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

Devel	Development Application for							
		Name of Applicant						
Addre	ess of site	42 Elanora Road, Elanora Heights						
		ers the minimum requirements to be addressed in a Geotechnical Risk <b>Declaration made by</b> 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 <u>12/9/19</u> 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 42 Elanora Road, Elanora Heights

Report Date: 9/9/19

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	Z	clut
Name		Ben White
Chartered Professional St	atus	MScGEOLAusIMM CP GEOL
Membership No.		222757
Company	Wh	ite 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

	alanment Application for
Deve	elopment Application for Name of Applicant
Add	Iress of site 42 Elanora Road, Elanora Heights
	ollowing checklist covers the minimum requirements to be addressed in a Geotechnical Risk Management Geotechnic rt. This checklist is to accompany the Geotechnical Report and its certification (Form No. 1).
	echnical Report Details: ort Title: Geotechnical Report 42 Elanora Road, Elanora Heights
керс	or The: Geotechnical Report 42 Elanora Road, Elanora Heights
Repo	ort Date: 9/9/19
Auth	nor: BEN WHITE
Auth	hor's Company/Organisation: WHITE GEOTECHNICAL GROUP PTY LTD
Please	e mark appropriate box
$\boxtimes$	Comprehensive site mapping conducted <u>9/8/19</u> (date)
$\boxtimes$	Mapping details presented on contoured site plan with geomorphic mapping to a minimum scale of 1:200 (as appropriate)
$\triangleleft$	Subsurface investigation required
	□ No Justification
$\triangleleft$	☑ Yes Date conducted <u>9/8/19</u> Geotechnical model developed and reported as an inferred subsurface type-section
2	Geotechnical hazards identified
	$\Box$ Above the site
	$\boxtimes$ On the site
	$\Box$ Below the site
	$\Box$ Beside the site
$\leq$	Geotechnical hazards described and reported
$\triangleleft$	Risk assessment conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
	⊠ Consequence analysis
	🖾 Frequency analysis
$\mathbf{X}$	Risk calculation
$\triangleleft$	Risk assessment for property conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 200
$\triangleleft$	Risk assessment for loss of life conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2
$\triangleleft$	Assessed risks have been compared to "Acceptable Risk Management" criteria as defined in the Geotechnical Risk
$\triangleleft$	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.
$\triangleleft$	Design Life Adopted:
	$\boxtimes$ 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
$\mathbf{X}$	
$\boxtimes$	Additional action to remove risk where reasonable and practical have been identified and included in the report.

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	Kelut
Name	Ben White
Chartered Professional Sta	tus MScGEOLAusIMM CP GEOL
Membership No.	222757
Company	White Geotechnical Group Pty Ltd



J2328. 9<sup>th</sup> September, 2019. Page 1.

# **GEOTECHNICAL INVESTIGATION:**

Secondary Dwelling and double garage at 42 Elanora Road, Elanora Heights

# **1.** Proposed Development

- 1.1 Construct a new Secondary Dwelling and Double Garage by excavating to a maximum depth of ~3.5m into the slope.
- 1.2 Details of the proposed development are shown on 8 drawings prepared by SketchArc, project number 1908, drawings numbered DA4 – DA10 and dated 31/7/19.

#### 2. Site Description

**2.1** The site was inspected on the 9<sup>th</sup> September, 2019.

**2.2** This residential property is on the high side of Elanora Rd near the crest of a hill. A ~7.5m sandstone cliff divides the block. Downhill of the cliff the slope falls at steep angles of 19°. Above the cliff the grade eases to moderate angles of ~10° rising to the NW. The slope continues at moderate angles above the house before reaching the other side of the hillslope. The slope below the property eases to moderate angles as the toe of the hill is approached.

**2.3** From the road frontage two 0.4m high mortared sandstone block retaining walls on outcropping sandstone terrace the street frontage (Photo 1). These stable walls support garden beds. A rough sandstone block and cut stairway travels along the NE boundary granting access to the rear of the property (Photo 2). Where mortared sandstone blocks are not used to support the cut batters for the stairway it is cut into outcropping rock. Outcropping sandstone was visible across the site from the road frontage to the base of the house (Photo 3). A sandstone cliff some 7.5m high rises below the house. There is some minor undercutting around the upper bedding plane



J2328. 9<sup>th</sup> September, 2019. Page 2.

