

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

Development Application for _____	Name of Applicant
Address of site 44 Nareen Parade, North Narrabeen	

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 11/03/21 certify that I am a geotechnical engineer or engineering geologist or coastal engineer as defined by the Geotechnical Risk Management Policy for Pittwater - 2009 and I am authorised by the above organisation/company to issue this document and to certify that the organisation/company has a current professional indemnity policy of at least \$2million.
I have:

Please mark appropriate box

- ☐ Prepared the detailed Geotechnical Report referenced below in accordance with the Australia Geomechanics Society's Landslide Risk Management Guidelines (AGS 2007) and the Geotechnical Risk Management Policy for Pittwater - 2009
- ☐ I am willing to technically verify that the detailed Geotechnical Report referenced below has been prepared in accordance with the Australian Geomechanics Society's Landslide Risk Management Guidelines (AGS 2007) and the Geotechnical Risk Management Policy for Pittwater - 2009
- ☐ Have examined the site and the proposed development in detail and have carried out a risk assessment in accordance with paragraph 6.0 of the Geotechnical Risk Management Policy for Pittwater - 2009. I confirm the results of the risk assessment for the proposed development are in compliance with the Geotechnical Risk Management Policy for Pittwater - 2009 and further detailed geotechnical reporting is not required for the subject site.
- ☒ Have examined the site and the proposed development/alteration in detail and am of the opinion that the Development Application only involves Minor Development/Alterations that do not require a Detailed Geotechnical Risk Assessment and hence my report is in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009 requirements for Minor Development/Alterations.
- ☐ Provided the coastal process and coastal forces analysis for inclusion in the Geotechnical Report


Geotechnical Report Details:

Report Title: Geotechnical Assessment 44 Nareen Parade, North Narrabeen
Report Date: 11/03/21
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>44 Nareen Parade, North Narrabeen</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>44 Nareen Parade, North Narrabeen</u>
Report Date: <u>11/03/21</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 5/03/21
(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 5/03/21
- ☒ 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 Granny Flat at 44 Nareen Parade, North Narrabeen

1. Proposed Development

- 1.1** Construct a new granny flat on the downhill side of the property
- 1.2** Various other minor alterations.
- 1.3** Details of the proposed development are shown on 3 drawings prepared by R. Conway, drawings numbered 20/6/1 to 20/6/3, dated 11.1.21.

2. Site Description

- 2.1** The site was inspected on the 5th March, 2021.
- 2.2** This residential property is on the high side of the road and has a SW aspect. It is located on the steeply graded lower reaches and toe of a hillslope. From the road frontage the natural slope rises at an average angle of ~25° to the upper boundary. The slope above the property continues at similar angles.
- 2.3** At the road frontage a concrete driveway runs up the slope to a parking area (Photo 1). The driveway has been partially cut into the slope. The cut is supported by a stable timber retaining wall ~1.5m high. A narrow timber pathway runs across the slope above this wall, and is supported by a stable keystone block retaining wall, ~1.2m high (Photo 3). The slope between the car space and the house is terraced with a series of timber retaining walls between ~1.0 and ~1.5m high. One of these retaining walls is tilting at a maximum angle of 18° downslope from vertical and will require remediation works (**see section 13**) (Photo 6). The two-storey timber framed and clad house is supported on steel posts and brick piers which appear to stand vertical. An excavation has been made through fill under the downhill side of the house for a storage area. The ~1.3m high cut face is unsupported. See **section 13** for

recommended remediation advice. A stable dintel retaining wall up to ~2.0m high supports a cut made for the lower level. An excavation has been made in the slope to create a level platform for the uphill side of the house. The cut is supported by a rock stack retaining wall ~1.3m high. A garden area continues above this wall to the upper common boundary.

