedial Works

It is recommended additional soldier posts be installed to support the middle portion of the tilting timber retaining wall (where it is tilting at up to 13° downslope - Photo 5) as part of the proposed works. The posts are to be designed and approved by the structural engineer.

## 17. 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.

**REQUIRED INSPECTION ON NEXT PAGE**

## 18. 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 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 and contractors are 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

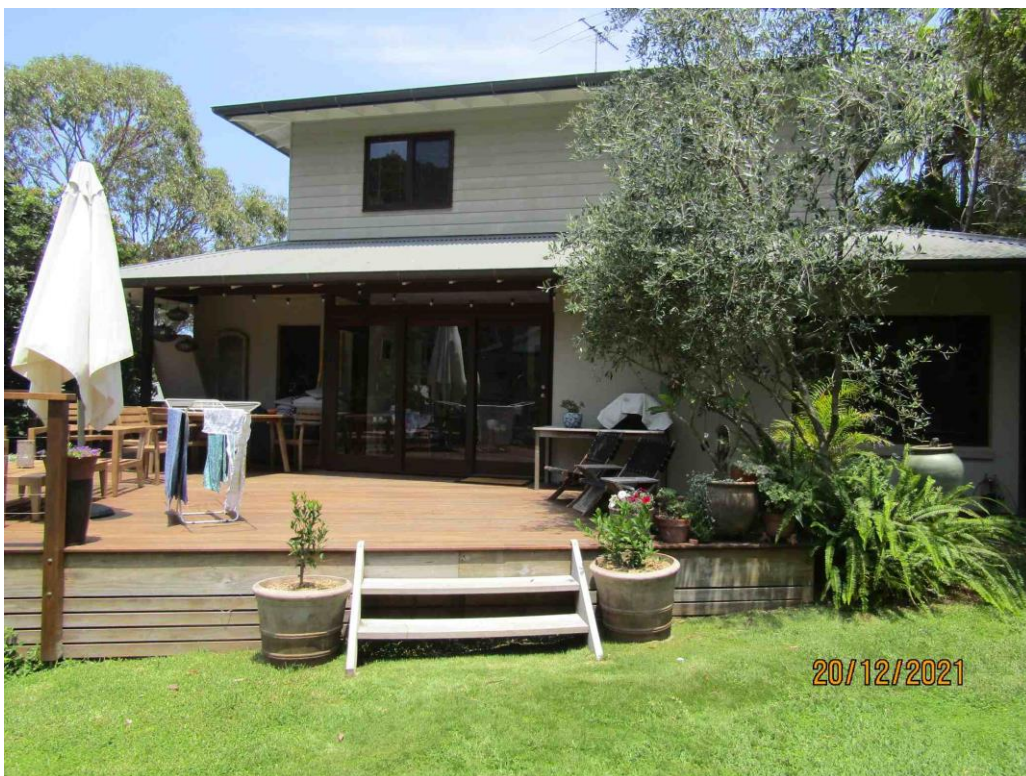


Photo 2



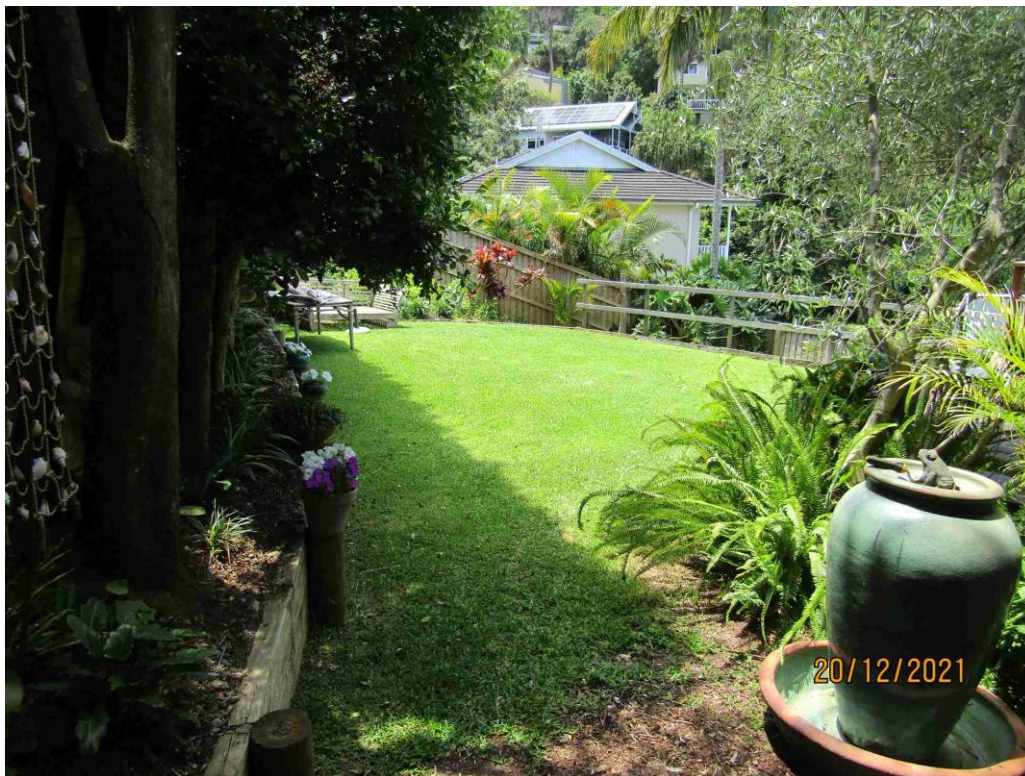


Photo 3



Photo 4





Photo 5



Photo 6: AH1 – Downhole is from left to right.

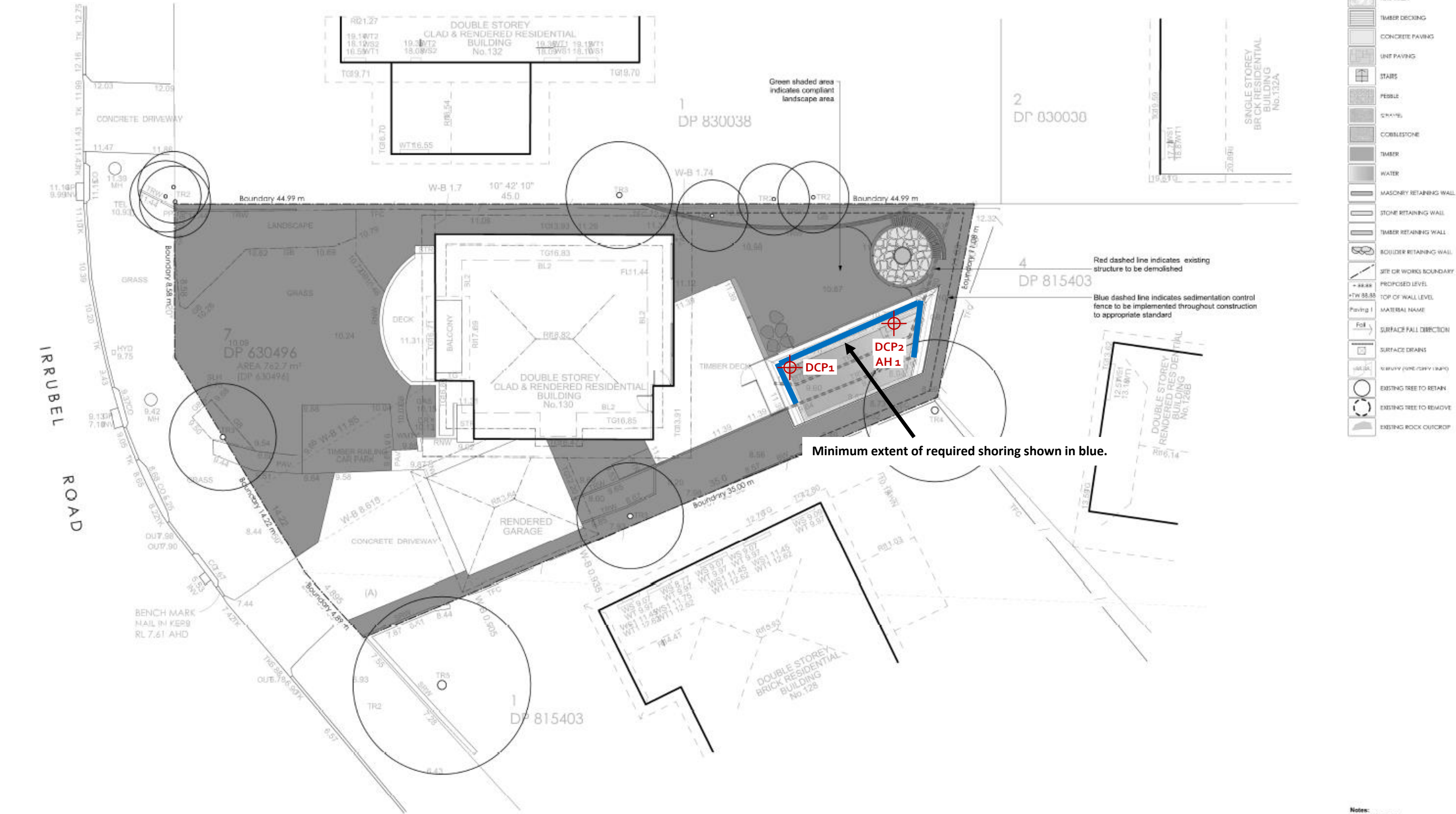
## Important Information about Your Report