but no significant geological defects where observed in the rock that could impact of its stability. The rock making up the cliff is Medium Strength or better and the formation is considered stable (Photo 4). Above the face a level lawn and paved terrace extend to the foot of the house (Photo 5). The 2 storey brick house shows no signs of movement or any visible cracking in its external walls and is considered stable. A paved parking area extends uphill of the house to a garage. A concrete paved right of way carriageway (ROW) enters the property form Dewrang Ave to the N (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

Two auger holes were put down to identify the soil materials. Eight DCP (Dynamic Cone Penetrometer) 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. 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 and the results are as follows:

# AUGER HOLE 1 (~RL76.3) - AH1 (Photo 7)

Depth (m)	Material Encountered
0.0 to 0.4	SANDY SOIL, dark brown, medium grained with trace organic matter.
0.4 to 0.5	SAND, medium to coarse grained with gravel, orange to yellow.

End of hole @ 0.5m in gravel. No watertable encountered.



J2328. 9<sup>th</sup> September, 2019. Page 3.

#### AUGER HOLE 2 (~RL78.3) - AH2 (Photo 8)

- Depth (m) Material Encountered
  0.0 to 0.5 SANDY SOIL, dark brown, medium grained with fine trace organic matter.
  - 0.5 to 0.6 **SAND**, medium to coarse grained with gravel, orange to yellow.

Refusal @ 0.6m grinding on rock. No watertable encountered.

	DCP TEST RESULTS – Dynamic Cone Penetrometer						
Equipment: 9kg	Equipment: 9kg hammer, 510mm drop, conical tip. Standard: AS1289.6.3.2 - 1997						
Depth(m) Blows/0.3m	DCP 1 (~RL74.19)	DCP 2 (~RL74.6)	<b>DCP 3</b> (~RL76.3)	DCP 4 (~RL77.8)			
0.0 to 0.3	Outcropping at surface	1F	5	Outcropping at surface			
0.3 to 0.6		12	10				
0.6 to 0.9		10	11				
0.9 to 1.2		#	18				
			#				
	Refusal on Rock @ 0.0m	Refusal on Rock @ 0.85m	Refusal on Rock @ 0.9m	Refusal on Rock @ 0.0m			
Depth(m) Blows/0.3m	<b>DCP 5</b> (~RL78.3)	<b>DCP 6</b> (~RL79.7)	<b>DCP 7</b> (~RL86.9)	<b>DCP 8</b> (~RL86.9)			
0.0 to 0.3	1	1F	2	1			
0.3 to 0.6	15	2	3	2			
0.6 to 0.9	11	7	#	10			
0.9 to 1.2	#	27		#			
		#					
	Refusal on Rock @ 0.7m	Refusal on Rock @ 1.0m	Refusal on Rock @ 0.3m	Refusal on Rock @ 0.5m			

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

# White geotechnical group

Sydney, Northern Beaches & beyond. Geotechnical Consultants

J2328. 9<sup>th</sup> September, 2019. Page 4.

#### DCP Notes:

DCP1 – Refusal on rock @ 0.0m, DCP bouncing off rock surface

DCP2 – Refusal on rock @ 0.85m, DCP bouncing off rock surface, maroon fragments on dry tip.

DCP3 – Refusal on rock @ 0.9m, DCP bouncing off rock surface, yellow dust on dry tip.

DCP4 – Refusal on rock @ 0.0m, DCP bouncing off rock surface

DCP5 – Refusal on rock @ 0.7m, DCP bouncing off rock surface, clean dry tip.

DCP6 – Refusal on rock @ 1.0m, DCP bouncing off rock surface, white dust on dry tip.

DCP7 – Refusal on rock @ 0.3m, DCP bouncing off rock surface, clean dry tip.

DCP8 – Refusal on rock @ 0.5m, DCP bouncing off rock surface, white 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 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 sandy soils that fill the bench step formation. In the test locations the depth to rock ranged between 0.0 to 1.1m below the current surface, being slightly deeper due to the stepped nature of the underlying bedrock. The outcropping sandstone across 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.



J2328. 9<sup>th</sup> September, 2019. Page 5.