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

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

DCP TEST RESULTS ON NEXT PAGE

DCP TEST RESULTS – Dynamic Cone Penetrometer				
Equipment: 9kg hammer, 510mm drop, conical tip.			Standard: AS1289.6.3.2 - 1997	
Depth(m) Blows/0.3m	DCP 1 (~RL16.5)	DCP 2 (~RL17.6)	DCP 3 (~RL12.8)	DCP 4 (~RL12.9)
0.0 to 0.3	8	8	3	6
0.3 to 0.6	31	14	8	18
0.6 to 0.9	33	14	11	36
0.9 to 1.2	#	22	18	#
1.2 to 1.5		26	21	
1.5 to 1.8		30	23	
1.8 to 2.1		#	30	
2.1 to 2.4			#	
	End of Test @ 0.9m	End of Test @ 1.7m	End of Test @ 1.9m	End of Test @ 0.9m

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

DCP Notes:

DCP1 – End of test @ 0.9m, DCP still very slowly going down, orange shale on dry tip.

DCP2 – End of test @ 1.7m, DCP still very slowly going down, clean dry tip, brown clay in collar.

DCP3 – End of test @ 1.9m, DCP still very slowly going down, white and orange shale on dry tip.

DCP4 – End of test @ 0.9m, DCP still very slowly going down, brown and orange shale on dry tip.

5. Geological Observations/Interpretation

The slope materials are colluvial at the near surface and residual at depth. In the location of the proposed work, they consist of a thin topsoil over silty clays. Filling has been placed across the property for terracing and under the house. In the test locations, the clays merge into the weathered zone of the underlying shale at depths of between 0.6m to 1.8m below the current surface. We note that there are isolated sandstone boulders embedded in this slope so DCP1 and DCP4 may have encountered these. The weathered zone is interpreted as Extremely Low Strength Shale. It is to be noted that this material 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 clay and 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. This will move down the slope at a relatively high velocity due to the steep slope.

8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed below or beside the property. The timber retaining wall that is tilting below the house is a potential hazard (**Hazard One**). The steep land surface that falls across the property and continues above is a potential hazard (**Hazard Two**).

RISK ANALYSIS ON THE NEXT PAGE

Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

HAZARDS	Hazard One	Hazard Two
TYPE	Further movement of the timber retaining wall below the house that causes failure (Photo 6).	The steep slope that falls across the property and continues above failing and impacting on the property.
LIKELIHOOD	'Likely' (10^{-2})	'Unlikely' (10^{-4})
CONSEQUENCES TO PROPERTY	'Medium' (15%)	'Medium' (12%)
RISK TO PROPERTY	'High' (2×10^{-3})	'Low' (2×10^{-5})
RISK TO LIFE	1.3×10^{-5} /annum	9.1×10^{-7} /annum
COMMENTS	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.	'ACCEPTABLE' level of risk, provided the recommendations in section 13 are followed.

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

9. Suitability of the Proposed Development for the Site

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

10. Stormwater

The fall is to Nareen Parade. Roof water from the development is to be piped to the street drainage system through any tanks that may be required by the regulating authorities.

11. Excavations

Apart from those for footings, no excavations are required.

12. Foundations

The proposed addition can be supported on piers taken to and embedded ~0.6m into the underlying Extremely Low Strength Shale. This material is expected at depths of between

1.4m to 1.8m below the current surface. A maximum allowable bearing pressure of 600kPa can be assumed for footings on Extremely Low Strength Shale.

It is recommended 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 wet 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 consultant on site at the start of the footing excavation to advise on footing depth and material. This mostly prevents unnecessary over-excavation in clay-like shaly-rock but can be valuable in all types of geology.

13. Site Maintenance

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

A timber retaining wall between the parking area and the house (Photo 6) is tilting downslope to a maximum angle of ~18°. Should this wall collapse, it would pose a threat to the proposed works and any inhabitants. As such, we recommend the retaining wall be rebuilt or remediated to current engineering standards as part of the proposed construction.

The vertical cut through fill below the house (photo 7) is to be battered at not more than 1.0 Vertical: 1.7 Horizontal (30°). Alternatively, the cut can be supported by an engineered retaining wall.

14. Inspection

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

White Geotechnical Group Pty Ltd.