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.

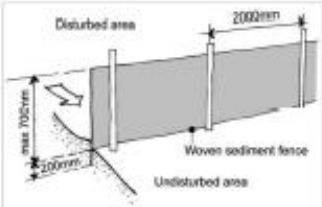
With this in mind, the following points are to be noted:

- 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.





AREA CALCULATION		
	AREA (m2)	PERCENTAGE
Site	762,7	
Landscape total as per DCP	391,07	51,27%



Sedimentation Control Fence  
Not to scale.  
Source: www.goulburnmunicipality.nsw.gov.au



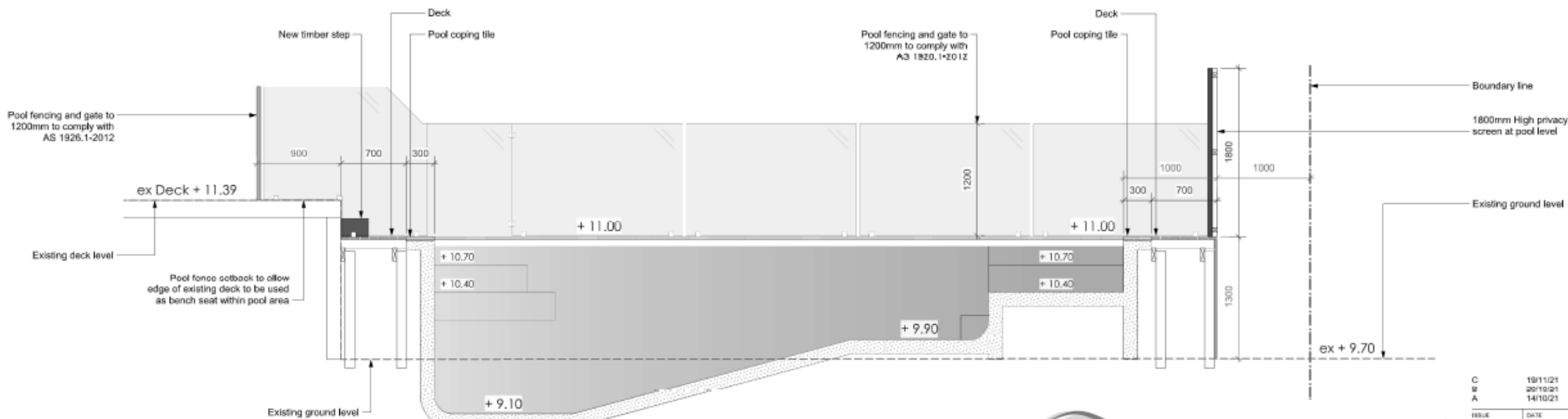
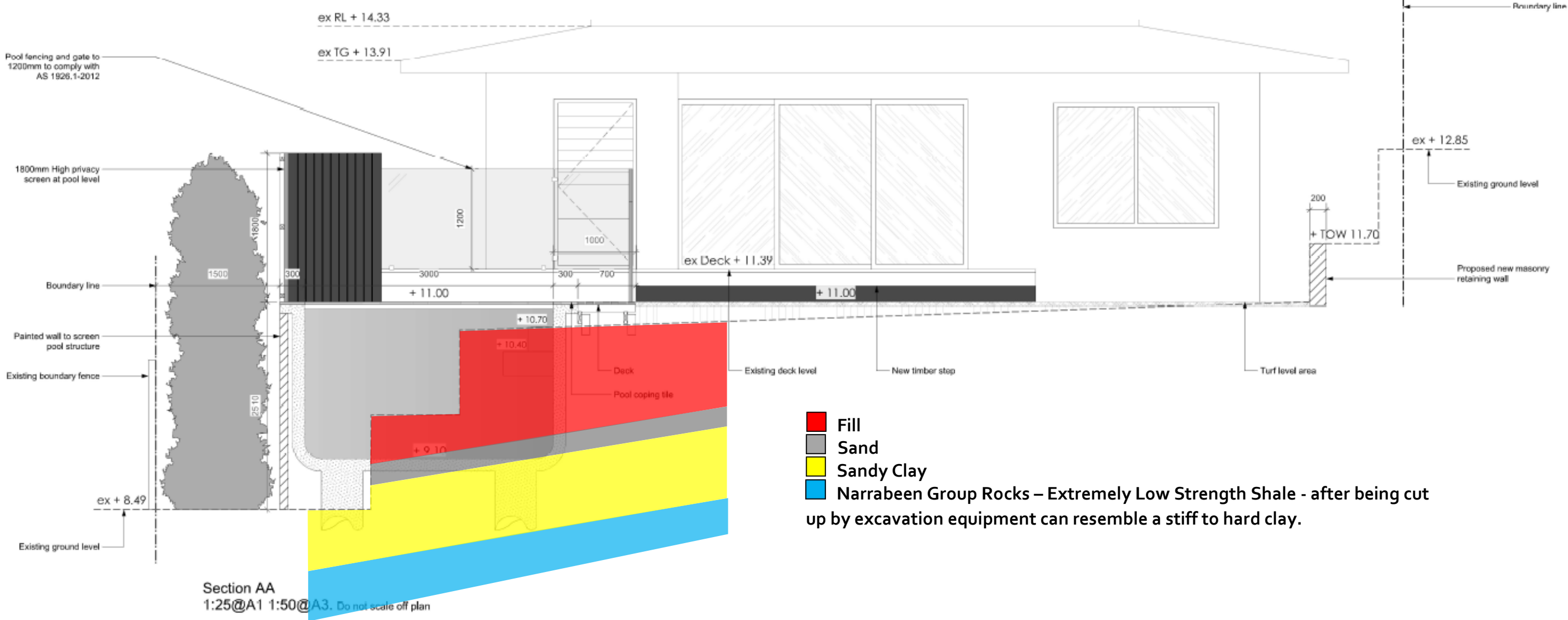
JAMIE KING  
LANDSCAPE ARCHITECT  
DESIGN • APPROVE • MANAGE

