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

Development Application for _____
Name of Applicant

Address of site 100 Hilltop Road, Avalon

The following checklist covers the minimum requirements to be addressed in a Geotechnical Risk ***Declaration made by geotechnical engineer or engineering geologist or coastal engineer (where applicable) as part of a geotechnical report***

I, Ben White *on behalf of* White Geotechnical Group Pty Ltd
(Insert Name) (Trading or Company Name)

on this the 30/7/24 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 **100 Hilltop Road, Avalon**
Report Date: 30/7/24

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 100 Hilltop Road, Avalon

The following checklist covers the minimum requirements to be addressed in a Geotechnical Risk Management Geotechnical Report. This checklist is to accompany the Geotechnical Report and its certification (Form No. 1).

Geotechnical Report Details:

Report Title: Geotechnical Report **100 Hilltop Road, Avalon**

Report Date: 30/7/24

Author: BEN WHITE

Author's Company/Organisation: WHITE GEOTECHNICAL GROUP PTY LTD

Please mark appropriate box

☒ Comprehensive site mapping conducted **17/8/22**
(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 **17/8/22**

☒ 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 House at **100 Hilltop Road, Avalon**

1. Proposed Development

1.1 Construct a new part four storey house with suspended garage and driveway by excavating to a maximum depth of ~3.1m. The Level 1, 2 and 3 portions of the excavation reach maximum depths of ~3.1m, ~2.0m and ~1.2m respectively.

1.2 Details of the proposed development are shown on 21 drawings prepared by Oliver Keaveney, project number 18456, drawings numbered A1.1 to A1.9, A2.1 to A2.5 and A3.1 to A3.8, dated 14/6/24.

2. Site Description

2.1 The site was inspected on the 17th August, 2022.

2.2 This vacant residential property is on the low side of the road and has a NW aspect. It is located on the steeply graded upper reaches of a hillslope. The natural slope falls across the property at an average angle of ~26°. The slope above the property continues at similar steep angles for some 35m before reaching the crest of the hill. The slope below the property continues at similar steep angles for some 85m before decreasing in grade.

2.3 Fill provides a level platform for the road and road reserve (Photo 1). The fill is supported by a concrete crib retaining wall that is estimated to be up to ~4.0m high (Photo 2). Part of the wall is obscured by vegetation and could not be adequately assessed. The visible portion of the wall appears to be currently stable. The vacant block is thickly vegetated (Photos 3 & 4). Sandstone bedrock is outcropping at the

upper middle portion of the property (Photo 5). Detached sandstone joint blocks are embedded in stable positions in the slope (Photos 6 & 7).

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. A band of Medium Strength Sandstone underlies the location of the proposed house and extends through the otherwise shale dominated profile.

4. Subsurface Investigation

One hand Auger Hole (AH) was put down to identify the soil materials. Five 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 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 (~RL71.8) **–** AH1 (Photo 8)

Depth (m)	**Material Encountered**
0.0 to 0.6	**COLLUVIUM**, soil and clay, dark brown, orange, dry, fine to course grained.

Refusal @ 0.6m in colluvium. 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** (~RL71.8)	**DCP 2** (~RL71.0)	**DCP 3** (~RL68.0)	**DCP 4** (~RL63.4)	**DCP 5** (~RL61.0)
0.0 to 0.3	5	3F	8	4	3
0.3 to 0.6	18	4	13	5	6
0.6 to 0.9	16	8	23	6	7
0.9 to 1.2	20	13	27	#	30
1.2 to 1.5	8	11	47		55
1.5 to 1.8	#	#	#		#
	Refusal on rock @ 1.3m	Refusal on rock @ 1.3m	End of Test @ 1.5m	Refusal on rock @ 0.7m	End of Test @ 1.5m

#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 @ 1.3m, DCP bouncing off rock surface, white, orange and maroon rock fragments and orange clay on dry tip.

DCP2 – Refusal on rock @ 1.3m, DCP bouncing off rock surface, white rock fragments and dark brown soil on moist tip.

DCP3 – End of test @ 1.5m, DCP still very slowly going down, brown orange rock fragments and dark brown soil on dry tip.

DCP4 – Refusal on rock @ 0.7m, DCP bouncing off rock surface, white impact dust and brown soil on moist tip.

DCP5 – End of test @ 1.5m, DCP still very slowly going down, white impact dust and brown soil 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 colluvium over firm to stiff clays. Medium Strength Sandstone bedrock is outcropping at the upper middle portion of the property (Photo 5). This is expected to be a band of sandstone in an otherwise shale dominated profile. In the test locations, the depth to weathered rock ranged from ~0.7m to ~1.3m below the current

surface, being shallower near where sandstone is outcropping (DCP4). The weathered zone of the underlying rock is interpreted as Extremely Low to Low Strength Rock. 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

Ground water seepage is expected to move over the denser and less permeable clay and weathered rock layers in the sub-surface profile and through the cracks in the rock. Due to the slope and elevation of the block, the water table 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. Normal sheet wash from the slope above will be intercepted by the street drainage system for Hilltop Road above.