#### 8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed above, below, or beside the property. The vibrations from the proposed excavations are a potential hazard (**Hazard One**). The proposed excavation is a potential hazard until retaining walls are in place (**Hazard Two**). The sandstone cliff face that rises across the block is a potential hazard (**Hazard Three**)

#### **Risk Analysis Summary**

HAZARDS	Hazard One	Hazard Two	Hazard Three
ТҮРЕ	The vibrations	The proposed	The sandstone cliff face
	produced during the	excavation collapsing	above the property
	proposed excavations	onto the work site	failing and impacting on
	impacting on the	before the retaining	the proposed works
	surrounding structures.	walls are in place.	(Photo 10).
LIKELIHOOD	'Possible' (10 <sup>-3</sup> )	'Possible' (10 <sup>-3</sup> )	'Unlikely' (10 <sup>-4</sup> )
CONSEQUENCES TO PROPERTY	'Medium' (15%)	'Medium' (12%)	'Medium' (20%)
RISK TO PROPERTY	'Moderate' (2 x 10 <sup>-4</sup> )	'Moderate' (2 x 10 <sup>-4</sup> )	'Low' (6 x 10 <sup>-6</sup> )
RISK TO LIFE	5.3 x 10 <sup>-6</sup> /annum	8.3 x 10 <sup>-6</sup> /annum	9.96 x 10 <sup>-7</sup> /annum
COMMENTS	This level of risk to property is	This level of risk to life and property is	
	'UNACCEPTABLE'. To	'UNACCEPTABLE'. To	
	move risk to	move risk to	This level of risk is
	'ACCEPTABLE' levels,	'ACCEPTABLE' levels,	'ACCEPTABLE'.
	the recommendations	the recommendations	
	in <b>Section 12</b> are to be	in <b>Section 13</b> are to be	
	followed.	followed.	

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

White geotechnical group

Sydney, Northern Beaches & beyond. Geotechnical Consultants

J2328. 9<sup>th</sup> September, 2019. Page 6.

#### 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 Elanora Rd below. 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

An excavation to a maximum depth of ~3.5m is required to construct the proposed secondary dwelling. The bulk excavation is expected to be through shallow sandy soil over Medium Strength Sandstone. Where sandstone is not outcropping it is expected at maximum depths of 0.9m below the surface.

It is envisaged that excavations through sandy soil and sandy clays can be carried out with a bucket and excavations through rock will require grinding or rock sawing and breaking.

#### 12. Vibrations

Possible vibrations generated during excavations through sandy soils will be below the threshold limit for building damage.

It is expected most of the excavations will be through Medium Strength Sandstone or better. Excavations through rock should be carried out to minimise the potential to cause vibration damage to the S neighbouring house and driveway. The N neighbouring driveway will be as close as ~1.0m from the edges of the excavation. Close controls by the contractor over rock excavation are recommended so excessive vibrations are not generated.

Excavation methods are to be used that limit peak particle velocity to 5mm/sec at the property boundaries. Vibration monitoring will be required to verify this is achieved.



J2328. 9<sup>th</sup> September, 2019. Page 7.

If a milling head is used to grind the rock, vibration monitoring will not be required. Alternatively, if rock sawing is carried out around the perimeter of the excavation boundaries in not less than 1.0m lifts, a rock hammer up to 300kg could be used to break the rock without vibration monitoring. Peak particle velocity will be less than 5mm/sec at the property boundaries using this method provided the saw cuts are kept well below the rock to broken.

It is worth noting that vibrations that are below thresholds for building damage may be felt by the occupants of the neighbouring properties.

# 13. Excavation Support Requirements

Allowing for backwall drainage the excavation along the S boundary will be as close as 0.6m from the neighbouring driveway.

No structures or boundaries will be within the zone of influence along the other excavation faces to the N and W. In this instance the zone of influence is that area above a theoretical 30° line through soil, and 45° line through clay from the top of Medium Strength Rock towards the surrounding structures and boundaries. The shallow soil portions of the cut are to be scraped back from the line of the excavation at least 0.5m and are to be battered at 1.0 vertical to 1.7 horizontal (30°).

Along the S boundary where the cut is within 1.2m of the neighbouring driveway, the cut thorough soil is to be permanently supported before the excavation through rock commences. The support is to be installed systematically as the excavation progresses to ensure the integrity of the neighbouring driveway. This will only be required along a short section of the S excavation face (some 3.0m) as the neighbouring driveway tapers away from the boundary and the proposed excavation reduces in height significantly downslope.

Excavations through Medium Strength Sandstone or better will stand at vertical angles unsupported subject to approval by the geotechnical consultant.

Upslope runoff is to be diverted from the cut faces by sandbag mounds or other diversion works. Unsupported cut batters through soil are to be covered to prevent access of water in



J2328. 9<sup>th</sup> September, 2019. Page 8.

wet weather and loss of moisture in dry weather. The covers are to be tied down with metal pegs or other suitable fixtures so they can't blow off in a storm. The materials and labour to construct the retaining walls are to be organised so on completion of the excavations they can be constructed as soon as possible. The excavations are to be carried out during a dry period. No excavations are to commence if heavy or prolonged rainfall is forecast.

During the excavation process, the geotechnical consultant is to inspect the excavation as it is lowered in 1.5m intervals to ensure the ground materials are as expected and no wedges or other geological defects are present that could require additional support. Should additional ground support be required, this will likely involve the use of mesh, sprayed concrete, and rock bolts.

Upon completion of the excavation, it is recommended all cut faces be supported with retaining walls to prevent any potential future movement of joint blocks in the cut faces that can occur over time, when unfavourable jointing is obscured behind the excavation faces. Additionally, retaining walls will help control seepage and to prevent minor erosion and sediment movement.

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

# 14. Retaining Walls

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



J2328. 9<sup>th</sup> September, 2019. Page 9.

	Earth Pressure Coefficients				
Unit	Unit weight (kN/m <sup>3</sup> )	'Active' Ka	'At Rest' K₀		
Sandy Soil and Residual Clay	20	0.40	0.55		
Medium Strength Sandstone	24	0.00	0.01		

#### Table 1 – Likely Earth Pressures for Retaining Walls

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 walls are fully drained. Rock strength and relevant earth pressure coefficients are to be confirmed on site by the geotechnical consultant.

All retaining walls are to have sufficient back-wall drainage and be backfilled immediately behind the wall 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 walls, the likely hydrostatic pressures are to be accounted for in the structural design.

#### 15. Foundations

A concrete slab and spread footings supported directly off Medium Strength Sandstone are suitable footings for the proposed secondary dwelling. This ground material is expected to be exposed across the base of the excavation. 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



J2328. 9<sup>th</sup> September, 2019. Page 10.

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.

#### 16. Inspections

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

- During the excavation process, the geotechnical consultant is to inspect the cut faces as they are lowered in 1.5m intervals to ensure ground materials are as expected and that there are no wedges or other defects present in the rock that may require additional support.
- 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.

lut

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



J2328. 9<sup>th</sup> September, 2019. Page 11.



Photo 1



Photo 2



J2328. 9<sup>th</sup> September, 2019. Page 12.



Photo 3



Photo 4

White Geotechnical Group ABN 96164052715

www.whitegeo.com.au Phone 027900 3214 Info@whitegeo.com.au Shop 1/5 South Creek Rd, Dee Why



J2328. 9<sup>th</sup> September, 2019. Page 13.



Photo 5



Photo 6



J2328. 9<sup>th</sup> September, 2019. Page 14.



Photo 7 – AH1

White Geotechnical Group ABN 96164052715

www.whitegeo.com.au Phone 027900 3214 Info@whitegeo.com.au Shop 1/5 South Creek Rd, Dee Why



J2328. 9<sup>th</sup> September, 2019. Page 15.



Photo 8 – AH2

White Geotechnical Group ABN 96164052715

www.whitegeo.com.au Phone 027900 3214 Info@whitegeo.com.au Shop 1/5 South Creek Rd, Dee Why