ISSUE	DATE	REVISION	PROJECT #
C	19/11/21	Issue C.	22043
B	20/10/21	Issue B.	
A	14/10/21	DRAFT issue for review.	
CLIENT	130 Irrubel Newport	DWG #	Sht-101
SCALE	See above	PLAN	
DRAWN	JK	REVISION	
CHKD	JK		
Jamie King Landscape Architect			W: www.jamieking.com.au
84 Palmgrove Rd, Avalon, NSW, 2107			T: 0421 517 991 E: jamie@jamieking.com.au

Notes:  
- Do not scale off plan.  
- Contractors to check all measurements on site before quoting or commencing work.  
- All anomalies arise, contact the Landscape Architect.  
- This design is copyright and is not to be reproduced in any way without written consent of Jamie King Landscape Architect.  
- POOL TO BE INSTALLED TO MEET THE REQUIREMENTS OF AS1633-2021. POOL LEVEL SHOWN IS INDICATIVE ONLY AND TO BE LAMPFORD UNITS BY IRRUBEL TO ENSURE COMPLIANCE WITH AS1633-2021



TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



Notes:

- >Do not scale off plan.
- >Contractors to check all measurements onsite before quoting or commencing work.
- >If anomalies arise, contact the Landscape Architect.
- >This design is copyright and is not to be reproduced in any way without written consent of Jamie King Landscape Architect.
- >POOL TO BE INSTALLED TO MEET THE REQUIREMENTS OF AS1926.1-2012. POOL LEVEL SHOWN IS INDICATIVE ONLY AND TO BE LUMPED IN WITHIN 5% TOLERANCE (1) ENSURE COMPLIANCE WITH AS1926.1-2012

