

CIVIL & STRUCTURAL ENGINEERING DESIGN SERVICES PTY LTD

WEB: www.civilandstructural.com.au EMAIL: hited@civilandstructural.com.au
PHONE: 61 2 9975 3899 FAX: 61 2 9975 1943 MOBILE: 0407 753 899
3 WANNITI ROAD, BELROSE NSW, 2085

19th December 2003

**The General Manager
Pittwater Council
P.O. Box 882
MONA VALE NSW 2103**

Attention: Building Department

Dear Sir or Madam,

Re: **New Dwelling Application & Waste Water Tank**
3 Boundary Street, Warriewood
For Mr. S. Avery

GEOTECHNICAL ASSESSMENT

I, Edward A. Bennett, practicing Civil, Structural, Environmental & Geotechnical Engineer, hereby wish to include the following Geotechnical Report.

INTRODUCTION

I have inspected the above site on 16th December 2003, for the purpose of reviewing the stability of the existing ground in the location of a proposed new dwelling. Please refer to drawings prepared by W & B Consulting Pty. Ltd., which will be submitted presently, along with this report, as a development application.

ASSESSMENT METHODOLOGY ***GEOTECHNICAL ASSESSMENT***

This assessment is based upon a detailed visual inspection of the local topography, surface drainage and known geological conditions of the site within the property boundaries. The site is a large block, some 0.82 ha, on the western side of Boundary Street, towards the end of the constructed portion of the roadway, after which the land falls steeply with inaccessible land remaining to the southern boundary of the block, near the upstream catchment and commencement of Narrabeen Creek.

The geological cross-section in the locality of the proposed new dwelling is easily and accurately compared with the excavation observations of local road cuttings. The

resultant soil profile would be as follows as observed from existing cuttings and other past works in the nearby vicinity:

0	to	400mm	Fill, compacted clay, topsoil
400mm	to	1500mm	Boulders, Shale/weathered sandstone
1500mm	to	Bedrock	

SLOPE STABILITY – SUMMARY OF OBSERVATIONS

It is my opinion that the risk of slope instability over the area of this development is **LOW** risk or Hazard in respect to a potential landslide occurring from the design and construction of the proposed development. In other words, I consider the development to be of a significant nature that a degree of understanding must be adopted from guidelines for good engineering practice for design and construction of a new dwelling and associated works as described in Appendix “J” of AGS 2000.

The location of the new dwelling is shown on DRG. No. 03.AVERY.02 dated 20/10/2003. This location has a 18000mm front set back from the street boundary (eastern) and 7500mm from the northern boundary, between NGL contours of RL 40.00 and RL 45.00. It must be recognized from the Typical X-Section, refer DRG. No. 03.AVERY.10, it indicates GRD. FL at RL 43.35 and FIRST Fl. at RL 46.30, that a significant engineered retained structure to stabilize the 2000-3000mm cut is to be established along the western side, with returns yet to be established, with the eastern side of the dwelling, suspended, piered and anchored into sound solid rock.

The area beyond the eastern portion of the development is inaccessible terrain and is sloping steeply downwards with boulders and cliff lines readily observed. This area is to remain untouched and shall be protected during construction by appropriate catch net and silt fence construction. It is highly likely that a vertical cut along the western side is appropriate due to the greater portion of the cut being into weathered sandstone.

Any overland stormwater drainage from the uphill catchment/sector is to be routed and diverted permanently around the new works as a provision to maintain slope stability and prevent scouring downstream only.

RISK ANALYSIS

With reference to the scope definitions paragraph 3.1 and the “Flow Chart” page 54 of the document AGS 2000 and Council’s requirements as set out in section 6.3 (a) through to (e) with appropriate forms of Councils “Interim Geotechnical Risk Management” June 2003, It is my opinion that the risk analysis applies only to loss of property and not that of “Life”.

In so doing I recognize the following potential “HAZARDS”. A geotechnical X-section is appendix “A”. The potential hazards recognized are localized landslip and are limited

to the excavation works within the access roadway and dwelling development area and are as follows: (Refer appendix G of AGS 2000)

Qualitative Measured likelihood

TYPE	Construction	DESCRIPTION	Likelihood Assessed As	PROBABILITY
A	RW's – Cut to 3m	Rolling boulders	Rare	<10 minus 6
B	Suspended beam/slab construction	Down slope excavation slip	Rare	<10 minus 6

For the ground floor structure, which is approx. half of the developed area above ground level at varying heights, an engineered suspended structure requiring the foundations to be piered and anchored to bedrock below, is required and obligatory. For the rear western half, which is mostly cutting into weathered sandstone, the use of an engineered reinforced block or concrete walling is required and obligatory. The design is to incorporate maintaining sub-soil water movements, such as not to create Hydrostatic heads driven by an upstream rising catchment area.

To mitigate both hazards "A" & "B", a temporary catch fence should be installed and for "B", piercing should be anchored at least 150mm into sound solid bedrock. Where there is to be any local excavations, deeper than 1000mm through boulders and/or clay the vertical sides shall be temporarily shored for OH & S reasons. In addition, I recommend that the entire structural design be by a suitably qualified structural engineer.

There is presently **NO** evidence that would indicate any instability during the construction of the proposed works, providing any overland stormwater drainage from the uphill catchment/sector is to be routed and diverted permanently around the new works as a provision to maintain slope stability and prevent scouring only.

CONCLUSION

From the above observations for "risk" of the immediate hillside and the proposed development within, are in my opinion, dealing only with property and not "of life" sufficient to evaluate under Council's Section 6.3 (a) through to (e) and relating the "Flow Chart" in AGS 2000 through (i) with appropriate forms of Councils "Interim Geotechnical Risk Management" June 2003.

It is my considered opinion that this site is suitable for the development proposed and that the site can achieve an "acceptable risk management" as required by Council. There is no evidence that the classification of LOW risk of slope instability, will alter over the life of the structure period providing all structures are detailed by a suitably qualified structural engineer and are founded by piercing into shale/weathered sandstone using

proper piercing details. As is normal, the contractor must provide proper housekeeping and hillside management to avoid the risk of localised slippage.

Special conditions of approval are as follows:

- 1. The base for the retaining walls shall be inspected by the engineer to ensure that the walls shall have even bearing and shall be of a keyed type to prevent lateral movement.**
- 2. The engineer shall be present during the excavation phase to determine the founding level into shale/rock**
- 3. The engineer shall check the piers (if required) before casting**

In respect to Landslip, I certify that the proposed development together with the existing development on the site and any occupants will be safe from the effects of any land slip over the economic life of the structure (taken to be 25 years unless otherwise stated). These recommendations form an integral part of the Landslide Risk management Process.