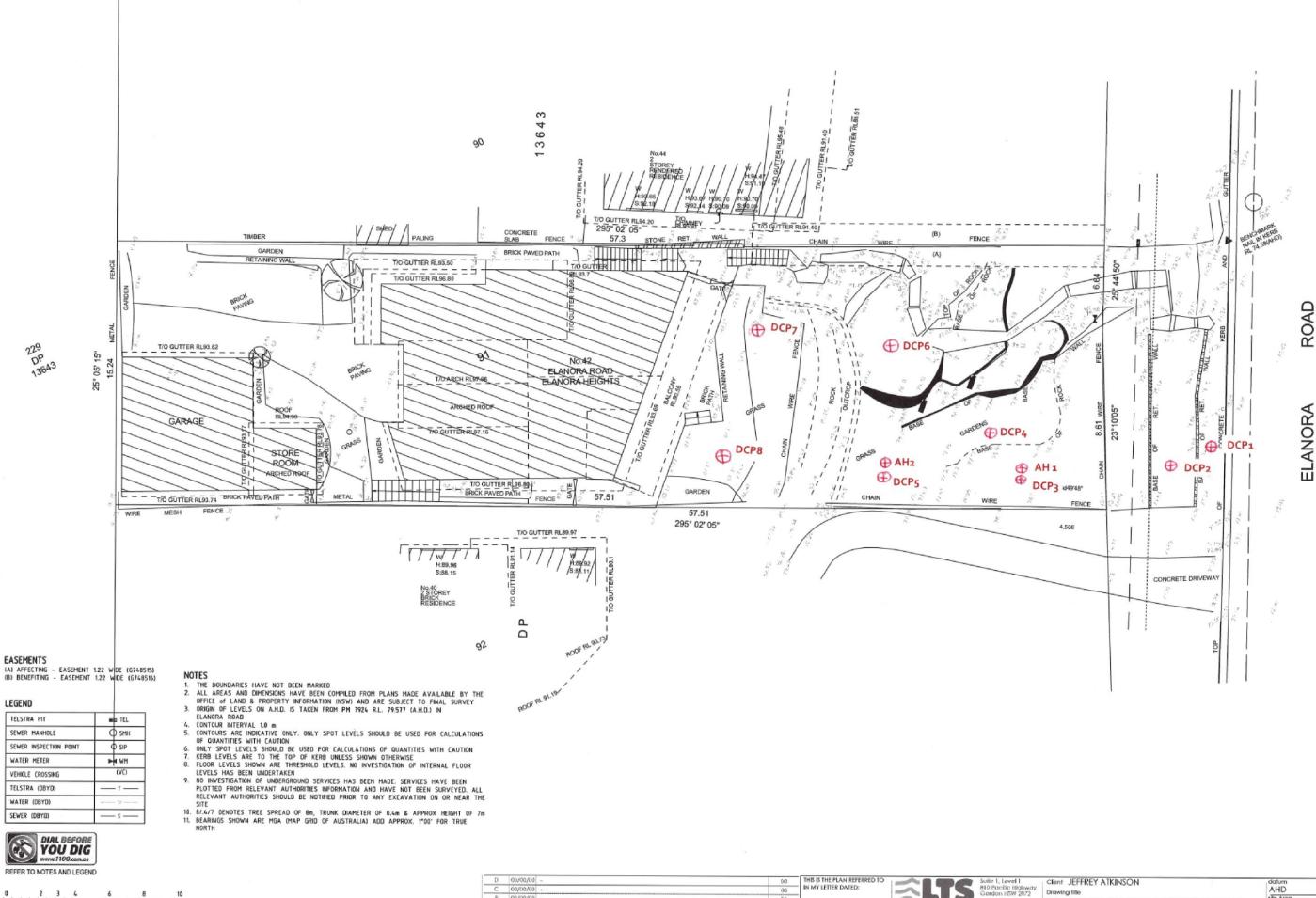
J2328. 9<sup>th</sup> September, 2019. Page 16.