8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed beside the property. The steep slope that falls across the property and continues above and below is a potential hazard (**Hazard One**). The vibrations produced during the proposed excavation are a potential hazard (**Hazard Two**). The proposed excavation is a potential hazard until retaining structures are in place (**Hazard Three**).

RISK ANALYSIS SUMMARY ON NEXT PAGE

Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

HAZARDS	Hazard One	Hazard Two	Hazard Three
TYPE	The steep slope that falls across the property and continues above and below failing and impacting on the property.	The vibrations produced during the proposed excavation for the house impacting on the surrounding structures.	The proposed excavation for the house collapsing onto the worksite and impacting the neighbouring properties during the excavation process.
LIKELIHOOD	'Unlikely' (10^{-4})	'Possible' (10^{-3})	'Possible' (10^{-3})
CONSEQUENCES TO PROPERTY	'Medium' (12%)	'Medium' (15%)	'Medium' (20%)
RISK TO PROPERTY	'Low' (2×10^{-5})	'Moderate' (2×10^{-4})	'Moderate' (2×10^{-4})
RISK TO LIFE	8.3×10^{-7}/annum	5.3×10^{-7}/annum	3.7×10^{-4}/annum
COMMENTS	This level of risk is 'ACCEPTABLE', Provided the recommendations in **Section 16** are followed.	This level of risk to property is 'UNACCEPTABLE'. To move risk to 'ACCEPTABLE' levels, the recommendations in **Sections 11 & 12** are to be followed.	This level of risk to life and property is 'UNACCEPTABLE'. To move the risk to 'ACCEPTABLE' levels, the recommendations in **Section 13** 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

The fall is away from the street. The stormwater engineer is to refer to council stormwater policy for suitable options.

11. Excavations

An excavation to a maximum depth of ~3.1m is required to construct the proposed new house. The Level 1, 2, and 3 portions of the excavation reach maximum depths of ~3.1m, ~2.0m, and ~1.2m respectively.

The excavation is expected to be through colluvium and clay, with Extremely Low to Medium Strength Rock expected at depths of up to ~1.5m below the current surface where it is not exposed.

It is envisaged that excavations through colluvium, clay and rock up to Low Strength can be carried out with an excavator and toothed bucket and excavations through Medium Strength rock or better will require grinding or rock sawing and breaking.

12. Vibrations

Possible vibrations generated during excavations through colluvium, clay, and rock up to Low Strength will be below the threshold limit for building damage utilising a domestic sized excavator up to 16 tonnes.

Excavations through Medium Strength Rock or better should be carried out to minimise the potential to cause vibration damage to the NE and SW neighbouring properties. Allowing 0.5m for backwall drainage, the setbacks are as follows:

- The Level 1 portion of the excavation is set back ~5.7m from the NE neighbouring house, ~5.8m from the SW neighbouring pool and ~8.4m from the SW neighbouring house.

- The Level 2 portion of the excavation is set back ~5.2m from the NE neighbouring house, ~3.2m from the SW neighbouring pool and ~7.6m from the SW neighbouring house.

Dilapidation reporting carried out on the NE and SW neighbouring properties is recommended prior to the excavation works commencing to minimise the potential for spurious building damage claims.

Excavation methods are to be used that limit peak particle velocity to 5mm/sec at the NE neighbouring house, SW neighbouring house and SW neighbouring pool. Vibration monitoring will be required to verify this is achieved. Vibration monitoring must include a light/alarm so the operator knows if vibration limits have been exceeded. The equipment is to log and record vibrations throughout the excavation works.

In Medium Strength rock or better techniques to minimise vibration transmission will be required. These include:

- Rock sawing the excavation perimeter to at least 1.0m deep prior to any rock breaking with hammers, keeping the saw cuts below the rock to be broken throughout the excavation process.
- Limiting rock hammer size.
- Rock hammering in short bursts so vibrations do not amplify.
- Rock breaking with the hammer angled away from the nearby sensitive structures.
- Creating additional saw breaks in the rock where vibration limits are exceeded, as well as reducing hammer size as necessary.
- Use of rock grinders (milling head).

Should excavation induced vibrations exceed vibration limits after the recommendations above have been implemented, excavation works are to cease immediately and our office is to be contacted.

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

13. Excavation Support Requirements

Allowing 0.5m for backwall drainage, the setbacks are as follows:

- The Level 1 portion of the excavation is set back ~2.0m from the NE common boundary.
- The Level 2 portion of the excavation is set back ~0.8m from the NE common boundary.
- The Level 3 portion of the excavation is set back sufficiently from the surrounding structures and property boundaries.

The NE common boundary will be within the zone of influence of the Level 1 and 2 portions of the excavation. In this instance, the zone of influence is the area above a theoretical 30° line (from horizontal) through colluvium and a 45° line through clay / weathered rock from the base of the excavation or the top of Medium Strength Rock, whichever comes first, towards the surrounding structures and boundaries.

Due to the steep grade of the slope, the presence of detached sandstone joint blocks across the slope, the depth of the excavation and the proximity of the excavation to the NE common boundary, all sides of the Level 1 and 2 portions of the excavation will require ground support prior to the commencement of the excavation. See the Site Plan attached for the minimum extent of the required shoring shown in blue.

A spaced pile retaining wall is one of the suitable methods of support. Pier spacing is typically ~2.0m but can vary between 1.6 to 2.4m depending on the design. As the excavation is lowered in 1.5m lifts, infill sprayed concrete panels or similar are added between the piers to form the wall. Drainage is to be installed behind the panels. To drill the pier holes for the walls, a pilling rig that can excavate through Medium to High Strength Rock will be required. The piers can be temporarily supported by embedment below the base of the excavation or

with a combination of embedment and propping. The walls are to be tied into the Level 1 and 2 slabs to provide permanent bracing after which any temporary bracing can be released.

The geotechnical consultant is to inspect the drilling process of the entire first pile and the ground materials at the base of all pile holes / excavations installed for ground support purposes.

Where shoring is not required, the colluvium/topsoil portion of the excavation is to be battered temporarily at 1.0 Vertical to 2.0 Horizontal (26°) until the retaining walls are in place. Excavations through clay and rock up to Low Strength are expected to stand at near-vertical angles for short periods of time until the retaining walls are in place, provided the cut batters are kept from becoming saturated.

Medium Strength Rock or better is expected to stand at vertical angles unsupported subject to approval by the geotechnical consultant.

During the excavation process, the geotechnical consultant is to inspect the cut face in 1.5m intervals as it is lowered to ensure ground materials are as expected and that additional support is not required.

Upslope runoff is to be diverted from the cut faces by sandbag mounds or other diversion works. All unsupported cut batters through colluvium/topsoil, clay and rock up to Low Strength are to be covered to prevent access of water in 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 cannot blow off in a storm. The materials and labour to construct the retaining walls are to be organised so shoring walls can be installed as required. The excavation is to be carried out during a dry period. No excavations are to commence if heavy or prolonged rainfall is forecast. If the cut batters through colluvium/topsoil, clay and rock up to Low Strength remain unsupported for more than a few days before the construction of the retaining walls they are to be temporarily supported until the retaining walls are in place.

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^3)	'Active' K_a	'At Rest' K_0	Passive
Fill, Colluvium and Topsoil	20	0.40	0.55	N/A
Residual Clays	20	0.35	0.45	Kp = 2.0 'ultimate'
Extremely Low to Very Low Strength Rock	22	0.25	0.38	Kp = 2.5 'ultimate'
Low Strength Rock	24	0.20	0.35	1000kPa 'ultimate'
Medium Strength Rock	24	0.00	0.01	2000kPa '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 and do not account for any surcharge loads, noting that surcharge loads from the slope above will be acting on the wall that will need to be accounted for in the design. It also assumes retaining structures are fully drained. It should be noted that passive pressure is an ultimate value and should have an appropriate safety factor applied. No passive resistance should be

assumed for the top 0.4m to account for any disturbance from the excavation. Ground materials 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, the likely hydrostatic pressures are to be accounted for in the structural design.

15. Foundations

Levels 1 and 2 of the proposed new house are expected to be seated in Extremely Low Strength Rock or better at the uphill side. This is a suitable foundation material. Where the proposed structures are not seated in weathered rock, piers taken to and embedded no less than 1.0m into Extremely Low Strength Rock or better will be required. This ground material is expected from exposed at the surface to ~1.5m below the current surface across the property. The required pier depths on the uphill side of the driveway are expected to be ~5m to ~6m deep due to the presence of ~3m to ~4m of fill at the road reserve (Photos 1 & 2). A maximum allowable bearing pressure of 600kPa can be assumed for piers embedded into Extremely Low Strength Rock or better. 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 weathered rock 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 weathered rock 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. Ongoing Maintenance

Where slopes are steep and approach or exceed 30°, such as on this site, it is prudent for the owners to occasionally inspect the slope (say annually or after heavy and prolonged 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 ongoing maintenance being carried out.

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 INSPECTIONS ON NEXT PAGE

18. 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 Occupation Certificate if the following inspections have not been carried out during the construction process.

- The geotechnical consultant is to inspect the drilling process of the entire first pile and the ground materials at the base of all pile holes / excavations installed for ground support purposes.

- During the excavation process, the geotechnical consultant is to inspect the cut face in 1.5m intervals as it is lowered to ensure ground materials are as expected and that additional support is not required.

- 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:

Dion Sheldon
BEng(Civil)(Hons),
Geotechnical Engineer.

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

REGISTERED PROFESSIONAL GEOSCIENTIST
AUSTRALIAN INSTITUTE OF GEOSCIENTISTS
NATHAN GARDNER
RPGeo No:
10307

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8: 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.