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



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7

Important Information about Your Report

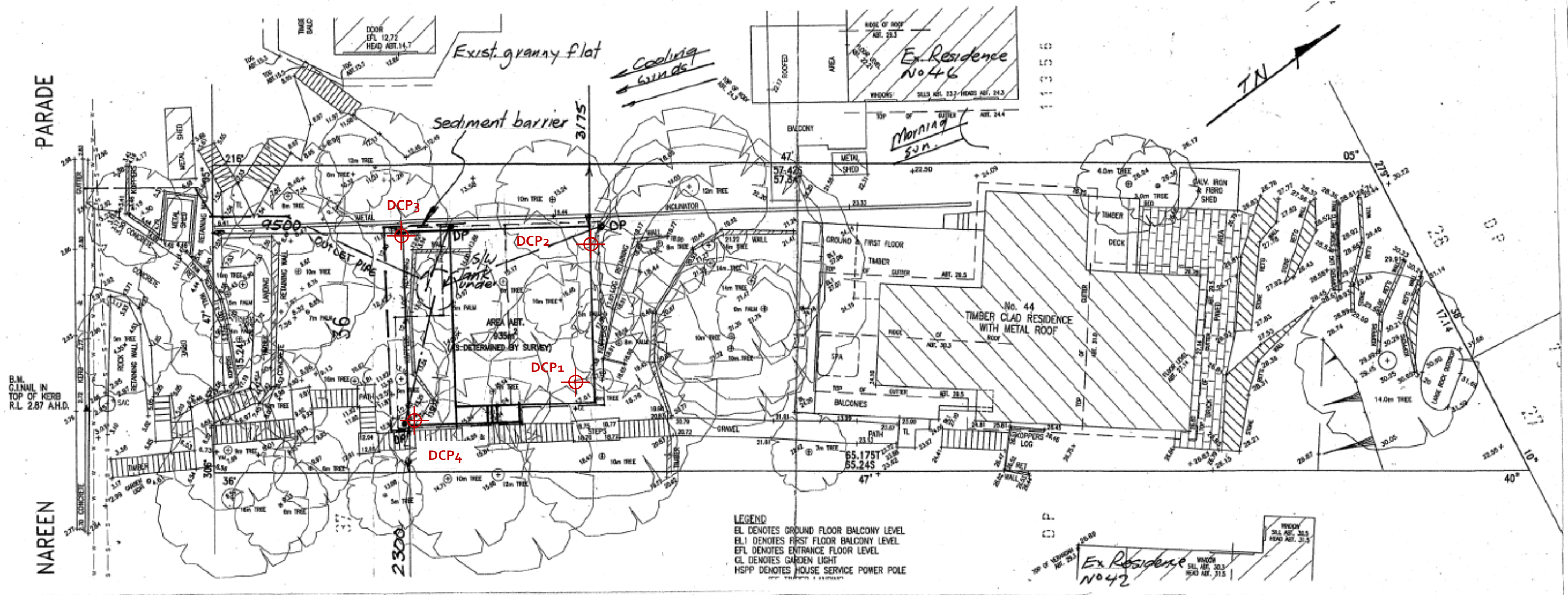
It should be noted that Geotechnical Reports are documents that build a picture of the subsurface conditions from the observation of surface features and testing carried out at specific points on the site. The spacing and location of the test points can be limited by the location of existing structures 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



SITE ANALYSIS, SITE, LANDSCAPE, STORMWATER & SEDIMENT CONTROL PLAN

Scale 1:200

DRAINAGE

All drainage shall discharge into Councils Kerby gutter after being piped to s/w tanks under the proposed building

WASTE MANAGEMENT

All waste shall be taken to Kimbriki or similar depot and recycled where possible. The Contractor shall be Stumpys dumpies. Rubbish shall be covered at all times

SEDIMENT CONTROL

A sediment cloth design shall be used to control sediment entering Councils s/w system or neighbours res. see plan for location.

DEMOLITION

There is no demolition for this project.