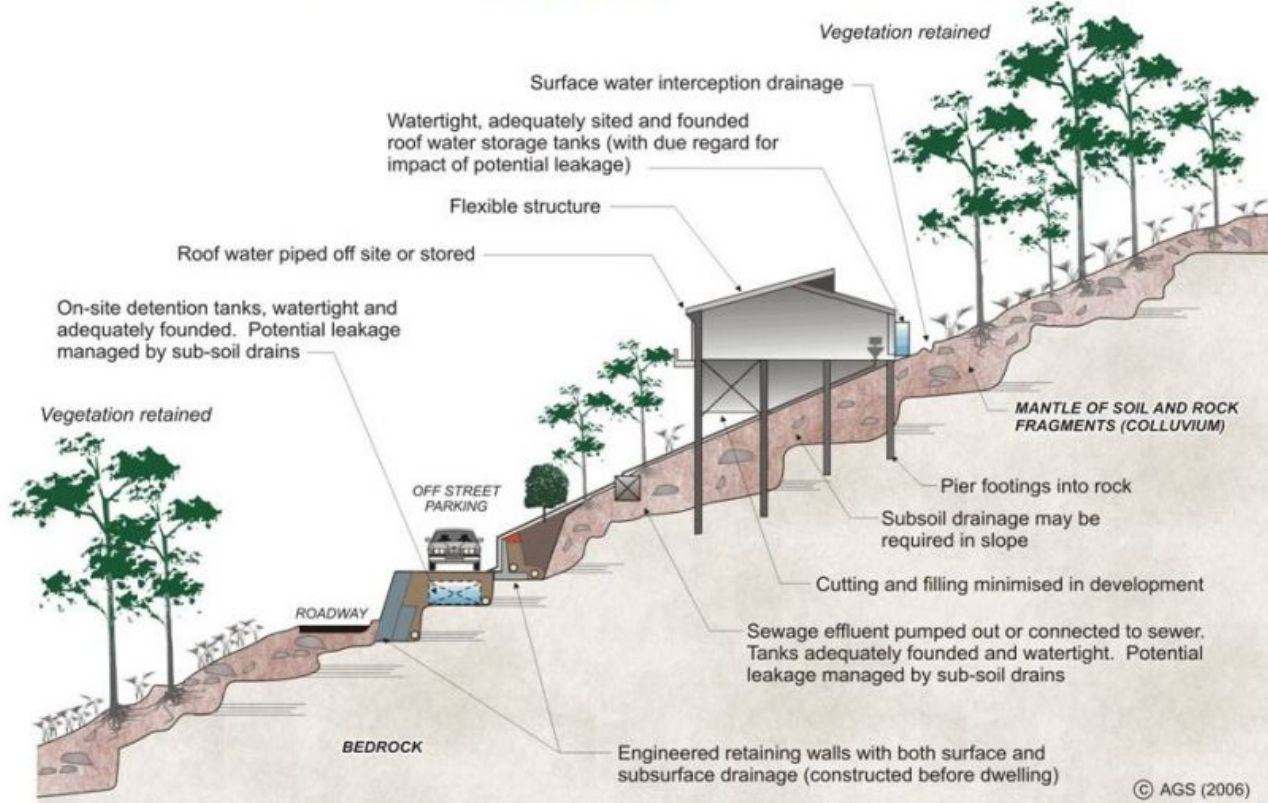
C	19/11/21	Issue C.	PROJECT #	22043
M	25/10/21	Issue M.	CLIENT	Ensor
A	14/10/21	DRAFT issue for review.	SCALE (E.A.)	See Plan
ISSUE	DATE	REVISION	DRAWN	PLR
PROJECT	130 Irrubel Newport		CHKD	JK
SECTION	Sections		REVISION	
DATE #	See above		DATE #	See Plan
SCALE (E.A.)	See Plan		SCALE (E.A.)	See Plan
DRAWN	PLR		DRAWN	PLR
CHKD	JK		CHKD	JK
REVISION			REVISION	



JAMIE KING  
LANDSCAPE ARCHITECT  
DESIGN • APPROVE • MANAGE

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# EXAMPLES OF **GOOD** HILLSIDE PRACTICE



# EXAMPLES OF **POOR** HILLSIDE PRACTICE