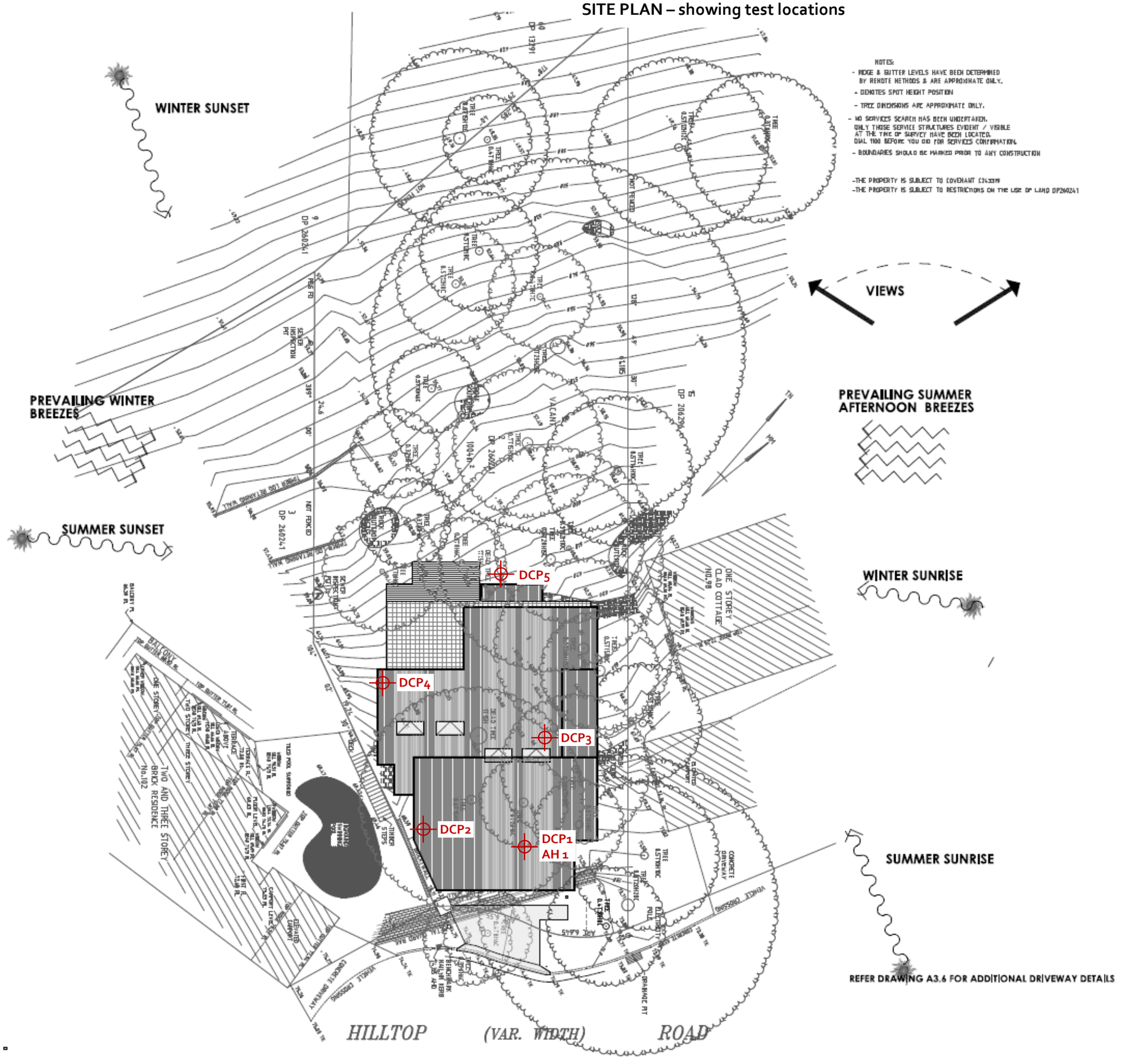
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

- 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.

SITE PLAN – showing test locations



NOTES
This drawing shall be read in conjunction with all other drawings and specifications for the project.
Any discrepancies shall be referred to the architect for clarification before proceeding with work.
All dimensions shall be verified on site prior to commencement of construction or fabrication on and off site.
Figured dimensions to be used rather than scaling.
All building work must be carried out in accordance with the Building Code of Australia and all relevant Australian Standards.
CAD Ref: 18546Keaveney-V27.pln DRAWN BY: SH

LEGEND

0 1 2 5 10m

OLIVER **KEAVENEY**
UNIT 4/101 DARLEY ST
MONA VALE NSW 2103
oliver@oak.net.au

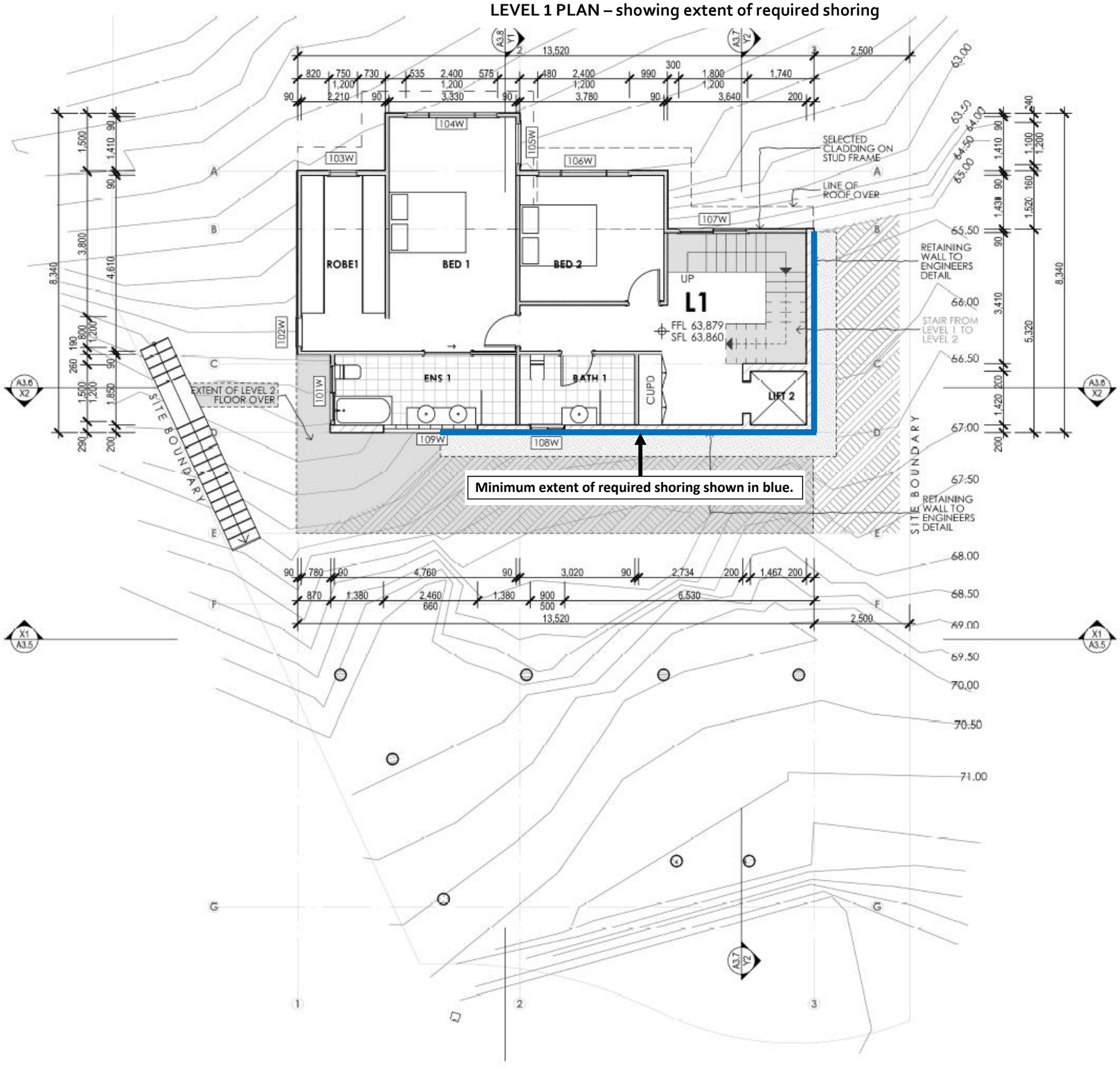
PROJECT
KEAVENEY HOUSE
100 HILLTOP ROAD
AVALON BEACH NSW .
LOT:2 DP:260241
NEW DWELLING
DEVELOPMENT APPLICATION
CLIENT
OLIVER KEAVENEY
UNIT 4/101 DARLEY ST
MONA VALE NSW 2103

DRAWING TITLE
SITE ANALYSIS

REVISION	DATE
DEVELOPMENT APPLICATION	14 JUN 2024

PLOT DATE	SCALE/A3	PROJECT NO.	DRAWING NO.
14/06/24	1:250	18456	A1.5

LEVEL 1 PLAN – showing extent of required shoring



NOTES
This drawing shall be read in conjunction with all other drawings and specifications for the project.
Any discrepancies shall be referred to the architect for clarification before proceeding with work.
All dimensions shall be verified on site prior to commencement of construction or fabrication on and off site.
Figured dimensions to be used rather than scaling.
All building work must be carried out in accordance with the Building Code of Australia and all relevant Australian Standards.
CAD Ref: 18546Keaveney-V27.pln DRAWN BY: SH

LEGEND

CL	CLOTHES LINE
DW	DISHWASHER
F	FREEZER
FP	FIREPLACE
GAS	GAS CYLINDER
GB	GAS BAYONET
HT:M	HOSE TAP MAINS
HT:T	HOSE TAP TANK
HW	GAS INSTANTANEOUS
IN	INVERTER
R	BAR FRIDGE
R	REFRIGERATOR
WP	WATER PUMP
WT	WATERTANK

D01	DOOR No. TAG
101D	GLAZED DOOR No. TAG
101W	GLAZEDWINDOW No. TAG
FFL	FINISHED FLOOR LEVEL
RL	REDUCED LEVEL
SFL	STRUCTURAL FLOOR LEVEL

0 1 2 5m

OLIVER **KEAVENEY**
UNIT 4/101 DARLEY ST
MONA VALE NSW 2103
oliver@oak.net.au

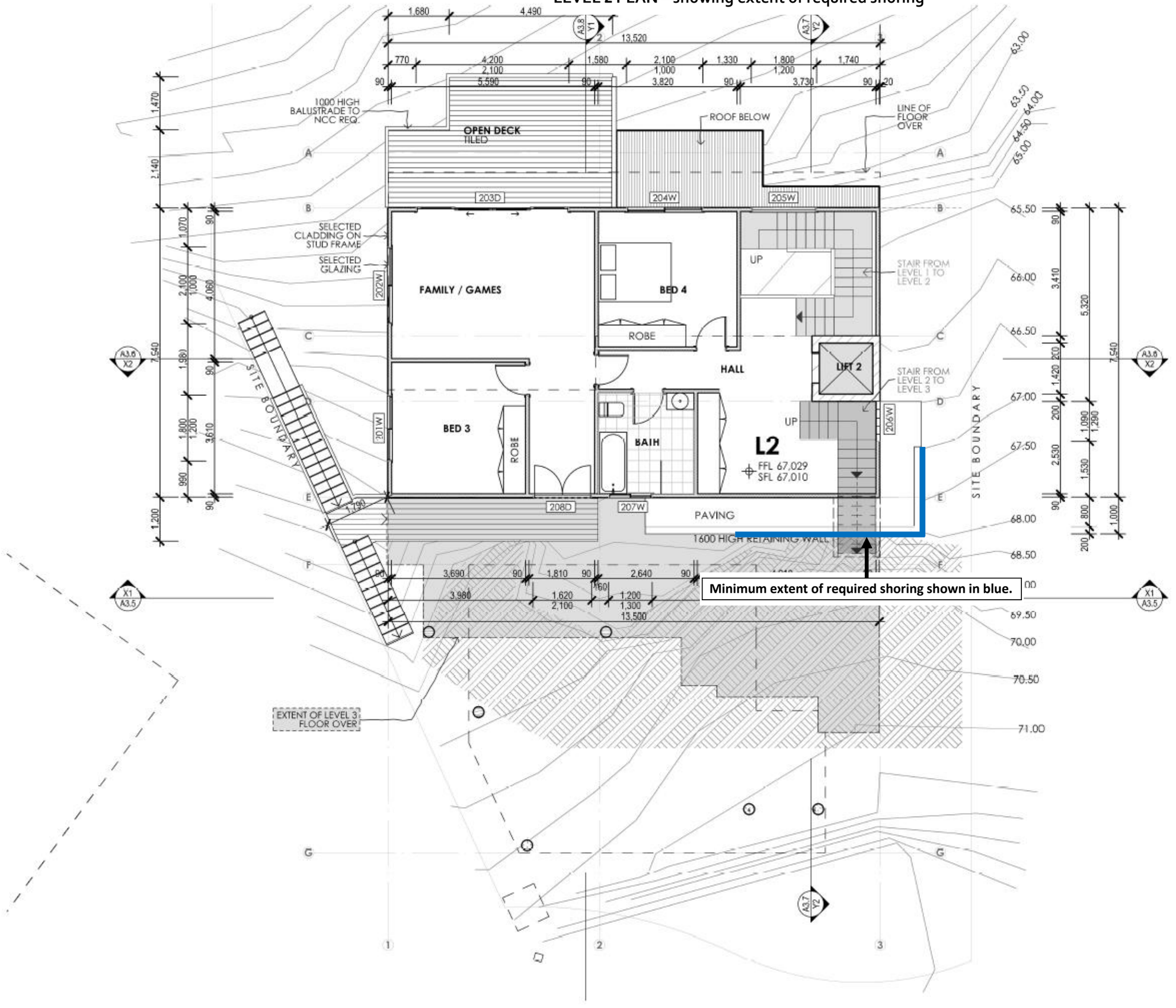
PROJECT
KEAVENEY HOUSE
100 HILLTOP ROAD
AVALON BEACH NSW .
LOT:2 DP:260241
NEW DWELLING
DEVELOPMENT APPLICATION
CLIENT
OLIVER KEAVENEY
UNIT 4/101 DARLEY ST
MONA VALE NSW 2103

DRAWING TITLE
LEVEL 1 FLOOR PLAN

REVISION	DATE
DEVELOPMENT APPLICATION	14 JUN 2024

PLOT DATE	SCALE@A3	PROJECT NO.	DRAWING NO.
14/06/24	1:100	18456	A2.5

LEVEL 2 PLAN – showing extent of required shoring



NOTES

This drawing shall be read in conjunction with all other drawings and specifications for the project.
Any discrepancies shall be referred to the architect for clarification before proceeding with work.
All dimensions shall be verified on site prior to commencement of construction or fabrication on and off site.
Figured dimensions to be used rather than scaling.
All building work must be carried out in accordance with the Building Code of Australia and all relevant Australian Standards.
CAD Ref: 18546Keaveney-V27.pln DRAWN BY: SH

LEGEND

CL	CLOTHES LINE
DW	DISHWASHER
F	FREEZER
FP	FIREPLACE
GAS	GAS CYLINDER
GB	GAS BAYONET
HT:M	HOSE TAP MAINS
HT:T	HOSE TAP TANK
HW	GAS INSTANTANEOUS
IN	INVERTER
R	BAR FRIDGE
R	REFRIGERATOR
WP	WATER PUMP
WT	WATERTANK