GEO TECHNICAL

A geotechnical report has been included in the application

EXTERNAL FINISHES

Roof & gutters - Colourbond - Medium colour
Walls - F/c sheeting
Windows - Aluminium
Decks - Timber
Supports - Treated timber or as per Engineer

PROPOSED NEW GRANNY FLAT

AT 44 NAREEN PDE. NTH. NARRABEEN

FOR MR & MRS McCABE

SITE ANALYSIS PLAN

SITE, LANDSCAPE, SEDIMENT & DRAINAGE

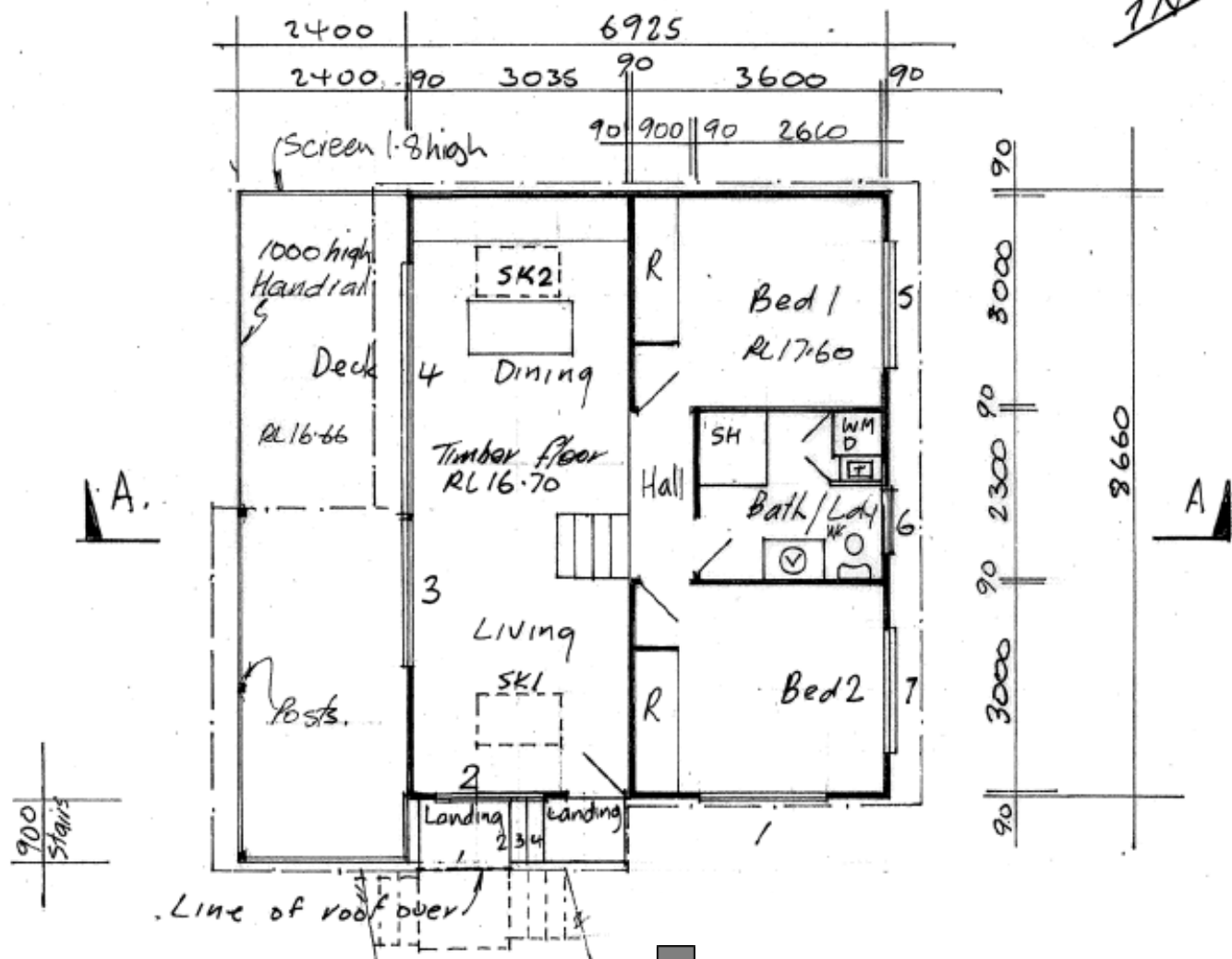
Scale 1:100 Date 11.1.21 Drawn by R. Conway