# 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.

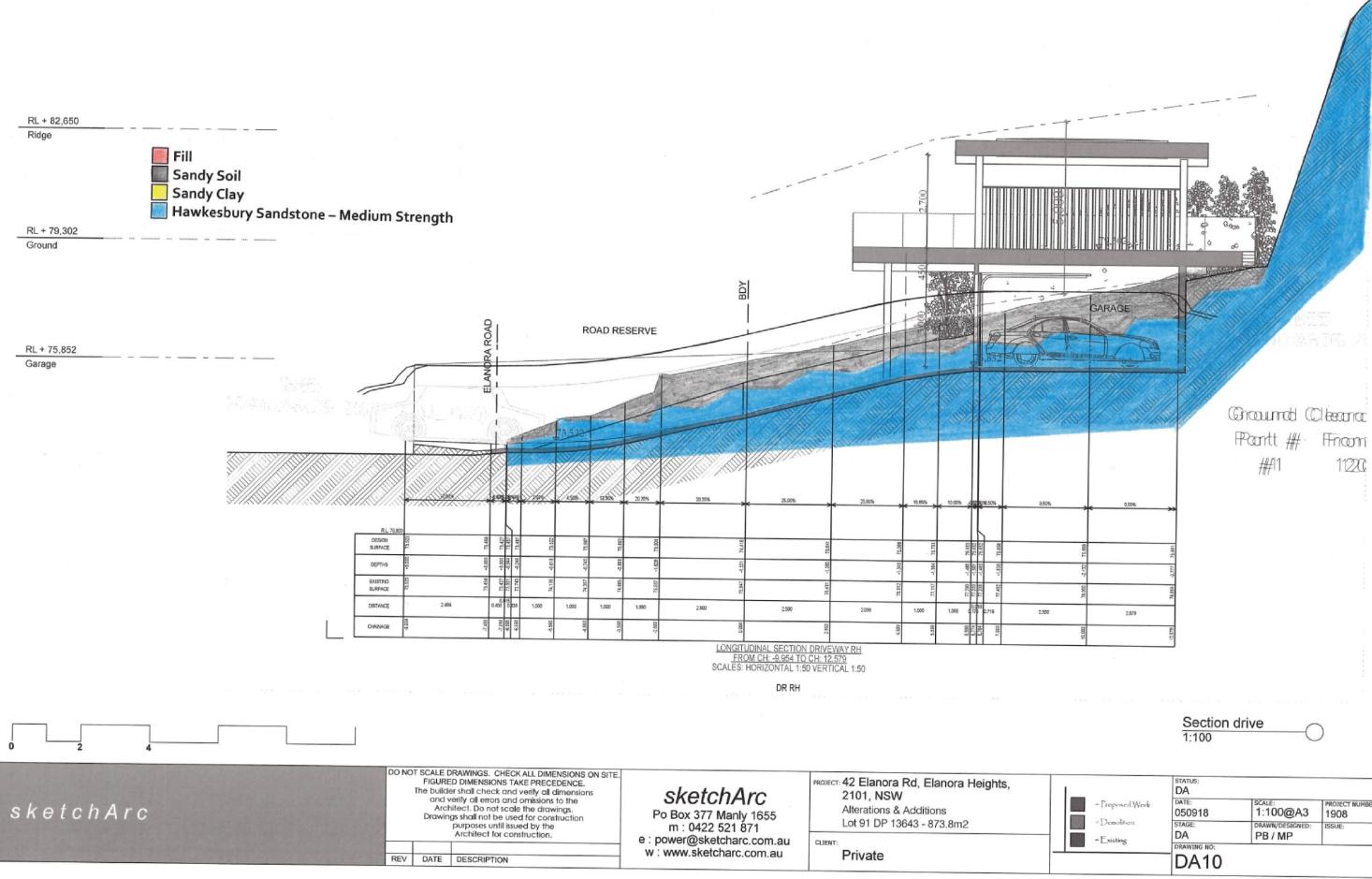


4 2 6 8 SCALE 1: 100 @ A1

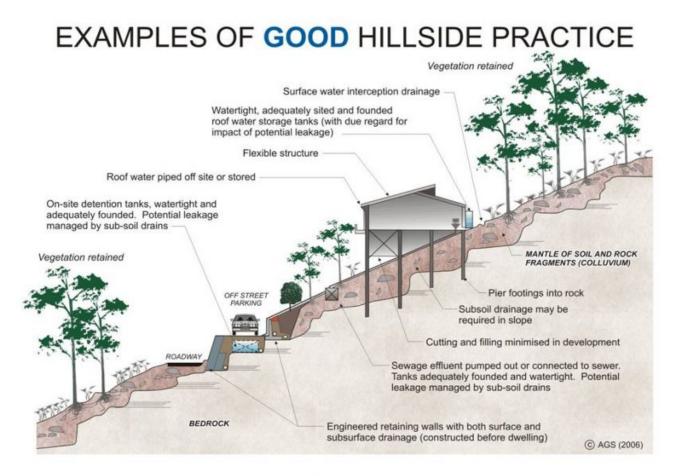
С	00/00/00	•	00	IN MY LETTER DATED:			810 Pacific Highway Gordon NSW 2072
8	00/00/00	-	00				Locked Bog 5
A	24/08/18	EXTRA DETAIL & LEVELS ADDED	42246 002		LOCKLEY	( Sevenments	Gordon NSW 2072

PLAN OF DETAIL AND LEVELS OVER LOT 91 IN	
KNOWN AS 42 ELANORA ROAD ELANORA H	EIGHTS

datum	project r	umber	referen
AHD	-		42244
site Area	scole		date of
873.8 m <sup>2</sup>	1:100	@A1	24-08
LGA		CUEE	,



	STATUS: DA		
- Proposed Work	DATE:	scale:	PROJECT NUMBER:
	050918	1:100@A3	1908
* Demolition	STAGE:	DRAWN/DESIGNED:	ISSUE:
- Existing	DA	PB / MP	
Listing	DRAWING NO: DA10		



# EXAMPLES OF **POOR** HILLSIDE PRACTICE