D01	DOOR No. TAG
101D	GLAZED DOOR No. TAG
101W	GLAZEDWINDOW No. TAG

FFL	FINISHED FLOOR LEVEL
RL	REDUCED LEVEL
SFL	STRUCTURAL FLOOR LEVEL

0 1 2 5m

OLIVER **KEAVENEY**
UNIT 4/101 DARLEY ST
MONA VALE NSW 2103
oliver@oak.net.au

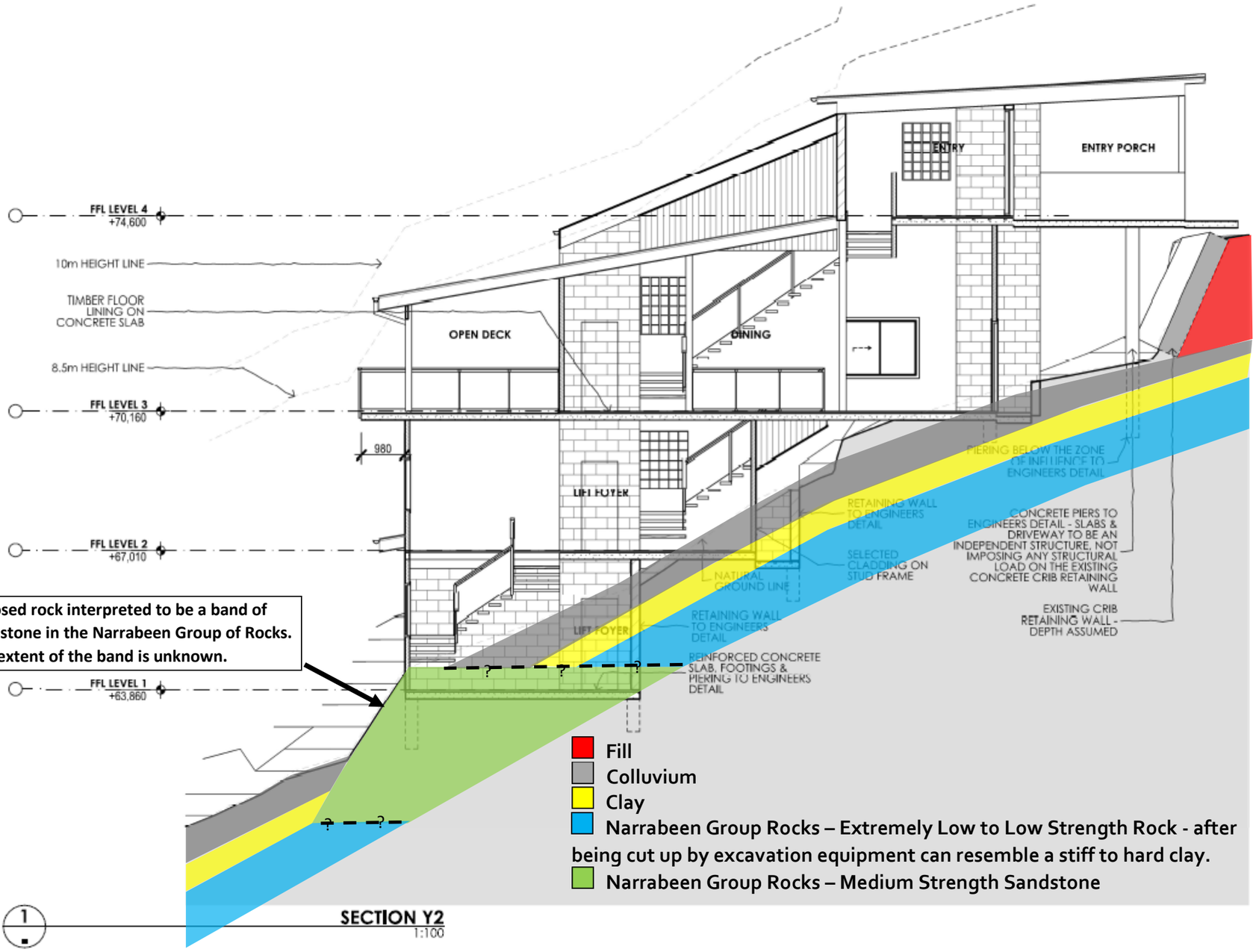
PROJECT
KEAVENEY HOUSE
100 HILLTOP ROAD
AVALON BEACH NSW .
LOT:2 DP:260241
NEW DWELLING
DEVELOPMENT APPLICATION
CLIENT
OLIVER KEAVENEY
UNIT 4/101 DARLEY ST
MONA VALE NSW 2103

DRAWING TITLE
LEVEL 2 FLOOR PLAN

REVISION	DATE
DEVELOPMENT APPLICATION	14 JUN 2024

PLOT DATE	SCALE@A3	PROJECT NO.	DRAWING NO.
14/06/24	1:100	18456	A2.4

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



1 SECTION Y2
1:100

NOTES
This drawing shall be read in conjunction with all other drawings and specifications for the project.
Any discrepancies shall be referred to the architect for clarification before proceeding with work.
All dimensions shall be verified on site prior to commencement of construction or fabrication on and off site.
Figured dimensions to be used rather than scaling.
All building work must be carried out in accordance with the Building Code of Australia and all relevant Australian Standards.
CAD Ref: 18546Keaveney-V27.pln DRAWN BY: SH