Phone 0425314716

Dr. No 20/6/3

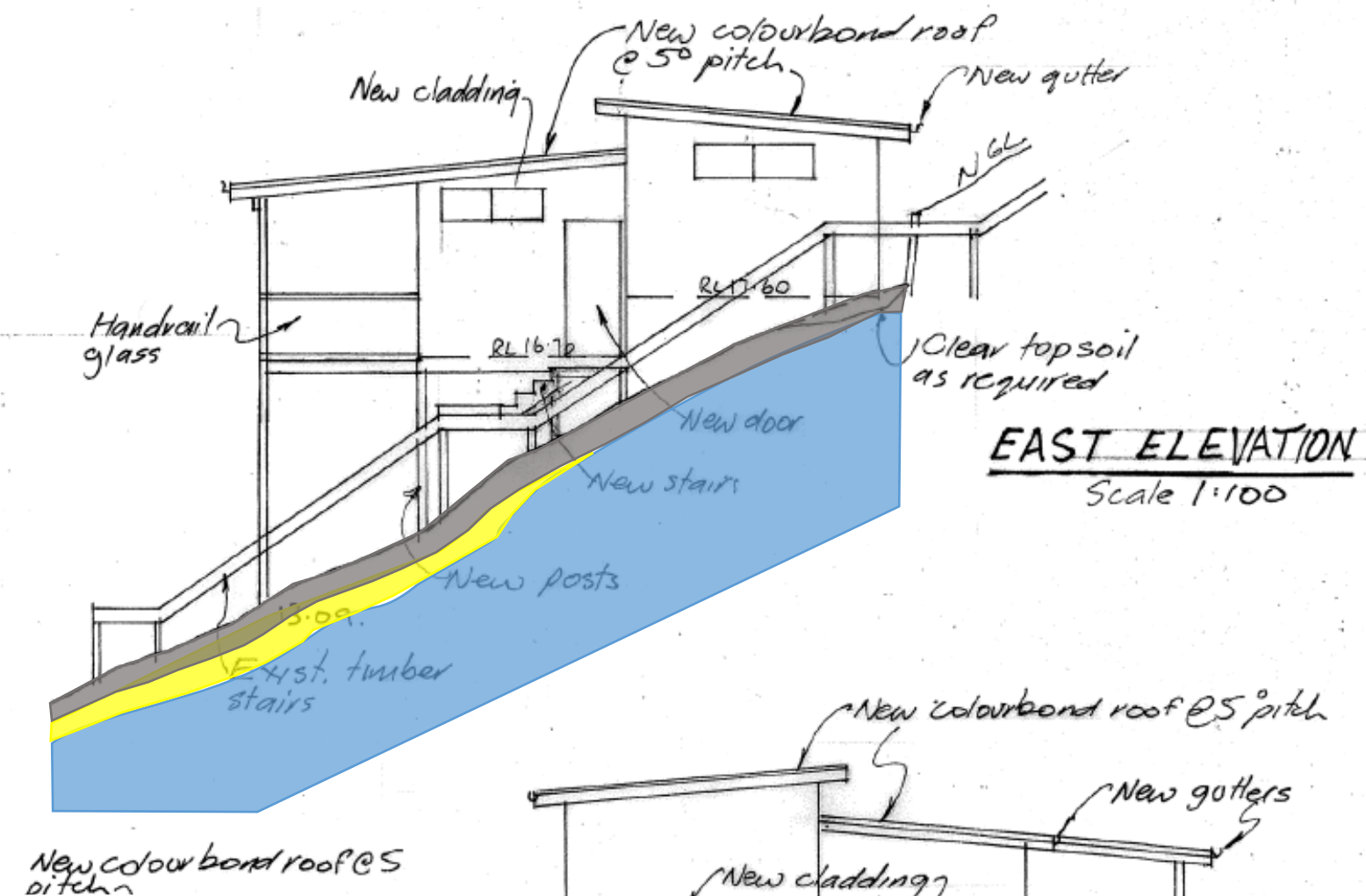
TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials

TN

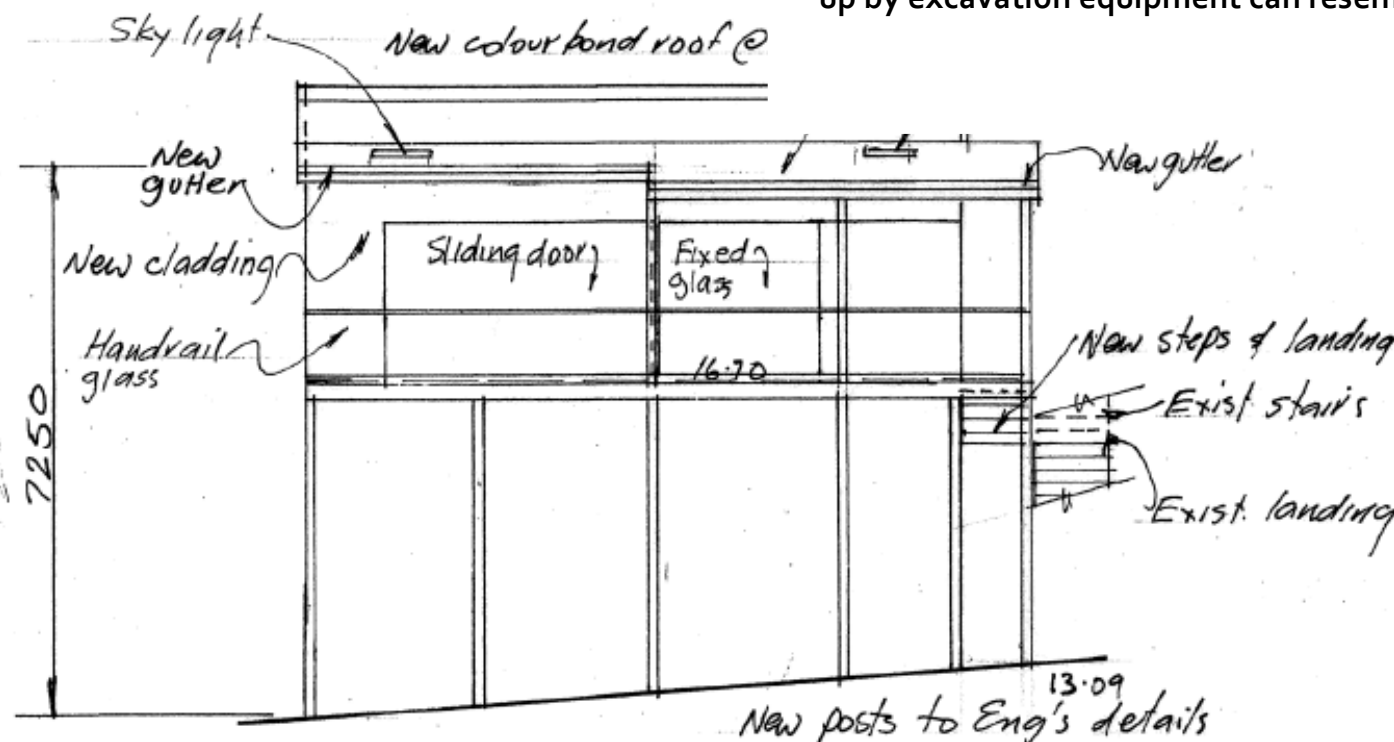


FLOOR PLAN

- Topsoil
- Silty Clay – Firm to Stiff
- Narrabeen Group Rocks – Extremely Low Strength Shale - after being cut up by excavation equipment can resemble a stiff to hard clay.



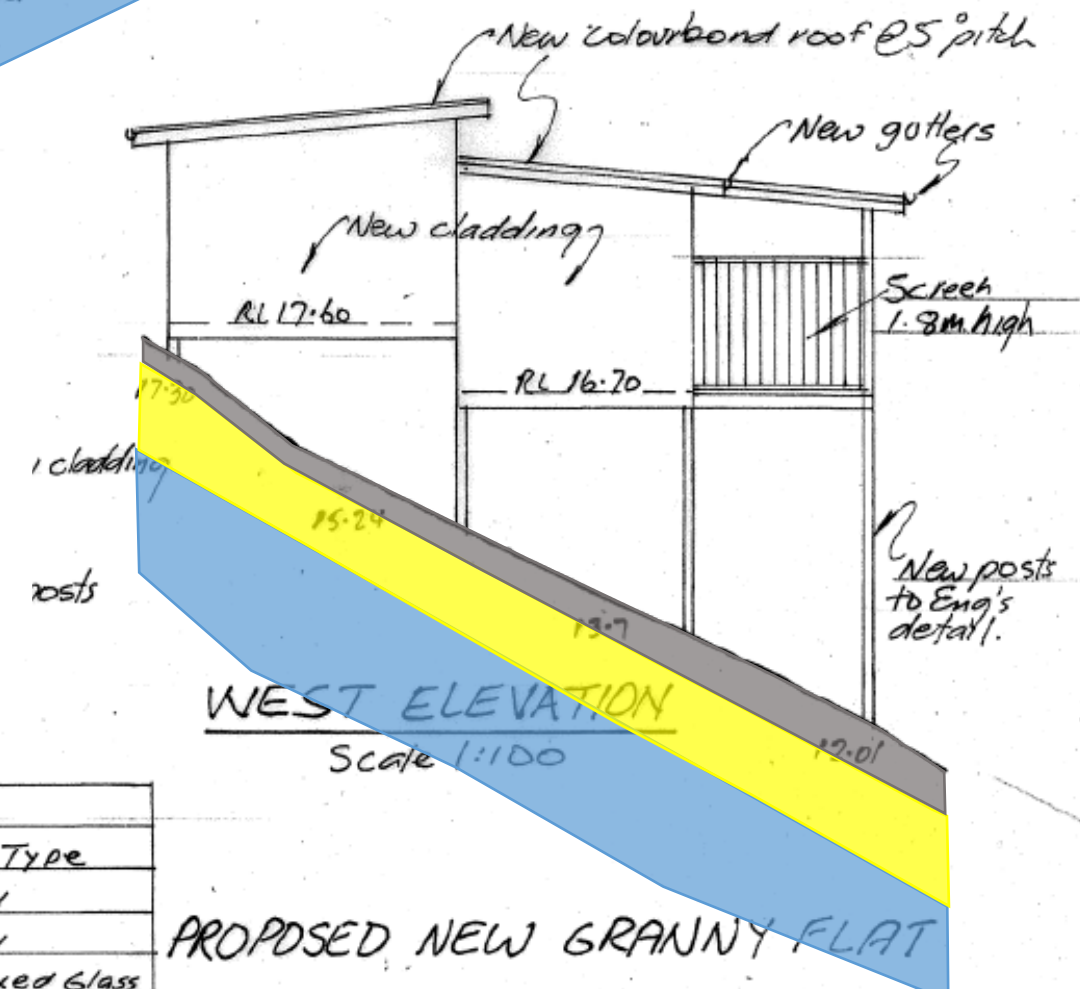
EAST ELEVATION
Scale 1:100



SOUTH ELEVATION Scale 1:100

NORTH ELEVATION
Scale 1:100

WINDOW SCHEDULE				
Code	Size	Direction	Area m ²	Type
1	0.5 x 1.8	E	0.9	W
2	1.5 x 1.5	E	0.75	W
3	2.1 x 2.1	S	4.41	Fixed Glass
4	2.1 x 3.6	S	7.56	Sl. door
5	1.2 x 1.8	N	2.16	W
6	0.9 x 0.9	N	0.73	Frosted
7	1.2 x 1.8	N	2.16	W
SK1	0.78 x 1.18	S	0.92	Sky light
SK2	0.78 x 1.18	S	0.92	Sky light



WEST ELEVATION
Scale 1:100

PROPOSED NEW GRANNY FLAT
AT 44 NAREEN PDE. NTH. NARRABEEN
FOR MR. & MRS. McCABE

PLANS & ELEVATIONS
Scale 1:100 Date 11.1.21 Drawn by R. Conway
Phone. 0425314716 Drg. No 20/6/1.

EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE