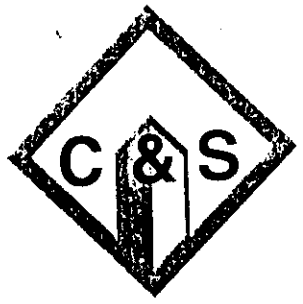
Forms 1 & 1(a) are enclosed

Yours faithfully,

E.A.Bennett M.I.E.Aust, C.P. Eng & M.A.G.S

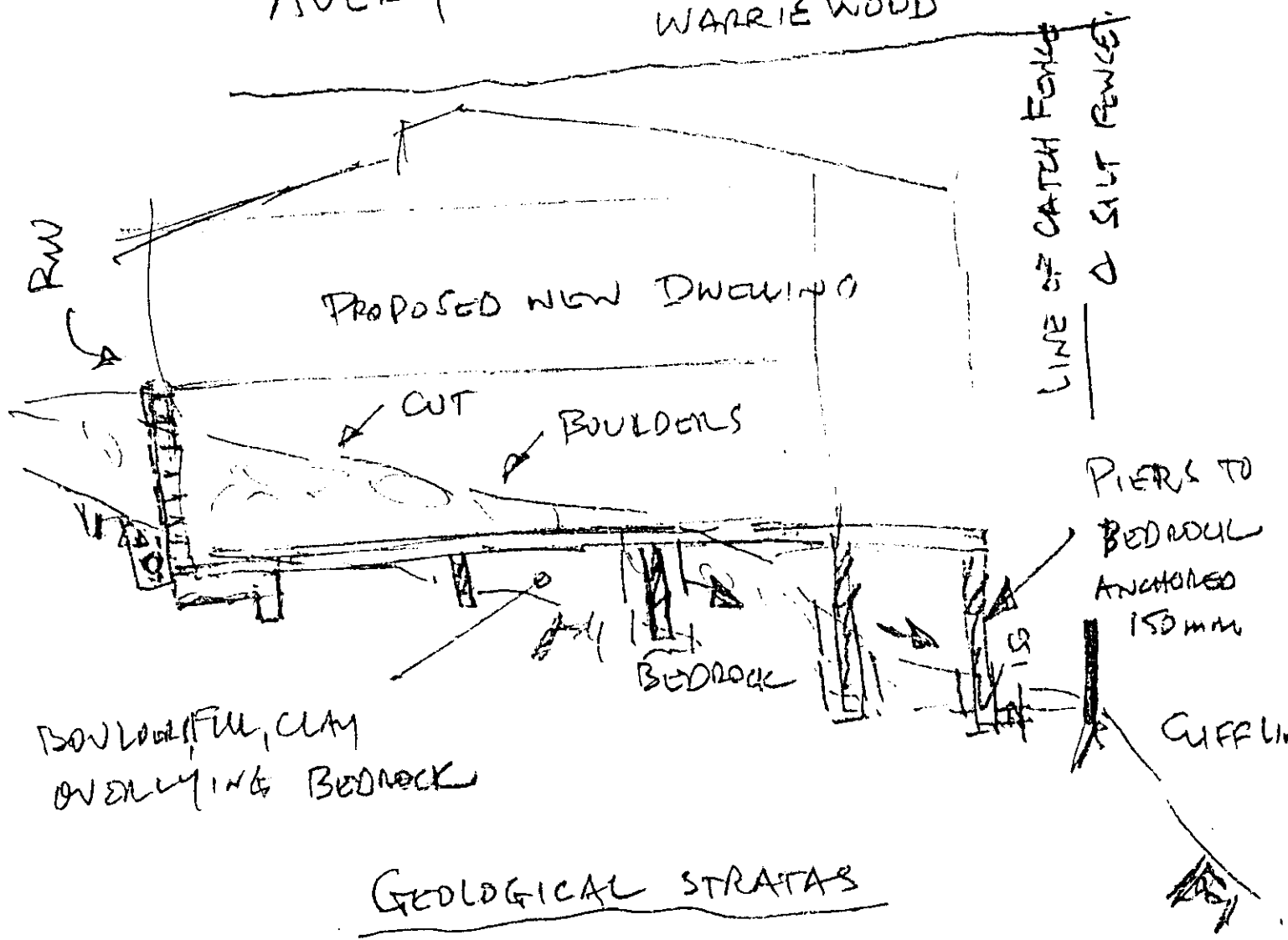
C.c.
Mr. S. Avery

CIVIL & STRUCTURAL ENGINEERING DESIGN SERVICES PTY LTD



WEB: www.civilandstructural.com.au EMAIL: hited@civilandstructural.com.au
PHONE: 61 2 9975 3899 FAX: 61 2 9975 1943 MOBILE: 0407 753 899
3 WANNITI ROAD, BELROSE NSW, 2085

AVERY - 3 BOUNDARY STREET
WARRIEWOOD



GEOTECHNICAL X-SECTION

NTS.

Handwritten signature 19/12/03

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

Development Application for	<u>MR. S. AVERY</u>
Address of site	<u>3 BOUNDARY STREET, WARRIEWOOD</u>
	Name of Applicant

Declaration made by geotechnical engineer or engineering geologist or coastal engineer (where applicable) as part of a geotechnical report

I, EDWARD A BENNETT on behalf of CIVIL & STRUCTURAL ENGINEERING DESIGN SERVICES PTY. LTD.
(Insert Name) (Trading or Company Name)

on this the 16/12/03 certify that I am a geotechnical engineer or engineering geologist or coastal engineer as defined by the Geotechnical Risk Management Policy for Pittwater 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 Geotechnical Risk Management Guidelines and the Pittwater Council Policy
- Am willing to technically verify that the detailed Geotechnical Report referenced below has been prepared in accordance with the Australian Geomechanics Society's Geotechnical Risk Management Guidelines and the Pittwater Council Policy
- 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 Policy requirements for Minor Development/Alterations.
- Provided the coastal process and coastal forces analysis for inclusion in the geotechnical report

Geotechnical Report Details:

Report Title:	<u>GEOTECHNICAL ASSESSMENT</u>
Report Date:	<u>19/12/03</u>
Author:	<u>EDWARD A BENNETT</u>

Documentation which relate to or are relied upon in report preparation:

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 [Signature]

Name EDWARD A BENNETT

Chartered Professional Status NPER

Membership No. 198230

GEOTECHNICAL RISK MANAGEMENT POLICY FOR PITTWATER
FORM NO. 1(a) - Checklist Of Requirements For Geotechnical Risk Management Report for Development
Application or Part V assessment

Development Application for	<u>MR. S. AVERY</u>
Address of site	<u>3 BOUNDARY STREET, WARRIEWOOD</u>

Name of Applicant

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).

Report Title:	<u>GEOTECHNICAL ASSESSMENT</u>
Report Date:	<u>19/12/03</u>
Author:	<u>EDWARD A. BENNETT</u>

Please mark appropriate box

- Comprehensive site mapping conducted _____ (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 16/12/2003
- 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 Council's Policy
 - Consequence analysis
 - Frequency analysis
- Risk calculation
- Risk assessment for property conducted in accordance with Council's Policy
- Risk assessment for loss of life conducted in accordance with Council's Policy
- Assessed risks have been compared to "Acceptable Risk Management" criteria as defined in the Geotechnical Risk Management Policy for Pittwater
- 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 25 years specify
- Development Conditions to be applied to all four phases as described in Pittwater Geotechnical Risk Management Policy have been specified
- 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 [Signature]

Name EDWARD A BENNETT

Chartered Professional Status NPER

Membership No. 198230