LEGEND

CL	CLOTHES LINE
DW	DISHWASHER
F	FREEZER
FP	FIREPLACE
GAS	GAS CYLINDER
GB	GAS BAYONET
HT:M	HOSE TAP MAINS
HT:T	HOSE TAP TANK
HW	GAS INSTANTANEOUS
IN	INVERTER
R	BAR FRIDGE
R	REFRIGERATOR
WP	WATER PUMP
WT	WATERTANK

D01	DOOR No. TAG
101D	GLAZED DOOR No. TAG
101W	GLAZEDWINDOW No. TAG
FFL	FINISHED FLOOR LEVEL
RL	REDUCED LEVEL
SFL	STRUCTURAL FLOOR LEVEL

0 1 2 5m

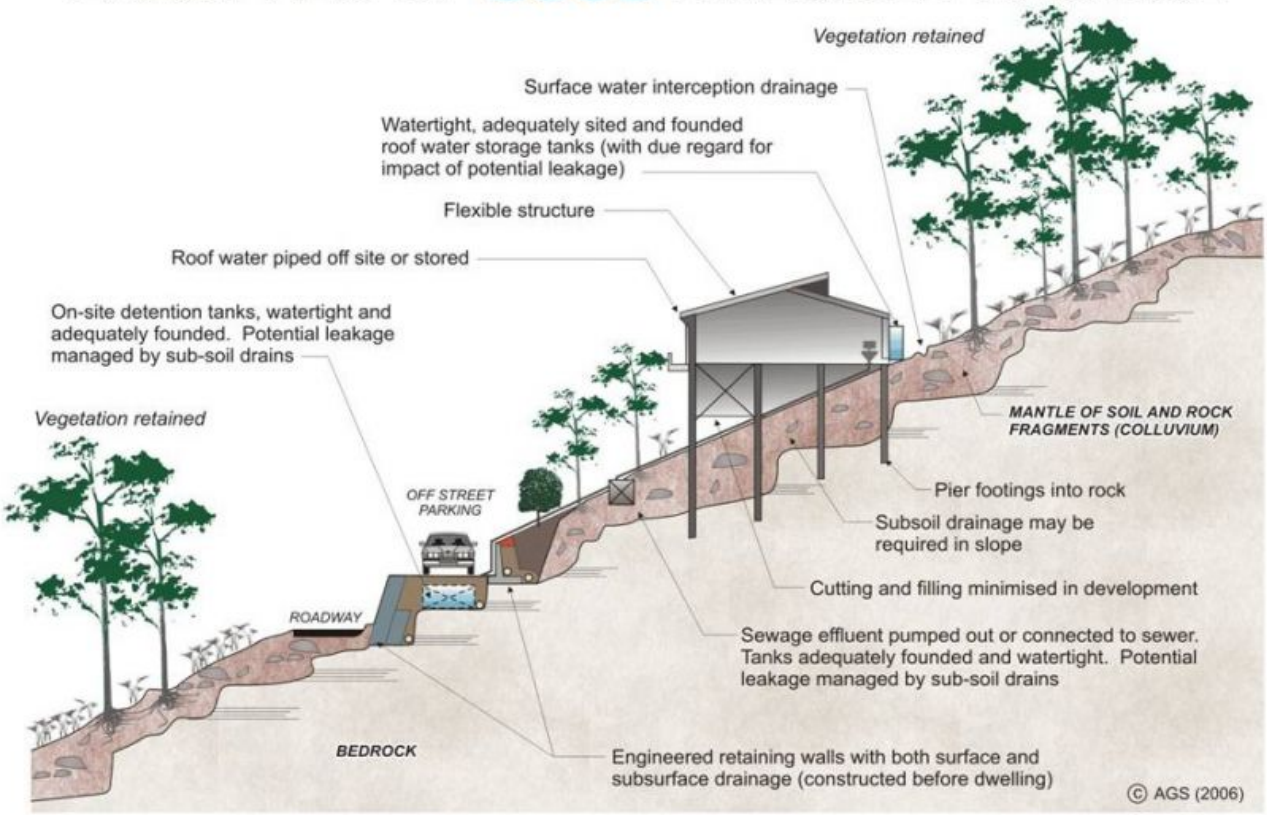
OLIVER **KEAVENEY**
UNIT 4/101 DARLEY ST
MONA VALE NSW 2103
oliver@oak.net.au

PROJECT
KEAVENEY HOUSE
100 HILLTOP ROAD
AVALON BEACH NSW .
LOT:2 DP:260241
NEW DWELLING
DEVELOPMENT APPLICATION
CLIENT
OLIVER KEAVENEY
UNIT 4/101 DARLEY ST
MONA VALE NSW 2103
DRAWING TITLE
SECTIONS

REVISION	DATE
DEVELOPMENT APPLICATION	14 JUN 2024

PLOT DATE	SCALE@A3	PROJECT NO.	DRAWING NO.
14/06/24	1:100	18456	**A3.7**

EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE