Pittwater.

Form 11

LOCAL

P.O. Box 3190
NARELLAN DC NSW 2567
P: (02) 4655 5811
F: (02) 4655 2411
E: info@localgroup.com.au
ABN: 30 735 366 565

COUNCIL COPY

Construction Certificate

and Determination
issued under the Environmental Planning and Assessment Act, 1979 Sections 109C(1)(b) and 81A(2)

Certificate Number: 5001468

Address:
LOT: 1
DP: 546543
HNO.:32
THE SERPENTINE
BILGOLA 2107

Development Consent: 0784/06

Description of Work: DEMOLITION

Date of Consent: 10 August, 2007

Building Classification: 1a

This Construction Certificate has been determined as **APPROVED** in accordance with the procedures outlined in Clause 142 of the Environmental Planning and Assessment Regulation 2000. In making this determination I certify that the work if completed in accordance with the plans and specifications referred to in this Certificate will comply with the requirements of the Environmental Planning and Assessment Regulation, 2000 as referred to in Section 81A(5) of the Environmental Planning and Assessment Act, 1979 (as amended).

Paul Gearin
Accredited Certifier
Building Professionals Board
BPB0132

R# 222346

28/8/07

Plans/s

Specification/s

Other Documents
APPLICATION FORM
OWNERS CONSENT
HOMEOWNERS INSURANCE
TREE MANAGEMENT
SURVERYORS PLAN
WASTE MANAGEMENT
GEOTECHNICAL ASSESSMENT

Fire Safety Schedule

24/8/07
Date of Determination

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Australian Bureau of Statistics

OUR REFERENCE **5001468**

THE AREAS

The Site (m^2): 763
Existing Building (m^2):
The Proposal (m^2):

THE EXISTING

Location:
LOT: 1
DP: 546543
HNO.:32
THE SERPENTINE
BILGOLA 2107

Use: Demolition
No. of Existing Dwellings:

THE PROPOSAL

Location:
LOT: 1
DP: 546543
HNO.:32
THE SERPENTINE
BILGOLA 2107

Use: Residential - Demolition
Dual Occupancy:
No. of Proposed Dwellings:
No. of Storeys:

THE MATERIALS

Walls:
Floors:
Frame:
Roof:

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P.O. Box 3190
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ABN: 30 735 366 565

Application Form

issued under the Environmental Planning and Assessment Act, 1979 Sections 109C(1)(b), 81A(2) and 81A(4)

APPLICANT	NAME:	MR LOUIS QUATTROMANI
	ADDRESS:	PO BOX 6924 BAULKHAM HILLS1 1755
	SIGNATURE:	SEE ATTACHED CONSENT
OWNER	NAME/S:	CABE INVESTMENTS PTY LTD
	ADDRESS:	Po Box 6924 BAULKHAM HILLS1 1755
	SIGNATURE/S:	SEE ATTACHED CONSENT
LAND TO BE DEVELOPED		LOT: 1 DP: 546543 HNO.:32 THE SERPENTINE BILGOLA 2107
DESCRIPTION OF DEVELOPMENT		RESIDENTIAL DEMOLITION
BCA CLASSIFICATION		1A
DEVELOPMENT CONSENT		0784/06 10 AUGUST, 2007
VALUE OF WORK		$ 1,800,000 – ($250000)
BUILDER/ OWNER BUILDER DETAILS		CABE DEVELOPMENTS LICENCE #: 126790C
DATE OF RECEIPT		24 AUGUST, 2007

LONG SERVICE
BUILDING & CONSTRUCTION

22 August 2007

RECEIVED
23 AUG 2007
BY:.....

Building and Construction Industry
Long Service Payments Corporation
Ground Floor
cnr Donnison & Baker Streets
Gosford NSW 2250
Locked Bag 3000
Central Coast MC NSW 2252
Tel: 13 14 41
Fax: (02) 9287 5685
Email: info@lspc.nsw.gov.au
www.lspc.nsw.gov.au
ABN 93 646 090 808

CABE DEVELOPMENTS PTY LTD
PO BOX 6924
BAULKHAM HILLS BC NSW 2153

Levy Receipt

Receipt No.
00053717

Received from: (Name of person or organisation paying for levy)

CABE DEVELOPMENTS PTY LTD

the amount of

$6,300.00

Payment details:

Cheque	000459	$6,300.00	CABE DEVELOPMENTS P/L

being payment for Long Service Levy as detailed below

Levy Payment Form number	0289992
Council/Department/Authority	PITTWATER COUNCIL
C.C. Number	5001192
Work address	32 THE SERPENTINE BILGOLA NSW 2107
Estimated value of work	$1,800,000.00
Levy payable (No exemption)	**$6,300.00**
Total levy paid	**$6,300.00**

Signed: (Signature of authorised person)

Date

22/8/07

87256

4001468

LOCAL

APPLICATION FORM

☑ Principal Certifying Authority

☑ Construction Certificate
☐ Complying Development Certificate
☑ Occupation Certificate

☐ Compliance Certificate

THE APPLICATION

DATE OF APPLICATION: 2/8/07.

LAND TO BE DEVELOPED

Lot No.:	1	**Deposited Plan:**	546543
House No.:	32	**Street Name**	THE SERPENTINE
Suburb:	BILGOLA	**Post Code:**	2107
Area (m^2):	763	**Section/Folio:**	

THE DEVELOPMENT

Proposed Building Work: Residential ☑ Commercial ☐ Industrial ☐

Description of Development: NEW RESIDENCE

Value of Work: $1,800,000 - (#25000)

Type of work: ~~House~~ Demolition Only.

CONSENTS

Consent Authority: PITTWATER COUNCIL

Development Consent No.: N0784/06 **Date of Issue:**

Builder or Owner/Builder Name: CABE DEVELOPMENTS PTY LTD

Licence No.: 126790C

THE APPLICANT

Surname: QUATTROMANI

First Name: LOUIS

Street: SUITE 202, 29-31 SOLENT CIRCUIT

Suburb: BAULKHAM HILLS 2153

Contact No's.: 02 8818 3630 / 0414 622 033

THE OWNER/S

	Owner 1	Owner 2	Owner 3	Owner 4
First Name:	CABEZ INVESTMENTS			
Surname:	PTY LTD.			
Street:	202, 29-31 SOLENT CIRC			
Address:	BAULKHAM HILLS.			
Contact No.:	(02) 8818 3600			

URBAN FORESTRY AUSTRALIA

TREE MANAGEMENT CONSULTING ARBORICULTURISTS

ARBORICULTURAL ASSESSMENT

for

Mr. Mark Monk
C/O Turner and Associates
Level 1, 582 Crown Street
SURRY HILLS NSW 2010

SITE ADDRESS
32 THE SERPENTINE
BILGOLA NSW

NOVEMBER 2006

MEMBER OF
INSTITUTE OF AUSTRALIAN CONSULTING ARBORICULTURISTS

URBAN FORESTRY AUSTRALIA

ABN 90 639 906 218

www.urbanforestry.com.au

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NEWPORT NSW 2106

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0414 997 417

Facsimile: (02) 9918 9844

Email: cmackenzie1@bigpond.com

CONTENTS

1 INTRODUCTION

1.1 This Arboricultural report was commissioned by Mr. Mark Monk on behalf of the owners of the subject site.
The subject site is identified as Lot 1 in DP 546543, and known as 32 The Serpentine, Bilgola, New South Wales.

1.2 This report is to accompany a development application to Pittwater Council for the proposed construction of a new dwelling and pool.

1.3 The purpose of this report is to assess the health and condition of trees within proximity to the proposed development of the subject site. The report also assesses any identified or potential impacts that proposed development will have on the subject trees.

1.4 This report gives recommendations for tree retention and removal based on their *Safe Useful Life Expectancy* (SULE) categories and the nature of the proposed development. The report also provides guidelines for tree protection and maintenance.

1.5 Information contained in this Arboricultural Assessment covers only the trees that were examined and reflects the condition of those trees at the time of inspection. Care has been taken to obtain all information from reliable sources.
All data has been verified as far as possible; however, I can neither guarantee nor be responsible for the accuracy of information provided by others.

1.6 This Arboricultural report is not intended as an assessment of any impacts on trees by any proposed future development of the site other than the current development application.

1.7 This report is not intended to be a comprehensive hazard assessment, however the report may make recommendations, where appropriate, for further assessment or testing of trees where potential structural problems have been identified or where below ground investigation may be required.

2 METHODOLOGY

2.1 In preparation for this report, a ground level visual tree assessment (Mattheck 1994) was undertaken by the author of this report on Wednesday 25 October, 2006.

2.2 Tree height and canopy spread was estimated.
Trunk diameter was measured at 1.4 metres above ground level (DBH), using a standard metal tape.

2.3 Field observations were written down.

2.4 No aerial (climbing) inspections, or woody tissue testing was undertaken as part of this tree assessment.
Information contained in this tree report covers only the trees that were examined and reflects the condition of the trees at the time of inspection.

2.5 Plans and documents referenced for the preparation of this report include:

- Contours and Boundary Survey, Ref. No.2699, dated 10/03/06, , prepared by Gary Edwards & Associates Pty Ltd;
- Floor Plans, Elevations and Sections Dwg. No's DA03-07 Rev. C, DA20 & 22 Rev. D, DA21 & 23 Rev. C, DA33 Rev C, DA31 Rev B, dated November 2006, prepared by Turner & Associates;
- Landscape Concept Plan, Dwg. No LC01, dated November 2006, prepared by Selena Hannan Landscape Design.

2.6 Trees assessed include those within 5 metres of the proposed development, or where they may be outside the 5 metre setback, but potentially affected by the proposal. Trees within the subject site which are not considered to be at risk of development impacts were not individually assessed.

2.7 Trees are shown on a marked up copy of a superseded site/roof plan. The plan is labeled the Tree Location Plan, attached as Appendix D.

3 OBSERVATIONS AND DISCUSSION

3.1 Proposed Tree Removal

3.1.1 Eleven (11) of the twenty two (22) assessed trees are proposed for removal. A brief description of each tree, or group of trees, is provided below.

Note: There are additional trees i.e. 1A and 10A included in this assessment. Tree 9 was removed when it collapsed some time ago.

3.1.2 Trees 1A, 2 and 3

These trees are Coastal Banksias of fair condition and health. The trees are within the proposed driveway footprint.

3.1.3 Tree 10A

This tree is a Sweet Pittosporum of very poor health and condition. The tree is too close to the proposed dwelling, and is not a worthy specimen for retention.

3.1.4 Tree 11

This tree is a Lilly Pilly in generally fair health, but poor condition due to its exposed location. Inhospitable conditions and the proximity of the proposed excavation for the dwelling would require its removal.

3.1.5 Trees 13, 14, 15, 16, 17 and 18

These are all Coastal Banksias varying from good to fair health, and good to poor condition. The majority of these trees have SULE's of 3 or 4, and are located within or too close to the development footprint.

3.1.6 There were no assessed trees which meet the physical criteria identifying them as 'significant' as defined by Pittwater Council's Development Control Plan 21[1].

[1] Significant trees are trees that:
i. are listed as Heritage Items in *Pittwater LEP 1993*; and/or
ii. contribute substantially, either individually or as a component of a tree group, to the landscape character, amenity, cultural values or biodiversity of their locality. (Generally trees with a girth greater than 500mm and a canopy spread of 6m radius would be considered significant however this should be confirmed by an independent arborist.) Pittwater Council DCP – *Pittwater 21*, Section A, p 16.

3.1.7 The vegetation on-site is not part of an endangered community or habitat for endangered fauna. I also note the landscape plan achieves the required 80% locally native planting requirement of Pittwater Council's Development Control Plan 21.

3.2 Trees to be Retained

3.2.1 Eleven (11) trees are to be retained.
Whilst the majority of these are located outside the property boundary, it is noted two Coastal Banksias of good health and condition have been retained within the site, and those trees substantially contribute to the landscape amenity when viewed from the south.

3.2.2 Subject to my previous advice to the architect, the original proposed pool location (as shown on the Tree Location Plan – Appendix D) has been relocated to ensure an adequate distance is provided from the structure to the two Banksias, Trees 19 and 20.

3.3 Potential Impacts on Trees Proposed for Retention.

3.3.1 Trees 19 and 20
The proposed pool, moat and low retaining wall structures are set back 5 metres from Tree 19. This is well outside the *Primary Root Zone* (PRZ) of the tree, and offset rather than directly upslope of the tree.
No impacts on the trees are expected as a result of the proposed works.

3.3.2 Sandstone blocks and stepping stones to serve as access to the lower levels and decking are proposed across the bank, upslope of the trees. The installation of these requires very minor 'setting in' to the bank to provide level areas for foot traffic. It is unlikely these 'paths' will unduly disturb the trees or their roots, however minor repositioning of stones may be required if significant roots were encountered.

3.3.3 The proposed timber decking beneath Trees 19 and 20 meets the existing ground level behind (south of) the trees, and is elevated beyond. Footings for piers would be small pad type and, provided they are dug by hand and allow for some flexibility in final location to avoid any roots greater than 30mm diameter, will not have any long term impacts on the trees. Soil resources will not be unduly disrupted by the work.

3.3.4 The crowns of the trees have developed to the north. There is unlikely to be any significant pruning required for use of the deck area.

3.3.5 An absorption trench is required along the lower bank as apart of the onsite water detention system. Due to the presence of existing below ground utility lines near the south boundary, the proposed trench will be located approximately 2.5 metres south of the trees. This is outside the Trees PRZ, and unlikely to encounter or affect significant *scaffold* roots belonging to the trees.

3.3.6 The trench, approximately 500 x 500mm will be backfilled with rubble and carry an agricultural drain to facilitate absorption of overflow from the detention tank upslope of the pool. The drainage line from the tank to the east end of the trench will not be located near the trees.

3.3.7 I understand the fall of the agricultural pipe is not critical, and would therefore allow some flexibility in installation in the event any roots were encountered during the work.
Being down slope of the two trees, the trenching will not disrupt soil water from moving into the root zone.

3.3.8 There is a proposed outdoor shower at the west end of the deck. Provided underground utilities, such as water for the shower, are located outside a 5 metre setback from the trees, there should be no impacts on the trees.

4 CONCLUSIONS

4.1 No significant trees have been identified on the site, or within proximity to the proposed dwelling.

4.2 Review of the landscape plan reveals new locally indigenous canopy trees to the site frontage and road reserve to replace those removed for the new driveway.

4.3 There are works within the vicinity of the two Banksias to be retained to the south of the dwelling. The proposed deck is within the root zone of the trees but is an elevated structure requiring excavation of a minor nature.
The Banksias can be successfully retained provided care is taken to avoid root disturbance during construction.

5 RECOMMENDATIONS

5.1 Minimising Impacts on Trees to be Retained.

5.1.1 Where excavation occurs within 3 metres of Trees 19 and 20, works must be carried out by hand.

5.1.2 The works are to be supervised by an experienced arboriculturist. If any roots are encountered, the arboriculturist is to advise which roots, if any, may be cut, or provide alternative methods of construction, amended design that will not affect the tree's health or stability.

5.1.3 Container size of proposed plants within the Primary Root Zone (PRZ) of the trees should be determined prior to purchase of plants. This is to determine where, and how large, plants can be at the time of planting. Otherwise, any proposed landscaping within the PRZ must consist of tubestock only. This is required to ensure that damage to the tree's roots is avoided.

Mattocks and similar digging instruments must not be used within 5 metres of the trees. Planting holes should be dug carefully by hand with a garden trowel, or similar small tool.

5.1.4 All existing ground levels (except where shown on the architectural drawings and the landscape plan) cannot be altered.

This is to ensure no excavation and/or fill impacts on the non-woody root system of the trees, and ongoing health and vigour of the trees is maintained.

5.1.5 'Blue metal' should not be used as a backfill drainage material as it is known to be toxic to tree roots.

5.2 Tree Protection Zones

5.2.1 Tree protection is to be provided to Trees 1, 4, 5, 19 and 20.

5.2.2 The Tree Protection Zone (TPZ) is to be in accordance with the following:

- Prior to any site works commencing, the project arboriculturist and the principal site contractor must meet on site to discuss appropriate tree protection devices, and the location of Tree Protection Zones (TPZ)'s.
- Where possible the fencing should be placed to encircle the whole tree or a group of trees.
- The most appropriate fencing for TPZ is 1.8m chainlink with 50mm metal pole supports. During installation care must be taken to avoid damage to significant roots. Locate large primary roots by careful removal of soil within the fencing area. ***Do not drive any posts or pickets into tree roots.*** Replace soil back over tree roots.
- Protection devices may include mulching, tree guards and other devices other than fencing.
- TPZ must be in place prior to any site works commencing, including clearing, demolition or grading.
- Any areas of the root zone (i.e. CRZ/PRZ) outside the Tree Protection Zone (TPZ) must, where practicable, be covered in thick, coarse mulch to a depth of 100mm to reduce soil compaction and soil moisture losses.
- It is recommended that the arboriculturist provide written certification that the TPZ is installed and will satisfy tree protection requirements.
- Nothing should occur inside the TPZ, so therefore all access to personnel and machinery, storage of fuel, chemicals, cement or site sheds is prohibited.
- No washing or rinsing of tools is to be carried out upslope of any trees, or within 8 metres of the trees.
- Signage should explain exclusion from the area defined by TPZ and carry a contact name for access or advice.
- The TPZ cannot be removed, altered, or relocated without the projects arborists' prior assessment and approval.

5.3 General

5.3.1 The following general comments apply to trees nominated for retention.

- Service trenches should not pass through a fenced area, although if this cannot be avoided, a qualified arboriculturist should be present to supervise excavation, cut torn roots cleanly or redesign around roots. Any roots that must be severed must be cut cleanly with a sharp handsaw. Tearing of roots is not acceptable.
- No stockpiling can take place around the root zone.
- The inclusion of a mulch layer of composted leaf and woodchip to a depth of 75mm will help retain soil moisture and protect soil from contaminants.
- A qualified arboriculturist must be retained to carry out and/or supervise works within the CRZ and Primary Root Zone (PRZ) of the trees.
- Any excavation within the CRZ should be carried out by hand i.e. a trench along the line of cut adjacent to the tree should be carefully dug by hand to expose any roots. After cutting of roots, machinery may complete the excavation.
- Do not allow excavation vehicles or equipment to rip at, or remove the roots along the face of the excavation adjacent to the tree. In the event the vehicles 'grab' at roots during works, the machine operator must stop work immediately and allow the roots to be cut before continuing.
- Providing a regular supply of water to the tree during the period of works is recommended.
- During this period it also recommended that the trees be given fortnightly applications of a rooting hormone, such as Hormone 20® to encourage the development of new roots.
- Removal of mulch is advised after construction to remove any contaminants.
- Regular monitoring of the trees during development works for unforeseen changes or decline, will help maintain the trees in a healthy state.

5.4 Post Construction Tree Care

5.4.1 Tree preservation requires a long-term commitment to monitoring and rectifying problems associated with trees.

- Mulching – removal of mulch after construction to remove any contaminants. Replacement with a good quality mulch and addition of 10% organic matter will improve beneficial soil micro-organisms, retain moisture and improve aeration and water infiltration.
- Pruning - Removal of any deadwood from the trees is recommended prior to project commencement.
- A minimum amount of live material should be removed from trees so they have maximum photosynthetic ability to develop new roots to adapt to new conditions.
- All pruning work must be carried out by a qualified arborist and be to Australian Standard for Pruning of Amenity Trees, AS4373 1996.
- Irrigation – An arboriculturist should determine whether irrigation should be carried out during extended periods of drought.
- Pest management – Monitoring is required as trees under stress are more prone to insect attack.
- Hazard Management – monitoring and management of the trees and routine re-assessment by a qualified arboriculturist is required for adequate long-term safety of residents.

Should you require further assistance with this matter, or require my liaison with Council officers, please do not hesitate to contact me.

MEMBER OF INSTITUTE OF AUSTRALIAN CONSULTING ARBORICULTURISTS

Catriona Mackenzie
Consulting arboriculturist, horticulturist and landscape designer.
Certificate of Horticulture *Honours*
Diploma of Horticulture (Arboriculture) *Distinction*
Associate Diploma of Applied Science (Landscape) *Distinction*
Member of the Australian Institute of Horticulture
Member of the International Society of Arboriculture
Member of the Institute of Australian Consulting Arboriculturists

6 BIBLIOGRAPHY

Barrell, J (1995) *Pre-development Tree Assessment* from *Trees and Building Sites*, Eds. Watson & Neely, International Society of Arboriculture, Illinois.

Mattheck, C. & Breloer, H.(1999) *The Body Language of Trees.* Research for Amenity Trees No.4, The Stationary Office, London.

APPENDIX A

TERMS AND DEFINITIONS

TERMS AND DEFINITIONS

The following relates to terms or abbreviations that may have been used in this report and provides the reader with a detailed explanation of those terms.

Age classes

- (I) = immature and refers to a well established but juvenile tree.
- (S) = semi-mature and refers to a tree at growth stages between immaturity and full size.
- (M) = mature and refers to a full sized tree with some capacity for further growth.
- (O) = over-mature and refers to a tree about to enter decline or already declining.

Condition refers to the tree's form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) and the state of the scaffold(i.e. trunk and major branches), including structural defects such as cavities, crooked trunks or weak trunk/branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition.

Critical Root Zone (CRZ) refers to a radial offset of five (5) times the trunk DBH measured from the center of the trunk. Excavation within this area may seriously destabilize the tree. Fully elevated construction within this area is possible with specific root zone assessment.

Diameter at Breast Height (DBH) refers to the tree trunk diameter at breast height (1.4 metres above ground level)

Footprint refers to the area occupied by structures including dwellings driveways and paths.

Health refers to the tree's vigour as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion, and the degree of dieback.

Inclusion - stem/bark, the pattern of development at branch or stem junctions where bark is turned inward rather than pushed out. This is normally a genetic fault and potentially a weak point of attachment.

Primary Root Zone (PRZ) refers to a radial offset of ten (10) times the trunk DBH measured from the center of the trunk. Excavation is possible within one offset only with this area and subject to specific rootzone assessment.

SAFE USEFUL LIFE EXPECTANCY (SULE)
In a planning context, the time a tree can expect to be usefully retained is the most important long-term consideration. SULE i.e. a system designed to classify trees into a number of categories so that information regarding tree retention can be concisely communicated in a non-technical manner.
SULE categories are easily verifiable by experienced personnel without great disparity.
A tree's SULE category is the life expectancy of the tree modified first by its age, health, condition, safety and location (to give safe life expectancy), then by economics (i.e. cost of maintenance: retaining trees at an excessive management cost is not normally acceptable), effects on better trees, and sustained amenity (i.e. establishing a range of age classes in a local population).
SULE assessments are not static but may be modified as dictated by changes in tree health and environment. Trees with a short SULE may be at present be making a contribution to the landscape but their value to the local amenity will decrease rapidly towards the end of this period, prior to them being removed for safety or aesthetic reasons.
For details of SULE categories see Appendix B, adapted from Barrell 1996.
Scaffold branch/root A primary structural branch of the crown or primary structural root of the tree.

Tree Protection Zone (TPZ), generally the minimum distance from the center of the tree trunk where protective fencing or barriers are to be installed to create an exclusion zone.

APPENDIX B

SULE CATEGORIES

Safe Useful Life Expectancy (SULE) CATEGORIES (after Barrell 1996, Updated 01/04/01)

The five categories and their sub-groups are as follows:

1. Long SULE - tree appeared retainable at the time of assessment for over 40 years with an acceptable degree of risk, assuming reasonable maintenance:

A. structurally sound trees located in positions that can accommodate future growth
B. trees which could be made suitable for long term retention by remedial care
C. trees of special significance which would warrant extraordinary efforts to secure their long term retention

2. Medium SULE - tree appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance:

A. trees which may only live from 15 to 40 years
B. trees which may live for more than 40 years but would be removed for safety or nuisance reasons
C. trees which may live for more than 40 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
D. trees which could be made suitable for retention in the medium term by remedial care

3. Short SULE - tree appeared to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance:

A. trees which may only live from 5 to 15 years
B. trees which may live for more than 15 years but would be removed for safety or nuisance reasons
C. trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
D. trees which require substantial remediation and are only suitable for retention in the short term

4. Removal - trees which should be removed within the next 5 years

A. dead, dying, suppressed or declining trees
B. dangerous trees through instability or recent loss of adjacent trees
C. dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form.
D. damaged trees that are clearly not safe to retain.
E. trees which may live for more than 5 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.
F. trees which are damaging or may cause damage to existing structures within the next 5 years.
G. trees that will become dangerous after removal of other trees for the reasons given in (a) to (f).
H. trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.

5. Small, young or regularly pruned - Trees that can be reliably moved or replaced.

A. small trees less than 5m in height.
B. young trees less than 15 years old but over 5m in height.
C. formal hedges and trees intended for regular pruning to artificially control growth.

APPENDIX C

SCHEDULE OF ASSESSED TREES

SCHEDULE OF ASSESSED TREES

32 The Serpentine, Bilgola. 23 October, 2006

Tree No.	Species	Height (M)	Canopy spread (M)	DBH (mm)	Age	Health	Condition	SULE	Comments
1	*Leptospermum laevigatum* Coastal Tea-tree	4	5	Multi 200	M	Fair	Fair	3D	Locally indigenous species. Sprawling plant. Recent failure of branch *inclusion.*
1A	*Banksia integrifolia* Coastal Banksia	7	4	330	M	Fair	Fair	3B	Locally indigenous species. Poorly pruned and lopped at 4m. Borers, dieback of stubs.
2	*Banksia integrifolia* Coastal Banksia	5	4	350	M	Fair	Fair	3B	Locally indigenous species. Windblown, collapsed.
3	*Banksia integrifolia* Coastal Banksia	6	5	350	M	Fair	Fair	3B	Locally indigenous species. Included branches. Decay pockets at branch stubs.
4	*Banksia integrifolia* Coastal Banksia	4	2	120	SM	Good	Fair	3B	Locally indigenous species. Collapsing, leaning to North.
5	*Callistemon citrinus* x 2 Bottlebrush	3.5	4	200	M	Good	Fair	3B	Locally indigenous species. Salt and wind burn to upper crown. Rope damaging stems.
6	Metrosideros *excelsa* 'Variegata' Variegated NZ Xmas Bush	4	4	Multi to 120	SM	Poor	Fair	4A	Introduced exotic species. Declining crown. Dieback.
7	*Nerium oleander* Oleander								Introduced exotic species. Exempt from protection under Tree Preservation and Management Order.
8	*Metrosideros* cv 'Thomasii' NZ Xmas Bush cultivar	4	3	Multi to 100	SM	Fair	Fair	3B	Introduced exotic species. Some dieback to mid crown. *Epicormic* shoots stimulated by pruning.
9	Not present								
10	*Syagrus romanzoffiana* Cocos Palm								Introduced exotic species. Exempt from protection under Tree Preservation and Management Order. Outside property boundary.

10A	*Pittosporum undulatum* Sweet Pittosporum	4.5	2	90/ 110	SM	Poor	Poor	4A	Locally indigenous species. Struggling tree – many borer sites, damaged crown. Dieback.
11	*Acmena smithii* Lillypilly	6	4	Multi	SM	Fair	Poor	4C	Locally indigenous species. Heavily lopped, poorly pruned. Many epicormics. Crown burn. Stem cluster at base, with inclusions. Poor location on rocks.
12	*Syagrus romanzoffiana* Cocos Palm								Introduced exotic species. Exempt from protection under Tree Preservation and Management Order. Outside property boundary.
13	*Banksia integrifolia* Coastal Banksia	5.5	2	80 / 110	SM	Good	Fair	3B	Locally indigenous species. Co-dominant stems @ base, included.
14	*Banksia integrifolia* Coastal Banksia	6.5	5	220	SM	Good	Fair	3B	Leans to NE. Overhangs deck, has been poorly pruned to clear. Extensive surface roots.
15	*Banksia integrifolia* Coastal Banksia	5.5	4	210	SM	Good	Fair	3B	Locally indigenous species. Leans to NE. Surface roots.
16	*Banksia integrifolia* Coastal Banksia	5	4	200	SM	Good	Good	2B	Locally indigenous species. Some minor dieback in crown. Surface roots to West.
17	*Banksia integrifolia* Coastal Banksia	4	3	200	OM	Good	Poor	4A	Locally indigenous species. One stem remaining from old, collapsed and pruned tree. Lopped.
18	*Banksia integrifolia* Coastal Banksia	4	4	2 x 150	M	Good	Poor	4E	Locally indigenous species. Poor form due to excessive stem and branch removal.
19	*Banksia integrifolia* Coastal Banksia	4	6	120 - 200	M	Good	Good	2A	Locally indigenous species. Has been lopped at 2m, but form is good.
20	*Banksia integrifolia* Coastal Banksia	4	6	120 - 200	M	Good	Fair	2A	Locally indigenous species. Low branching. Lopped at 2-3m.
21	*Washingtonia robusta* Cotton Palm	7	2	350	SM	Fair	Fair	2A	Introduced exotic species. Typical salt and wind burn damage to fronds.

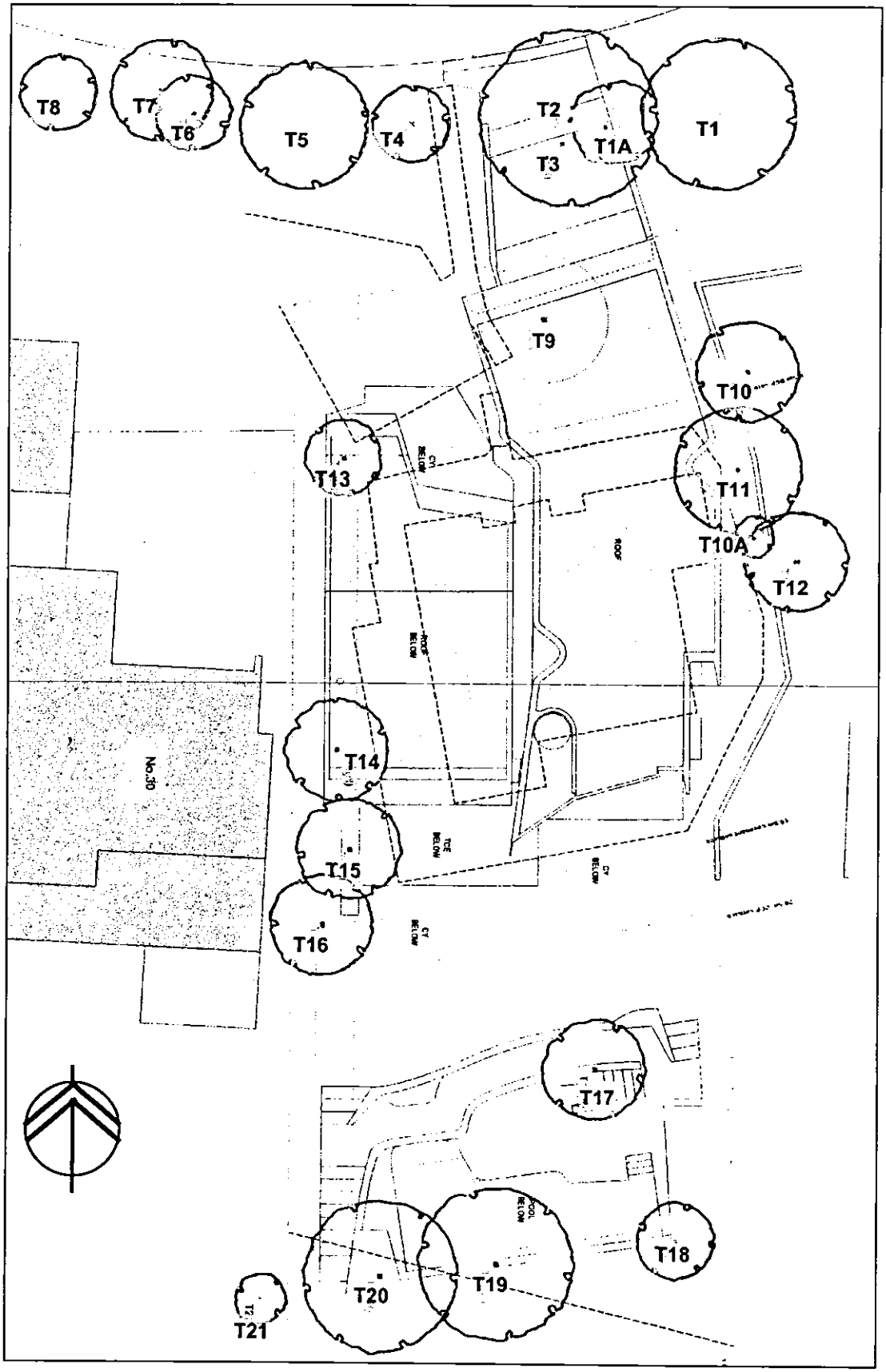
LEGEND

Trees within, or too close to the development footprint, and proposed for removal.

Trees to be retained.

APPENDIX D

TREE LOCATION PLAN



Note: This plan shows the location of existing trees in, or near the subject site. The footprint of dwelling and pool shown are not those of the current development application and should not be relied upon for assessment of the application. Subject to arboricultural advice the pool has since been relocated to retain Trees 19 and 20. The above plan is not to scale.

Part CC payment
of $2475
paid on cheque no:
454. 22/8/07

CABE

21 August 2007

Paul Gearin
Local Management Services Pty Ltd
PO Box 3190
NARELLAN DC NSW 2567

P 02 4655 5811
F 02 4655 2411

Dear Paul

32 The Serpentine, Bilgola
Early Works Demolition CC

Please find enclosed information available to date. Further to our discussion I am seeking a Demolition approval to allow commencement on site as balance of documentation required is prepared and finalised.

I would appreciate your attention to this matter at your earliest convenience as I am away next week and would like to commence works prior to my departure. Please do not hesitate to contact myself should you require any further information.

Yours sincerely
CABE

LOUIS QUATTROMANI
Project Manager
D 02 8818 3630

5001192

CABE

21 August 2007

Paul Gearin
Local Management Services Pty Ltd
PO Box 3190
NARELLAN DC NSW 2567

P 02 4655 5811
F 02 4655 2411

Dear Paul

32 The Serpentine, Bilgola
Waste Management Plan

Waste Management during construction will be managed by local bins to each level of the building which will be craned on a daily basis (by site tower crane) to Cabes tipper truck and waste will be tipped at the local public tip _ 'Kimbricki' site.

It is envisaged that the tower crane will be erected at site establishment stage due the difficult site access. Upon removal of the tower crane, which is expected to be 6 to 8 weeks prior to completion the residual waste at this point will be managed by Reefway Waste skip bins.

Yours sincerely
CABE

LOUIS QUATTROMANI
Project Manager
Ø 02 8818 3630

Jeffery and Katauskas Pty Ltd

CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
ABN 17 003 550 801

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DRAFT REPORT

TO

CABE

ON

GEOTECHNICAL ASSESSMENT

(IN ACCORDANCE WITH PITTWATER COUNCIL AMENDED INTERIM POLICY)

FOR

PROPOSED RESIDENTIAL DEVELOPMENT

AT

32 THE SERPENTINE, BILGOLA

19 October 2006

Ref:20608SLrpt

TABLE OF CONTENTS

1 INTRODUCTION

This report presents the results of our geotechnical assessment of the site at 32 The Serpentine, Bilgola. The assessment was commissioned by Mr Mark Monk of CABE in accordance with our proposal (Ref: P13267SLrev1) dated 18 September 2006. The site was inspected by the undersigned on 28 September 2006, in order to assess the existing stability of the site and the effect on stability of the proposed development. In addition to this, an investigation of the subsurface conditions was undertaken on 3 October 2006 to assess the subsurface conditions to allow us to provide comments and recommendations on the excavation conditions, shoring and footing design.

Details of the proposed development are presented in Section 4 below. In summary, however, it is proposed to construct a new multi level residential dwelling with excavation to maximum depths in the order of 6m.

This report has been prepared in accordance with the requirements of the Amended Interim Geotechnical Risk Management Policy for Pittwater (adopted 17 June 2003) as discussed in Section 5 below. It is understood that the report will be submitted to Council as part of the DA documentation. Our report is preceded by the completed Council Forms 1 and 1a.

This site is also included in the Councils coastal hazard map and so a coastal engineers report has been prepared by Patterson Britton and Partners. A copy of their report is included in Appendix C, while their completed forms 1 and 1a also precede this report.

2 ASSESSMENT METHODOLOGY

2.1 Walkover Survey

The stability assessment is based upon a detailed inspection of the topographic, surface drainage and geological conditions of the site and its immediate environs. These features were compared to those of other similar lots in neighbouring locations to provide a comparative basis for assessing the risk of instability affecting the proposed development. The attached Appendix A defines the terminology adopted for the risk assessment together with a flow chart illustrating the Risk Management Process based on the guidelines given in AGS 2000 (Reference 1).

A summary of our observations is presented in Section 3 below. Our specific recommendations regarding the proposed development are discussed in Section 7 following our geotechnical assessment.

The attached Figure 1 presents a geotechnical site plan showing the principal geotechnical features present at the site. Figure 1 is based on the survey plan prepared by Gary Edwards and Associates Pty Ltd (Ref: 2699 dated 10 March 2006). Figure 2 shows the outline of the proposed new dwelling. Additional features on Figures 1 and 2 have been measured by hand held inclinometer and tape measure techniques and hence are only approximate. Should any of the features be critical to the proposed development, we recommend they be located more accurately using instrument survey techniques. Figures 3 and 4 present a typical cross-section A-A through the site based on the survey data augmented by our mapping observations.

2.2 Subsurface Investigation

The fieldwork for the subsurface investigation comprised the following;

- Drilling 4 boreholes (BH1 to BH4 inclusive) to depths ranging from 0.9m (BH3) to 9.73m (BH1). BH1 and BH2 were initially drilled using a hand auger to refusal and were then continued using portable Melville coring equipment. BH3 and BH4 were drilled using hand auger equipment until refusal of the hand auger equipment was encountered.
- Six Dynamic Cone Penetrometer (DCP) tests were carried out and these extended to depths ranging from about 0.8m to 1.9m. DCP1 to DCP4 inclusive were completed adjacent to each corresponding borehole to assess the strength of the soils and to probe for rock. DCP5 and DCP6 were carried out to probe for the top of rock. We note that the DCP test will often provide an indication of the top of weathered rock, however it can also prematurely refuse on obstructions in any fill or on other hard soil layers.

The investigation locations, as shown on the attached Figure 1, were set out by taped measurements from existing surface features shown on the survey plan.

The investigation was completed in the full-time presence of a Geotechnical Engineer who nominated the sampling and testing locations, and prepared the logs of the strata encountered in the boreholes. The boreholes are attached, along with a glossary of the terms and symbols used in the logs.

Testing for possible contamination of the soils and groundwater were beyond the scope of the investigation.

For further details of the investigation techniques adopted, reference should be made to the attached Report Explanation Notes.

The recovered rock core from BH1 and BH2 were returned to a NATA registered laboratory where it was colour photographed and Point Load Strength Index tests completed. A summary of the test results are provided on the borehole logs and in the attached Table C.

3 SUMMARY OF OBSERVATIONS

In the following section of this report we have summarised the site observations made during our site visits on 28 September 2006 and 3 October 2006, many of which are shown on the attached Figure 1. We recommend that the summary of observations which follows be read in conjunction with the attached Figure 1.

- The site is located toward the crest of the hill above the northern end of Bilgola Beach, on the southern side of Bilgola Head. Surface slopes in the vicinity of the site are of the order of 15° to 25° down to the south.
- The site is located on the low side of The Serpentine at Bilgola.
- The Serpentine appears to have been formed by cutting into the high side of the site and possibly filling on the low side. The cuts are retained by retaining walls of various construction with heights of 1m to 2m. The Serpentine is relatively level and has no kerb and guttering on the low side adjacent to the subject site.
- Between the northern site boundary and The Serpentine is a vegetated batter which slopes down to the south at maximum gradients of about 30°. At the crest of the batter slope is a stormwater pit which appears to collect runoff from The Serpentine. A stormwater pipe appears to run parallel with the edge of the road and have an invert at about 1.4m depth below the top of the stormwater pit. A set of stairs extends down the batter, to a concrete paved car parking area.
- The majority of the site is grassed with some terraced gardens and slopes down to the south at gradients of 12° to 18°.

- The existing residence is a single storey clad residence with a storage room underneath the low (or southern side). The residence is surrounded by timber decking and is supported on sandstone block footing walls and
- About 10m to 20m from the southern boundary is a cliff which falls about 10m to 12m to the back beach area of Bilgola Beach. The cliff exposes weathered sandstone and shale of the Narrabeen Group with some steeply inclined and smooth joints. The base of the cliff is undercut by a metre or so.
- There appears to be an existing sewer line which extends along or close to the rear site boundary. Its depth is unknown.
- The properties to either side of the site are relatively similar in profile to the site. The house to the east is a one and two storey residence which is as close as 3.8m from the subject site boundary. The site to the west has a residence which is almost complete, but still partially under construction; it is a multistorey concrete residence which abuts the subject site boundary.

4 SUBSURFACE CONDITIONS

The fieldwork has disclosed the subsurface profile to comprise some surficial silty clay fill over residual silty clays of medium plasticity which in turn overlies weathered sandstone bedrock. The more pertinent features of the materials encountered are provided below. For further details of the strata encountered at each location reference should be made to the attached borehole logs. The borehole data has been incorporated into the inferred geotechnical cross section shown on Figures 3 and 4.

Fill

A silty clay fill was encountered in each of the four boreholes and extended to depths ranging from 0.5m to 0.6m. From the DCP test results, the fill appeared to be generally poorly compacted.

Residual Silty Clay

Residual silty clay of medium plasticity was encountered in all boreholes from the base of the fill to the surface of the weathered sandstone bedrock. These clayey soils were assessed from the DCP test results and tactile examination to be of stiff or very stiff strength.

Weathered Sandstone Bedrock

Weathered sandstone bedrock was inferred from the DCP tests and boreholes to be encountered at depths ranging from about 0.8m to about 2.0m depth below existing surface levels. The upper sandstone to a depth of about 6.1m (BH1) and to the borehole termination depth of 4.58m (BH2) was quite variable ranging from extremely to distinctly weathered and extremely low to medium strength, with some large core loss zones. Below 6.1m, in BH1, the sandstone was distinctly weathered and medium strength with some defects (such as thin extremely weathered and clay seams), while below 7.4m, the sandstone was slightly weathered and high strength with no defects in the core. These variable sandstone conditions are not unusual in the Narrabeen Group of rocks encountered in this region, and are consistent with our observations of the exposed cliff face to the south of the site.

Groundwater

Groundwater seepage was not encountered during auger drilling in any of the boreholes. The introduction of water during the coring precluded further useful groundwater monitoring on the day and no longer term groundwater monitoring has been undertaken.

Laboratory Test Results

The Point Load Strength Index test results correlate well with the field assessment of rock strength. A summary of the results is provided in Table C.

5 PROPOSED DEVELOPMENT

As part of our assessment. we have been provided with the following architectural drawings, prepared by Turner Associates Architects, which are all Job Number 06025, Revision A, dated 11 October 2006;

- DA03 – Roof/Site Plan
- DA04 – Street Level Plan
- DA05 – Upper Ground Level Plan
- DA06 – Ground Level Plan
- DA07 – Lower Ground Level Plan
- DA20 – North Elevation
- DA21 – East Elevation
- DA22 – South Elevation
- DA23 – West Elevation
- DA32 – Section

From these drawings we understand that the proposed development will include a four level residential building with a lower ground floor level at about RL29.5m. Excavation to achieve this floor level will be to maximum depths in the order of 6m at the northern end. Access to the dwelling will be via an elevated driveway from The Serpentine.

The general footprint of the proposed development is indicated on Figure 2

6 GEOTECHNICAL ASSESSMENT

The site is located within topography that has relatively gentle slopes typically of 12° to 18°. Beyond the site to the south is a cliff which adjoins the northern end of Bilgola Beach. Immediately above the site is a batter slope which may contain some fill as a result of construction of The Serpentine. From our visual surface observations we did not observe any features on the site which would indicate evidence of mass soil instability.

6.1 Potential Landslide Hazards

We consider that the potential landslide hazards associated with the site in its current condition to be the following:

Hazard A – Instability of the batter slope above the subject site.
Hazard B – Instability of the hillside slope under the existing dwelling.
Hazard C – Instability of the hillside slope below the existing dwelling
Hazard D – Instability of the hillside slope at the southern site boundary close to the existing sewer.
Hazard E – Instability of the cliff face involving a large wedge failure
Hazard F – Instability of the cliff face involving a small wedge failure

These potential hazards for the existing condition are indicated in schematic form on the attached Figure 5.

We consider that the potential landslide hazards associated with the site in its proposed condition to be the following:

Hazard A1 – Instability of the batter slope above the subject site.
Hazard D1 – Instability of the hillside slope at/or close to the southern site boundary close to the existing sewer.

Hazard E1 - Instability of the cliff face involving a large wedge failure.

Hazard F1 – Instability of the cliff face involving a small wedge failure.

Hazard G – Instability of the retaining walls on all sides of the new residence during both construction and in the permanent condition.

These potential hazards for the existing condition are indicated in schematic form on the attached Figure 5.

6.2 Coastal Assessment

As mentioned above, an assessment of the coastal processes at the site has been undertaken by Patterson Britton & Partners Pty Ltd, with the results being provided in their report Ref ; a copy of the report is provided in Appendix C.

The report summarises the potential coastal hazards and recommends a bluff erosion of mm per year be allowed in the landslide risk assessment. We note that this relates to before erosion at such a rate would impact upon the property. The advised erosion rate has been used in our assessment.

6.2 Risk Analysis

The attached Table A summarises our qualitative assessment of each potential landslide hazard and of the consequences to property should the landslide hazard occur. Table A has included hazards for both the existing and proposed conditions. Based on the above, the qualitative risks to property have been determined. The terminology adopted for this qualitative assessment is in accordance with Table A1 given in Appendix A. Table A indicates that the assessed risk to property for both the existing and proposed conditions varies from Very Low to Low which would be considered acceptable in accordance with the criteria given in Reference 1 and the Pittwater Council Amended Interim Policy.

We have also used the indicative probabilities associated with the assessed likelihood of instability to calculate the risk to life. The temporal and vulnerability factors that have been adopted are given in the attached Table B together with the resulting risk calculation. Table B includes hazards for both the existing and proposed conditions. Our assessed risk to life for the person most at risk is about $5x10^{-7}$ (existing condition) and $5x10^{-8}$ (proposed condition). This would be considered to be acceptable in relation to the criteria given in Reference 1 and the Pittwater Council Amended Interim Policy.

6.3 Risk Assessment

The Pittwater Amended Interim Policy requires suitable measures 'to remove risk'. It is recognised that, due to the many complex factors that can affect a site, the subjective nature of a risk analysis, and the imprecise nature of the science of geotechnical engineering, the risk of instability for a site and/or development cannot be completely removed. It is, however, essential that risk be reduced to at least that which could be reasonably anticipated by the community in everyday life and that landowners be made aware of reasonable and practical measures available to reduce risk as far as possible. Hence, where the policy requires that 'reasonable and practical measures have been identified to remove risk', it means that there has been an active process of reducing risk, but it does not require the geotechnical engineer to warrant that risk has been completely removed, only reduced, as removing risk is not currently scientifically achievable.

Similarly, the Pittwater Interim Policy requires that the design project life be taken as 100 years unless otherwise justified by the applicant. This requirement provides the context within which the geotechnical risk assessment should be made. The required 100 years baseline broadly reflects the expectations of the community for the anticipated life of a residential structure and hence the timeframe to be

considered when undertaking the geotechnical risk assessment and making recommendations as to the appropriateness of a development, and its design and remedial measures that should be taken to control risk. It is recognised that in a 100 year period external factors that cannot reasonably be foreseen may affect the geotechnical risks associated with a site. Hence, the Policy does not seek the geotechnical engineer to warrant the development for a 100 year period, rather to provide a professional opinion that foreseeable geotechnical risks to which the development may be subjected in that timeframe have been reasonably considered.

In preparing our recommendations given below we have adopted the above interpretations of the Interim Policy requirements. We have also assumed that no activities on surrounding land which may affect the risk on the subject site would be carried out. We have further assumed that all Council's buried services such as the sewer and existing stormwater pipe along the edge of The Serpentine are, and will be regularly maintained to remain, in good condition.

We consider that our risk analysis has shown that the site and existing and proposed development can achieve the 'Acceptable Risk Management' criteria in the Pittwater Interim Policy provided that the recommendations given in Section 7 below are adopted. These recommendations form an integral part of the Landslide Risk Management Process.

7 COMMENTS AND RECOMMENDATIONS

We consider that the proposed development may proceed provided the following specific design, construction and maintenance recommendations are adopted to maintain and reduce the present risk of instability of the site and to control future risks. These recommendations address geotechnical issues only and other conditions may be required to address other aspects.

7.1 Conditions Recommended to Establish the Design Parameters

7.1.1 Prior to work being carried out on the site, we recommend detailed dilapidation reports be carried out on the adjoining residences to the east and west of the subject site. A copy of these reports should be provided to the adjoining property owners, who should be asked to confirm (by signing the reports) that they present a fair record of existing conditions.

7.1.2 Excavation to maximum depths of about 6m is proposed to achieve the lower ground floor level (about RL29.5m). Our subsurface investigations have indicated that inferred weathered sandstone bedrock will be encountered at depths in the order of 1.5m to 2.0m (although the upper weathered rock will be of very poor quality with significant extremely weathered sandstone and clay seams expected). The weathered sandstone will also contain bands of sandstone that could be upto high strength. More uniform high strength sandstone bedrock was encountered in BH1 at a depth of about 6.1m (RL31.5m) and as such some excavation through this higher strength sandstone may also be required at the high end of the site where excavation depths will be greatest.

- Excavation for the most part will be through the soils and upper weathered rock which we expect mostly will be able to be excavated using a large excavator with a bucket and ripping tyne. Some bands of medium or higher strength sandstone may require excavation with a hydraulic impact hammer. If the better quality medium and high strength sandstone is encountered at the base of the excavation then hydraulic impact hammers will also be required for effective excavation through this type of rock.

- Excavation through medium or high strength sandstone bedrock using hydraulic impact hammers can cause vibration damage to adjoining structures if appropriate precautions are not followed. At the

commencement of rock excavation quantitative vibration monitoring by a geotechnical engineer must be carried out to check that vibration frequencies and velocities on adjoining structures are not exceeding tolerable limits. Rock excavation should be commenced at a point furthest from adjoining structures. If vibration monitoring indicates greater than tolerable vibrations then alternative excavation equipment would be required (such as smaller excavators and impact hammers, rock grinders or rock saws). Specific advice on the suitability of the equipment being used, safe distances from adjoining structures for rock excavation and alternative techniques can be provided by the geotechnical engineers during initial rock excavation and vibration monitoring.

- Due to the poor quality and defects within the upper weathered sandstone, excavation through the soils and weathered sandstone could be battered at not steeper than 1 Vertical (V) in 1 Horizontal (H) if room exists within the site boundaries. However due to the depth of the excavation, temporary batter slopes will generally not fit within the site boundaries and therefore excavations will need to be supported by an insitu shoring system. Such a system could comprise an anchored soldier pile wall with reinforced shotcrete infill panels. It is essential that even with a properly design shoring system such as this that geotechnical inspections of the cut faces between soldier piles be inspected at not greater than 1.5m depth intervals.

7.1.3 Any new retaining walls and shoring systems should be designed by a suitably experienced structural/geotechnical engineer. The following parameters can be used for design of retaining walls;

- Free standing retaining walls of less than 3m in height may be designed for a triangular lateral earth pressure distribution using an 'active' earth

pressure coefficient, (Ka) of 0.33 for the soils and a Ka of 0.25 for the weathered rock. If retaining walls are to be laterally restrained then an 'at rest' earth pressure coefficient (Ko) of 0.53 may be adopted for the soils and a Ko of 0.4 for the weathered rock. The above earth pressure parameters assume a level backfill surface.

- Soldier pile shoring walls should be adopted where excavation heights exceed 3m and will need to be laterally supported in the short term during construction by a combination of toe socket and either temporary anchors or bracing. The new residence to the west has also carried out some excavation to achieve its floor levels. Therefore prior to detailing anchors it will be essential to identify the extent and depth of adjacent excavation. It is possible that temporary anchors may not be feasible. We expect that in the permanent condition retaining walls will be laterally supported by the permanent structure. Where retaining walls are to be anchored or braced, they should be designed for a uniform (rectangular) earth pressure distribution of 5H kPa, through the soils and weathered sandstone, where H is the depth of excavation in metres.

- During soldier pile wall construction it is essential that excavation faces be inspected by a geotechnical engineer at not greater than 1.5m depth intervals to check for adverse defects. If adverse defects occur then it may be necessary to install additional anchors or bracing for lateral support of the excavation.

- The toe socket for piles into sandstone of at least very low strength, starting from a depth of at least 0.5m below the lowest proposed adjacent excavation (including excavation for footings or services) may be designed for an allowable lateral bearing pressure of 300kPa. Where the better quality sandstone bedrock is encountered it may be difficult or impossible

to socket the piles sufficiently into sandstone of medium strength or higher and so a level of anchors at the toe of the piles may be necessary, followed by detailed inspection of the exposed conditions below the toe of any piles during excavation. It is possible that piles may need to be underpinned if adverse defects are encountered below the toe of the pile.

- Temporary anchors with a bond of at least 3m into sandstone of at least very low strength may be designed for an allowable bond of 150kPa. The bond length should be behind a 45° zone of influence behind the wall. The anchors should have a free length of at least 3m. All anchors should be proof loaded to at least 1.3 times their design working load. Where anchors extend beyond the site boundary, it will be necessary to obtain permission from the owners of those properties prior to installing the anchors.

- Any surcharge (including nearby retaining walls and their backfill, sloping backfill to the retaining walls, adjacent footings, construction traffic etc) affecting the walls should be allowed in the design.

- Preferably all proposed retaining walls should be designed as permanently drained. The subsoil drainage system should incorporate a slotted pipe surrounded by a free draining single sized aggregate. The aggregate should be protected by a non-woven geotextile fabric (such as Bidim A34) to act as a filter against subsoil erosion. Behind a reinforced shotcrete wall, strip drain can be installed vertically at relatively close centres (in the order of 1.5m) prior to spraying with shotcrete. If drainage is not possible then the wall will need to be designed for full hydrostatic pressures.

- A bulk unit weight of 20kN/m^3 may be adopted for the soils and 22kN/m^3 for the weathered rock.

- Backfill to walls retaining grass or garden areas should be moderately compacted to reduce post construction settlements and possible infiltration to the subsoil drain. Backfill to walls retaining movement sensitive elements should be compacted in 100mm thick loose layers to a minimum density of 98% Standard Maximum Dry Density. An alternative to this would be to backfill the walls with durable, free draining fill such as uniformly sized crushed concrete or gravel which can be nominally compacted. An impervious seal should be placed over the gravel backfill to restrict surface infiltration.

7.1.4 We recommend all new building footings (including the proposed new swimming pool be founded on at least the underlying weathered sandstone bedrock. Footings can be designed on the basis of a maximum allowable bearing pressure of 600kPa. The founding condition for footings must be inspected by a geotechnical engineer to confirm that a satisfactory bearing stratum is being achieved. The bearing pressure has been kept relatively low due to the variability in the bedrock; much higher bearing pressures would be feasible in some locations following significant additional proving with cored boreholes.

7.1.5 Filling should be avoided unless it is placed as engineered fill behind properly designed retaining walls. Additional advice should be sought for the specification of engineered fill.

7.1.6 All roof and other water drainage should be directed to appropriate sealed pipe drains, which should discharge in such a way as to avoid concentrated flows and erosion. Discharge of stormwater may require construction of a detention tank and slow release system.

7.1.7 Appropriate soil erosion control measures (such as hay bale silt fences) should be implemented during construction.

7.1.8 In addition to the above, we refer the designer to the principals of hillside construction presented in Appendix B.

7.2 Conditions Recommended to the Detailed Design to be Undertaken for the Construction Certificate

7.2.1 All structural design drawings must be reviewed by the geotechnical engineer who should endorse that the recommendations contained in this report have been adopted in principle.

7.2.2 The structural engineer must indicate on the structural drawings the design life of all structures and structural elements.

7.2.3 All hydraulic design drawings must be reviewed by the geotechnical engineer who should endorse that the recommendations contained in this report have been adopted in principle.

7.2.4 Dilapidation surveys must be carried out on the neighbouring buildings and structures to the north and south. A copy of the dilapidation report must be provided to the neighbours and Council or the Principle Certifying Authority.

7.2.5 An excavation/retention methodology must be prepared prior to bulk excavation commencing. The methodology must include but not be limited to proposed excavation techniques, the proposed excavation equipment, excavation sequencing, geotechnical inspection intervals or hold points and vibration monitoring procedures.

7.2.6 The excavation/retention methodology must be reviewed and approved by the geotechnical engineer.

7.3 Conditions Recommended During the Construction Period

7.3.1 Quantitative vibration monitoring should be carried out by a geotechnical engineer at the start of rock excavation and whenever excavation is intended to extend closer than previous monitoring. This monitoring is to check vibration frequency and velocities on adjoining structures are within tolerable limits and to confirm suitable precautions are being utilised.

7.3.2 The geotechnical engineer is to inspect **ALL** excavation batters (including temporary batters) at not greater than 1.5m height intervals to check that batter slopes are in accordance with our report and to check for any adverse defects that may affect the stability of cut batters.

7.3.3 The geotechnical engineer is to inspect **ALL** footings (including those for retaining walls and the founding conditions for the swimming pool etc) prior to placement of reinforcement or pouring of concrete.

7.3.4 The approved excavation/retention methodology must be followed.

7.3.5 Any proposed material to be used as backfill behind any retaining walls must be approved by the geotechnical engineers prior to placement.

7.3.6 Density testing of all structural backfill material must be checked by an approved NATA registered laboratory to at least Level 2 in accordance with, and to the frequency outlined in, AS3798, and the results submitted to the geotechnical engineer for any fills which support settlement sensitive structures or pavements.

7.3.7 If they are to be retained, the existing stormwater system, sewer and water mains must be checked for leaks by using static head and pressure tests under

the direction of the hydraulic engineer or architect, and repaired if found to be leaking.

7.3.8 The hydraulic and/or geotechnical engineer must inspect all subsurface drains prior to backfilling.

7.3.9 An 'as-built' drawing of all buried services at the site must be prepared (including all pipe diameters, pipe depths, pipe types, inlet pits, inspection pits, etc).

7.3.10 All rock anchors must be proof-tested to 1.3 times the working load. In addition, the anchors must be subjected to lift-off testing no sooner than 24 hours after locking off at the working load. The proof-testing and lift-off tests must be witnessed by the geotechnical engineer. The anchor contractor must provide the geotechnical engineer with all field records including anchor installation and testing records.

7.3.11 The geotechnical engineer must confirm that the proposed new residence has been completed in accordance with the geotechnical reports.

7.4 Conditions Recommended for Ongoing Management of the Site/Structure(s)

The following recommendations have been included so that the current and future owners of the subject property are aware of their responsibilities:

7.4.1 All existing and proposed surface (including roof) and subsurface drains must be subject to ongoing and regular maintenance by the property owners.

7.4.2 No cut or fill in excess of 0.5m (eg. for landscaping, buried pipes, retaining walls, etc), is to be carried out on site without prior consent from Pittwater Council.

7.4.3 Where the structural engineer has indicated a design life of less than 100 years then the structure and/or structural elements must be inspected

by a structural engineer at the end of their design life; including a written report confirming scope of work completed and identifying the required remedial measures to extend the design life over the remaining 100 year period.

7.4.4 We have assumed that no activities on surrounding properties, which may affect the stability of the subject site, will be carried out.

8 OVERVIEW

Provided the risk management details provided in Section 7 of this report are adopted, we consider that the risks associated with the proposed development are within those considered acceptable in accordance with the Interim Geotechnical Risk Management Policy For Pittwater produced by Pittwater Council in June 2003. Further, we consider that complying with the recommendations provided in Section 7 of this report comply with the requirement to undertake reasonable and practical steps to remove foreseeable geotechnical risk from the site.

It is possible that the subsurface soil, rock or groundwater conditions encountered during construction may be found to be different (or may be interpreted to be different) from those inferred from our surface observations in preparing this report. Also, we have not had the opportunity to observe surface run-off patterns during heavy rainfall and cannot comment directly on this aspect. If conditions appear to be at variance or cause concern for any reason, then we recommend that you immediately contact this office.

This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose. Copyright in this report is the property of Jeffery and Katauskas Pty Ltd. We have used a degree of care, skill and diligence normally exercised by consulting engineers in similar circumstances and locality. No other

warranty expressed or implied is made or intended. Subject to payment of all fees due for the investigation, the client alone shall have a licence to use this report. The report shall not be reproduced except in full.

Should you have any queries regarding this report, please do not hesitate to contact the undersigned.

LJ Speechley
Senior Associate

P Stubbs
Principal
For and on behalf of
JEFFERY AND KATAUSKAS PTY LTD

Reference 1: Australian Geomechanics Society (2000) *'Landslide Risk Management Concepts and Guidelines'*, Australian Geomechanics, Vol 35, No 1, March 2000, pp49-92.

TABLE A
SUMMARY OF RISK ASSESSMENT TO PROPERTY – EXISTING AND PROPOSED CONDITIONS

Potential Landslide Hazard	Assessed Likelihood	Assessed Consequences	Risk	Comments
EXISTING CONDITIONS				
Hazard A – Instability of the batter slope above the subject site.	Unlikely	Minor	Low	Council should ensure that their stormwater pipes are in good working order with no leaks.
Hazard B – Instability of the hillside slope under the existing dwelling.	Rare	Minor	Very Low	
Hazard C – Instability of the hillside slope below the existing dwelling.	Rare	Minor to Insignificant	Very Low	
Hazard D – Instability of the hillside slope at the southern boundary close to the existing sewer.	Rare to Unlikely	Insignificant	Very Low	Failure could be instigated by leaking sewer, however slopes quite gentle.
Hazard E – Instability of the cliff face involving a large wedge failure.	Possible	Insignificant	Low	Evidence of previous large wedge failure immediately to the east of the site. Large failure would probably not reach site. Assessment of damage to beach area has not been assessed
Hazard F – Instability of the cliff face involving a small wedge failure.	Likely	Insignificant	Low	Undercutting and steeply inclined joints present, evidence of other small wedge failures. Small wedge failure would not reach site. Assessment of damage to beach area has not been assessed
PROPOSED CONDITIONS				
Hazard A1 –Instability of the batter slope above the subject site.	Unlikely	Minor	Low	Council should ensure that their stormwater pipes are in good working order with no leaks.
Hazard D1 – Instability of the hillside slope at/or close to the southern boundary close to the existing sewer.	Rare to Unlikely	Minor to Insignificant	Very Low	Pool to be founded on rock see text of report.

Hazard E1 – Instability of the cliff face involving a large wedge failure.	Possible	Insignificant	Low	Evidence of previous large wedge failure immediately to the east of the site. Large failure would probably not reach site. Assessment of damage to beach area has not been assessed
Hazard F1 – Instability of the cliff face involving a small wedge failure.	Likely	Insignificant	Low	Undercutting and steeply inclined joints present, evidence of other small wedge failures. Small wedge failure would not reach site. Assessment of damage to beach area has not been assessed
Hazard G – Instability of the retaining walls on all sides of the new residence during both construction and in the permanent condition.	Rare	Medium	Low	New temporary and permanent retaining walls to be properly designed and constructed.

TABLE B
SUMMARY OF RISK ASSESSMENT TO LIFE – EXISTING CONDITION

Potential Landslide Hazard	**Hazard A** Instability of the batter slope above the subject site.	**Hazard B** Instability of the hillside slope under the existing dwelling.	**Hazard C** Instability of the hillside slope below the existing dwelling.	**Hazard D** Instability of the hillside slope at the southern boundary close to the existing sewer.	**Hazard E** Instability of the cliff face involving a large wedge failure.	**Hazard F** Instability of the cliff face involving a small wedge failure.
Assessed Likelihood	Unlikely	Rare	Rare	Rare to Unlikely	Possible	Likely
Indicative Annual Probability	$1x10^{-4}$	$1x10^{-5}$	$1x10^{-5}$	$5x10^{-5}$	$1x10^{-3}$	$1x10^{-2}$
Persons at Risk	Persons in front of house or front garden	Persons in house	Persons in rear yard	Persons in rear yard	Persons between site boundary and cliff	Persons beyond site boundary and below cliff
Number of Persons Considered	4	4	4	2	2	2
Duration of Use of Area Affected (Temporal Probability)	8 hours per day (0.33)	8 hours per day (0.33)	2 hours per week (0.01)	2 hours per week (0.01)	2 hours/year Currently heavily vegetated (0.0002)	<0.5 hours/year Currently heavily vegetated (0.00005)
Probability of Not Evacuating Area Affected	0.5	0.5	0.01 Slow moving failure would allow evacuation	0.01 Slow moving failure would allow evacuation	1 Failure would likely be rapid	1 Failure would likely be rapid
Vulnerability to Life if Failure Occurs Whilst Person Present	0.01 only small volume likely to reach building and therefore building unlikely to collapse	0.01 Movements would be small creep type movements, with cracking evident before any failure	0.01 Slow moving failure expected	0.01 Slow moving failure expected	1 Almost certain death	1 Almost certain death
Risk for Person Most at Risk	$1.65x10^{-7}$	$1.65x10^{-8}$	$1x10^{-11}$	$5x10^{-11}$	$2x10^{-7}$	$<5x10^{-7}$
Total Risk	$6.6x10^{-7}$	$6.6x10^{-8}$	$4x10^{-11}$	$1x10^{-10}$	$4x10^{-7}$	$<1x10^{-6}$
Combined Total Risk for person most at risk	$5x10^{-7}$					

Notes **1) From the summation of risk for person most at risk, the combined total risk for the person most at risk is [5x 10^{-7}].**
2) Risk to life has not included an assessment of cliff face failures on persons at the base of the cliff. Council should commission their own assessment.

TABLE B
SUMMARY OF RISK ASSESSMENT TO LIFE – PROPOSED CONDITION

Potential Landslide Hazard	**Hazard A1** Instability of the batter slope above the subject site.	**Hazard D1** Instability of the hillside slope at/or close to the southern boundary close to the existing sewer.	**Hazard E1** Instability of the cliff face involving a large wedge failure.	**Hazard F1** Instability of the cliff face involving a small wedge failure.	**Hazard G** Instability of the retaining walls on all sides of the new residence during both construction and in the permanent condition.
Assessed Likelihood	Unlikely	Rare to Unlikely	Possible	Likely	Rare
Indicative Annual Probability	$1x10^{-4}$	$5x10^{-5}$	$1x10^{-3}$	$1x10^{-2}$	$1x10^{-5}$
Persons at Risk	Persons in front of house or front garden	Persons in or around pool	Persons between site boundary and cliff	Persons between site boundary and cliff	Persons in residence
Number of Persons Considered	4	4	2	2	4
Duration of Use of Area Affected (Temporal Probability)	8 hours per day (0.33)	4 hours per week (0.33)	2 hours/year Currently heavily vegetated (0.0002)	0.5 hours/year Currently heavily vegetated (0.00005)	8 hours per day (0.33)
Probability of Not Evacuating Area Affected	0.1	0.1	1 Failure would likely be rapid	1 Failure would likely be rapid	0.1 cracking and deformation likely before failure
Vulnerability to Life if Failure Occurs Whilst Person Present	0.01 only small volume likely to reach building and therefore building unlikely to collapse plus concrete structure	0.01 Movements would be small creep type movements, with cracking evident before any failure	1 Almost certain death	1 Almost certain death	0.5 Possibly buried
Risk for Person Most at Risk	$3.3x10^{-8}$	$1.6x10^{-8}$	$2x10^{-7}$	$2x10^{-7}$	$1.65x10^{-7}$
Total Risk	$1.3x10^{-7}$	$6.6x10^{-8}$	$4x10^{-7}$	$4x10^{-7}$	$6.6x10^{-7}$
Combined Total Risk for person most at risk	$6x10^{-7}$				

Notes **1) From the summation of risk for person most at risk, the combined total risk for the person most at risk is [$6x\ 10^{-7}$].**
2) Risk to life has not included an assessment of cliff face failures on persons at the base of the cliff. Council should commission their own assessment.

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SOIL TEST SERVICES
ABN 43 002 145 173

Ref No: 20608SL
Table C: Page 1 of 1

TABLE C
SUMMARY OF POINT LOAD STRENGTH INDEX TEST RESULTS

BOREHOLE NUMBER	DEPTH m	$I_{S(50)}$ MPa	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)
1	2.47-2.49	1.5	30
	3.19-3.22	0.5	10
	4.70-4.72	0.5	10
	5.08-5.11	0.2	4
	6.59-6.62	0.6	12
	7.66-7.68	1.7	34
	8.57-8.60	1.9	38
	9.0-9.03	2.8	56
2	2.77-2.81	0.5	10
	3.03-3.06	0.2	4
	3.97-4.00	0.2	4
	4.15-4.18	0.4	8

NOTES:

1. In the above table testing was completed in the Axial direction.
2. The above strength tests were completed at the 'as received' moisture content.
3. Test Method: RTA T223.
4. The Estimated Unconfined Compressive Strength was calculated from the point load Strength Index by the following approximate relationship and rounded off to the nearest whole number :
   U.C.S. = 20 $I_{S(50)}$

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CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

Borehole No. 1 1/3

BOREHOLE LOG

Client: CABE
Project: PROPOSED NEW RESIDENCE
Location: 32 THE SERPENTINE, BILGOLA, NSW

Job No. 20608SL **Method:** HAND AUGER **R.L. Surface:** 37.6m
Date: 3-10-06 **Datum:** mAHD
Logged/Checked by: M.T./

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION					Refer to DCP Test Results Sheet	0			FILL: Silty clay, low to medium plasticity, dark grey and dark brown, with a trace of roots and ironstone gravel.	MC<PL			
						1		CL	SILTY CLAY: medium plasticity, dark brown and orange brown.	MC>PL	(St-VSt)	-	
									as above, but medium plasticity, orange brown.				
						2			as above, but orange brown, red and light brown.	MC<PL			
									as above, but light grey, orange brown and light brown.				
									REFER TO CORED BOREHOLE LOG				
						3							
						4							
						5							
						6							
						7							

Jeffery and Katauskas Pty Ltd
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Borehole No. 1 2/3

CORED BOREHOLE LOG

Client: CABE
Project: PROPOSED NEW RESIDENCE
Location: 32 THE SERPENTINE, BILGOLA, NSW

Job No. 20608SL **Core Size:** TT56 **R.L. Surface:** 37.6m
Date: 3-10-06 **Inclination:** VERTICAL **Datum:** mAHD
Drill Type: MELVELLE **Bearing:** - **Logged/Checked by:** M.T.

Water Loss/Level	Barrel Lift	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, structure, minor components.	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_S(50)$ EL VL L M H VH EH	DEFECT DETAILS: DEFECT SPACING (mm) 600 300 100 50 30 10	DEFECT DETAILS: DESCRIPTION Type, inclination, thickness, planarity, roughness, coating. Specific / General
		2		START CORING AT 2.15m					
FULL RETURN		3		SANDSTONE: fine to medium grained, red and orange brown and light grey.	DW	L M	×		- XWS, 10mm.t - XWS, 10mm.t - XWS, 15mm.t - CS, 2mm.t - J, 90°, P, R
NO RETURN		4		CORE LOSS 0.91m					
		5		SANDSTONE: fine to medium grained, light grey, orange brown and red. as above, but red brown and light grey.	XW DW	EL L-M	×		- J, 90°, P, S - FRAGMENTED ZONE, 30mm.t - J, 90°, P, R - J, 90°, P, R
		6		CORE LOSS 0.71m					
		7		SANDSTONE: fine to medium grained, orange brown, light grey and red.	DW	M	×		- CS, 60mm.t - Be, 150mm.t, IS - XWS, 10mm.t - J, 90°, P, R, IS - CS, 30mm.t - XWS, 10mm.t - Be, 0°, IS - FRAGMENTED ZONE, 50mm.t - Be, 30° P, R, IS - Be, 30°, P, R, IS - J, 30°, P, R, IS - FRAGMENTED ZONE, 30mm.t - XWS, 30mm.t
		8		SANDSTONE: fine to medium grained, grey.	SW	H	×		
		9					×		

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Borehole No. 1 3/3

CORED BOREHOLE LOG

Client: CABE
Project: PROPOSED NEW RESIDENCE
Location: 32 THE SERPENTINE, BILGOLA, NSW

Job No. 20608SL **Core Size:** TT56 **R.L. Surface:** 37.6m
Date: 3-10-06 **Inclination:** VERTICAL **Datum:** mAHD
Drill Type: MELVELLE **Bearing:** - **Logged/Checked by:** M.T.

Water Loss/Level	Barrel Lift	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, structure, minor components.	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_S(50)$ EL VL L M H VH EH	DEFECT DETAILS DEFECT SPACING (mm) 500 300 100 50 30 10	DESCRIPTION Type, inclination, thickness, planarity, roughness, coating. Specific / General
				SANDSTONE: fine to medium grained, light grey, with dark grey laminae, bedded at 0-5°.	DW	M-H			
		10		END OF BOREHOLE AT 9.73m					
		11							
		12							
		13							
		14							
		15							

Jeffery and Katauskas Pty Ltd

CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

Borehole No. 2 1/2

BOREHOLE LOG

Client: CABE

Project: PROPOSED NEW RESIDENCE

Location: 32 THE SERPENTINE, BILGOLA, NSW

Job No. 20608SL **Method:** HAND AUGER/MELVELLE **R.L. Surface:** 31.7m

Date: 3-10-06 **Datum:** mAHD

Logged/Checked by: M.T./

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION			■			0			FILL: Silty clay, medium plasticity, dark brown, with roots. Refer to DCP test results sheet	MC<PL			GRASS COVER
			■					CL	SILTY CLAY: medium plasticity, dark brown and orange brown, with a trace of root fibres and fine to medium grained sandstone gravel. REFER TO CORED BOREHOLE LOG	MC>PL	(VSt)	-	HAND AUGER REFUSAL AND COMMENCE WASH BORING
						1							
						2							
						3							
						4							
						5							
						6							
						7							

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CORED BOREHOLE LOG

Borehole No. 2 2/2

Client: CABE
Project: PROPOSED NEW RESIDENCE
Location: 32 THE SERPENTINE, BILGOLA, NSW

Job No. 20608SL **Core Size:** TT56 **R.L. Surface:** 31.7m
Date: 3-10-06 **Inclination:** VERTICAL **Datum:** mAHD
Drill Type: MELVELLE **Bearing:** - **Logged/Checked by:** M.T./

Water Loss/Level	Barrel Lift	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, structure, minor components.	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_S(50)$ (EL VL L M H VH EH)	DEFECT DETAILS: DEFECT SPACING (mm) (500 300 100 60 30 10)	DEFECT DETAILS: DESCRIPTION Type, inclination, thickness, planarity, roughness, coating. Specific / General
		1		START CORING AT 1.45m					
				SANDSTONE: fine to medium grained, light grey, orange brown and red.	DW	EL			
		2		CORE LOSS 0.61m					
FULL RETURN				SANDSTONE: fine to medium grained, red, orange brown and light grey.	DW	L			
					XW	EL			
					DW	L-M			- Ba, 0°, P, R - XWS, 5mm.t - Ba, 30°, P, R, IS - XWS, 70mm.t - XWS, 15mm.t - XWS, 10mm.t - J, 80°, P, R - XWS, 0°, P, R - J, 70°, P, S, CLAY INFILL
		3							
						VL			- J, P, S
		4				L-M			- XWS, 50mm.t - J, 95°, P, R
				CORE LOSS 0.27m					
				SANDSTONE: fine to medium grained, light grey, red and orange brown.	DW	VL-L			- XWS, 10mm.t - Ba, 0°, P, S - XWS, 30mm.t
				END OF BOREHOLE AT 4.58m					
		5							
		6							
		7							
		8							

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Borehole No. 3 1/1

BOREHOLE LOG

Client: CABE

Project: PROPOSED NEW RESIDENCE

Location: 32 THE SERPENTINE, BILGOLA, NSW

Job No. 20608SL **Method:** HAND AUGER **R.L. Surface:** 27.8m

Date: 3-10-06 **Datum:** mAHD

Logged/Checked by: M.T./

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION				■	Refer to DCP test results sheet	0			FILL: Silty clay, low to medium plasticity, dark brown.	MC>PL			GRASS COVER
				■				CL	SILTY CLAY: medium plasticity, yellow brown, red and orange brown.	MC>PL	St	-	
						1			END OF BOREHOLE AT 0.9m				
						2							
						3							
						4							
						5							
						6							
						7							

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Borehole No. 4 1/1

BOREHOLE LOG

Client: CABE
Project: PROPOSED NEW RESIDENCE
Location: 32 THE SERPENTINE, BILGOLA, NSW

Job No. 20608SL **Method:** HAND AUGER **R.L. Surface:** 30.0m
Date: 3-10-06 **Datum:** mAHD
Logged/Checked by: M.T./

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION					Refer to DCP test results sheet	0			FILL: Silty clay, low to medium plasticity, dark brown, with a trace of roots.	MC < PL			GRASS COVER
						1		CL	SILTY CLAY: medium plasticity, yellow brown, brown and orange brown, with a trace of roots.	MC > PL	(St -VSt)	-	
									END OF BOREHOLE AT 1.3m				
						2							
						3							
						4							
						5							
						6							
						7							

DYNAMIC CONE PENETRATION TEST RESULTS

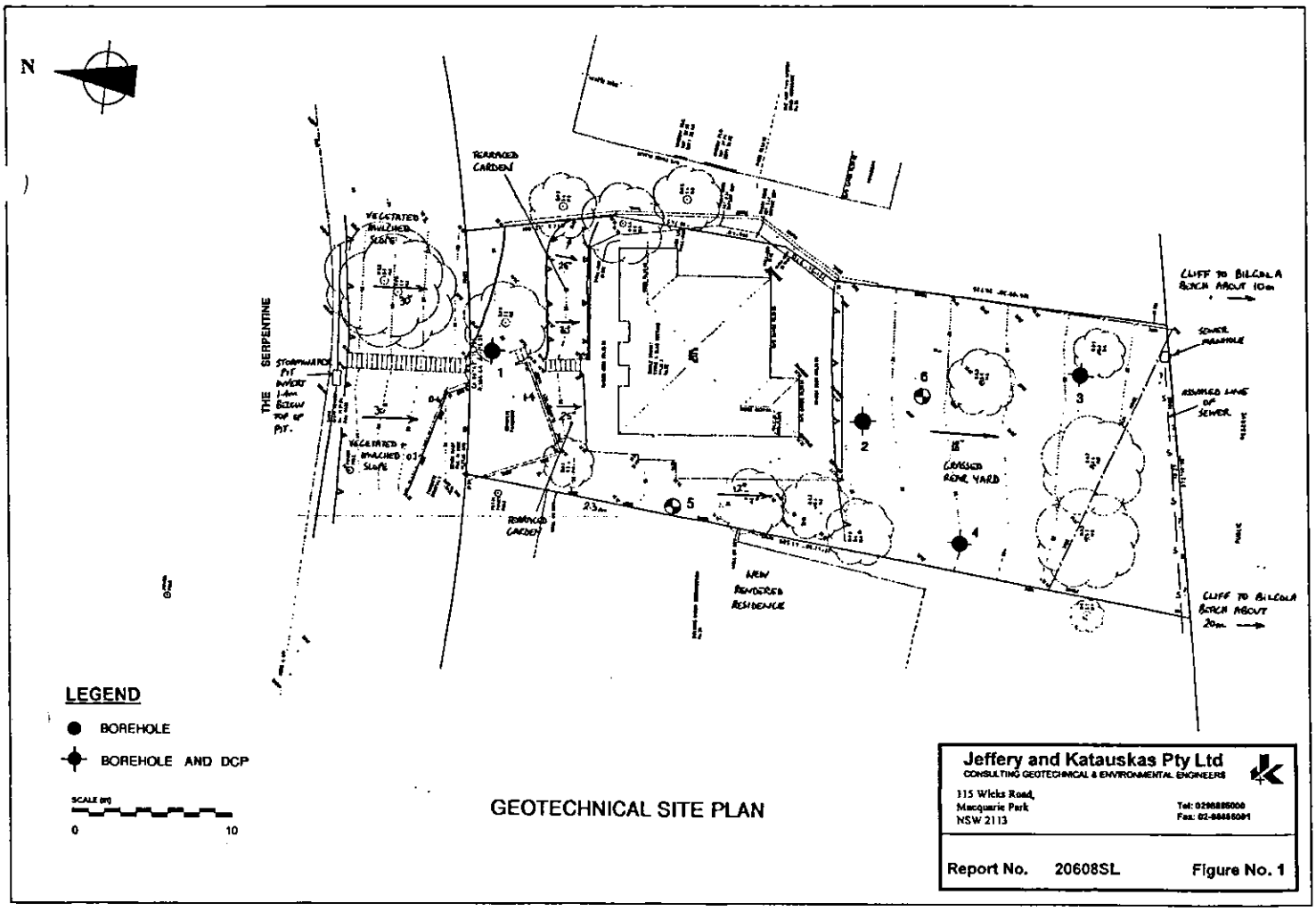
Client:	CABE		
Project:	PROPOSED RESIDENCE		
Location:	32 THE SERPENTINE, BILGOLA, NSW		
Job No.	20608SL	Hammer Weight & Drop:	9kg/510mm
Date:	3-10-06	Rod Diameter:	16mm
Tested By:	M.T.	Point Diameter:	20mm

Number of Blows per 100mm Penetration

Test Location	RL37.6m	RL31.7m	RL27.8m	RL30.0m	RL34.6m	RL30.4m	
Depth (mm)	**1**	**2**	**3**	**4**	**5**	**6**	
0 - 100	1	2	1	3	2	↓	
100 - 200	1	2	3	3	2	1	
200 - 300	↓	1	2	1	2	2	
300 - 400	2	1	2	2	1	2	
400 - 500	2	1	23	2	2	2	
500 - 600	3	2	3	1	1	3	
600 - 700	1	2	2	2	2	5	
700 - 800	2	6	17/70mm	3	3	4	
800 - 900	2	6	REFUSAL	3	2	3	
900 - 1000	2	9		2	3	3	
1000 - 1100	3	12		4	3	3	
1100 - 1200	2	14		2	2	4	
1200 - 1300	2	18		4	3	6	
1300 - 1400	2	16/50mm		15	4	7	
1400 - 1500	4	REFUSAL		REFUSAL	3	10	
1500 - 1600	4				4	8/20mm	
1600 - 1700	5				23	REFUSAL	
1700 - 1800	4				REFUSAL		
1800 - 1900	16						
1900 - 2000	REFUSAL						
2000 - 2100							
2100 - 2200							
2200 - 2300							
2300 - 2400							
2400 - 2500							
2500 - 2600							
2600 - 2700							
2700 - 2800							
2800 - 2900							
2900 - 3000							

Remarks:
1. The procedure used for this test is similar to that described in AS1289.6.3.2-1997, Method 6.3.2.
2. Usually 8 blows per 20mm is taken as refusal

Ref: Scala3.xls April 99



GEOTECHNICAL SITE PLAN

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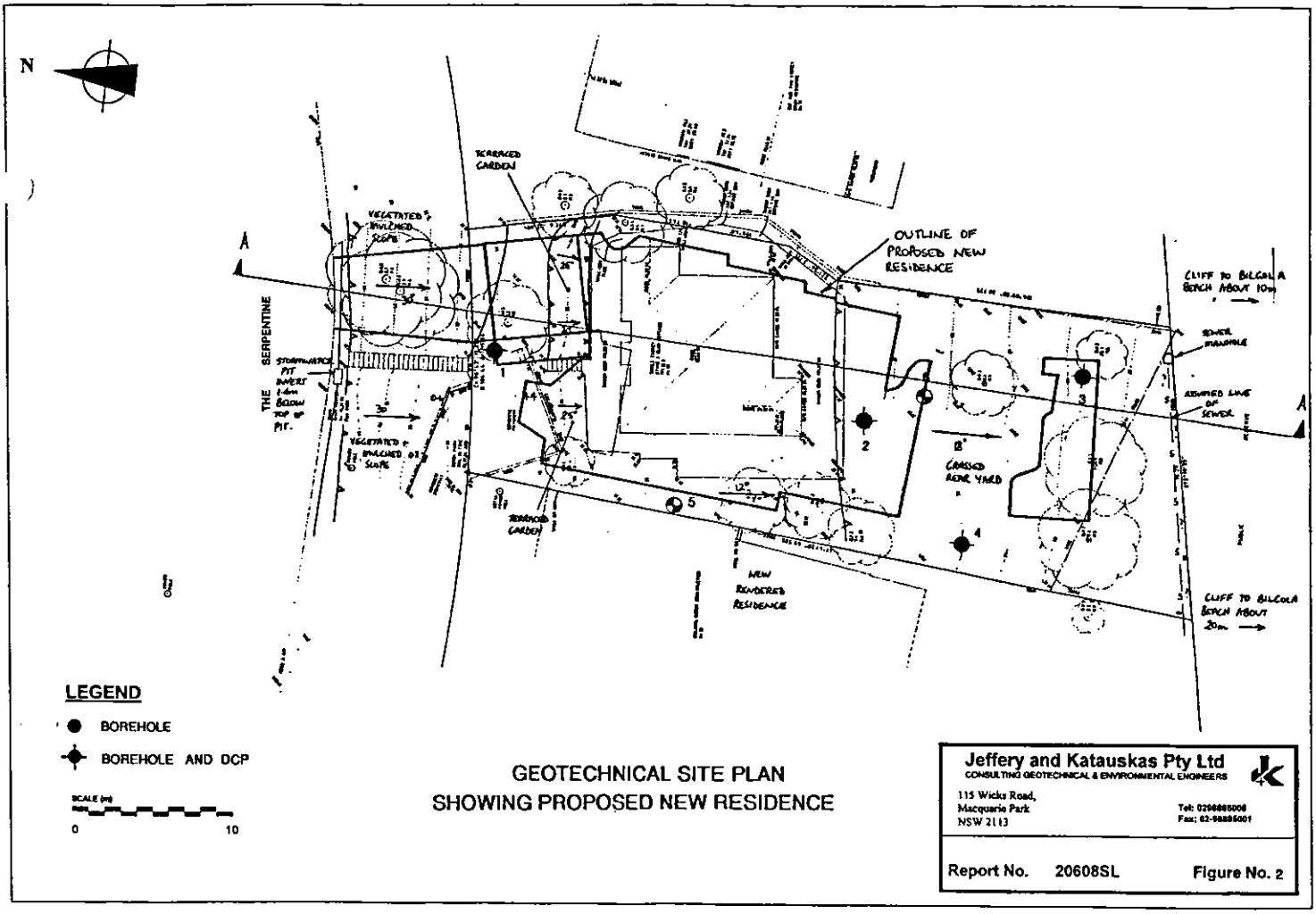
Report No. 20608SL Figure No. 1



GEOTECHNICAL SITE PLAN
SHOWING PROPOSED NEW RESIDENCE

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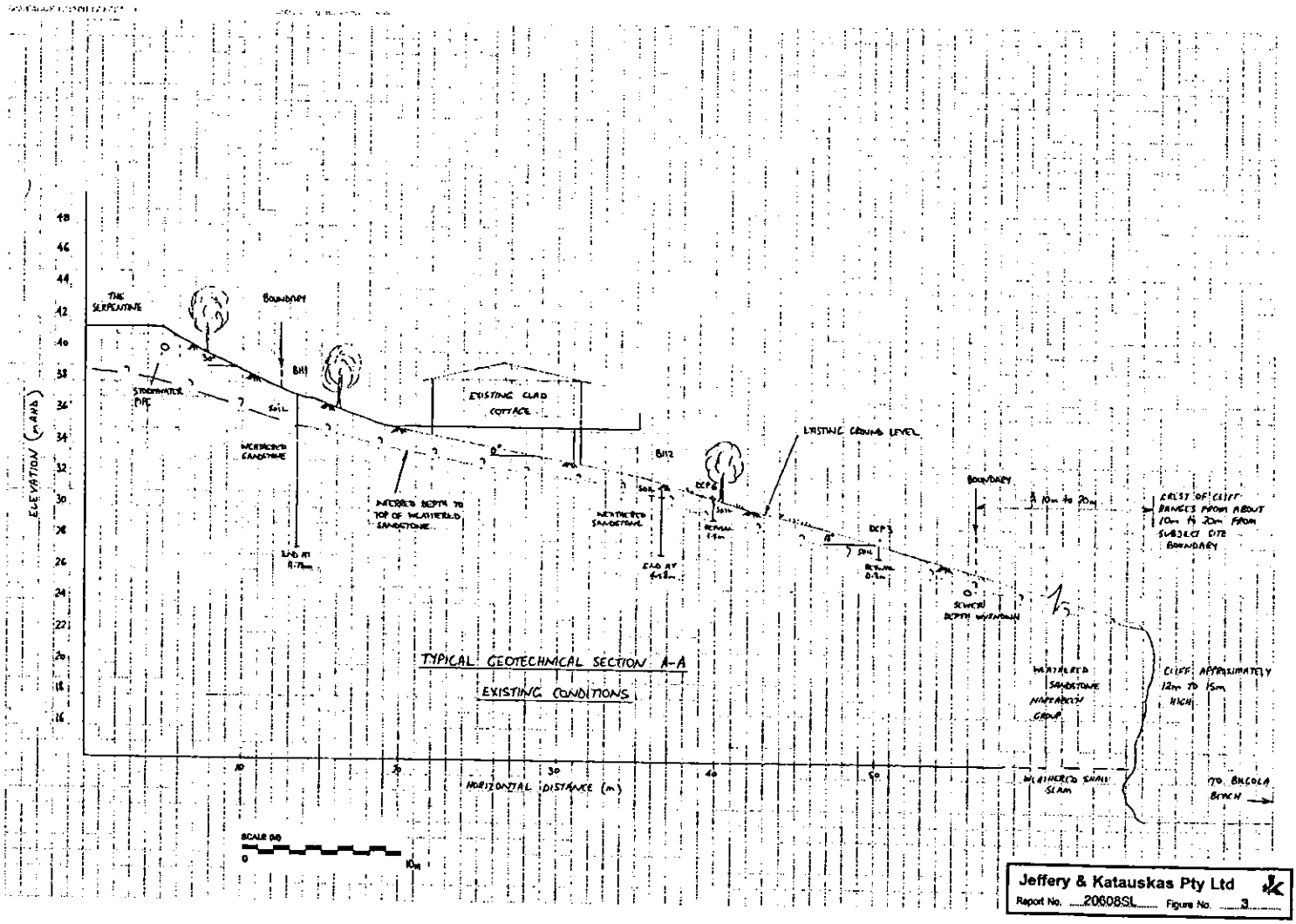
Report No. 20608SL Figure No. 2



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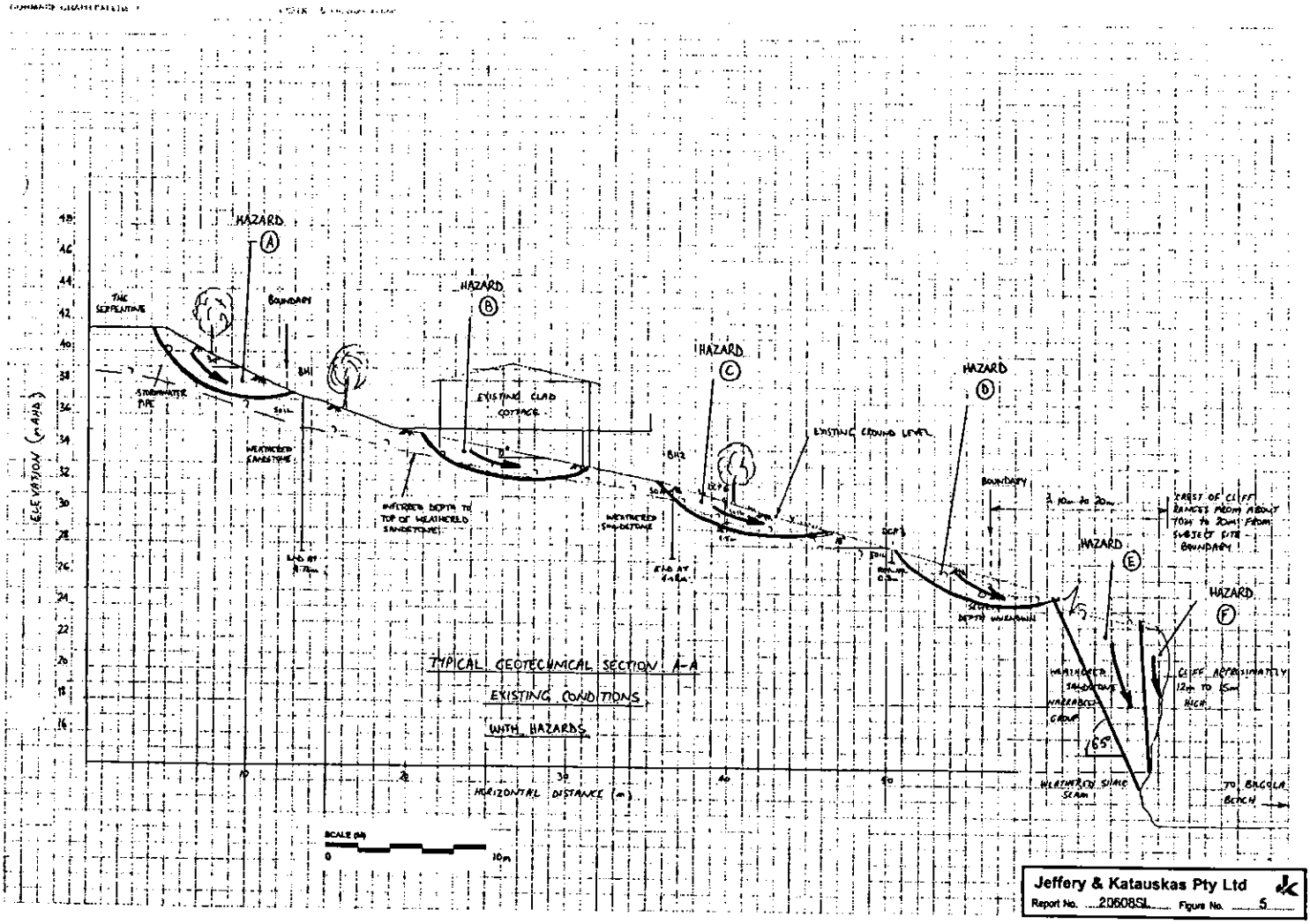
Report No. 20608SL Figure No. 3



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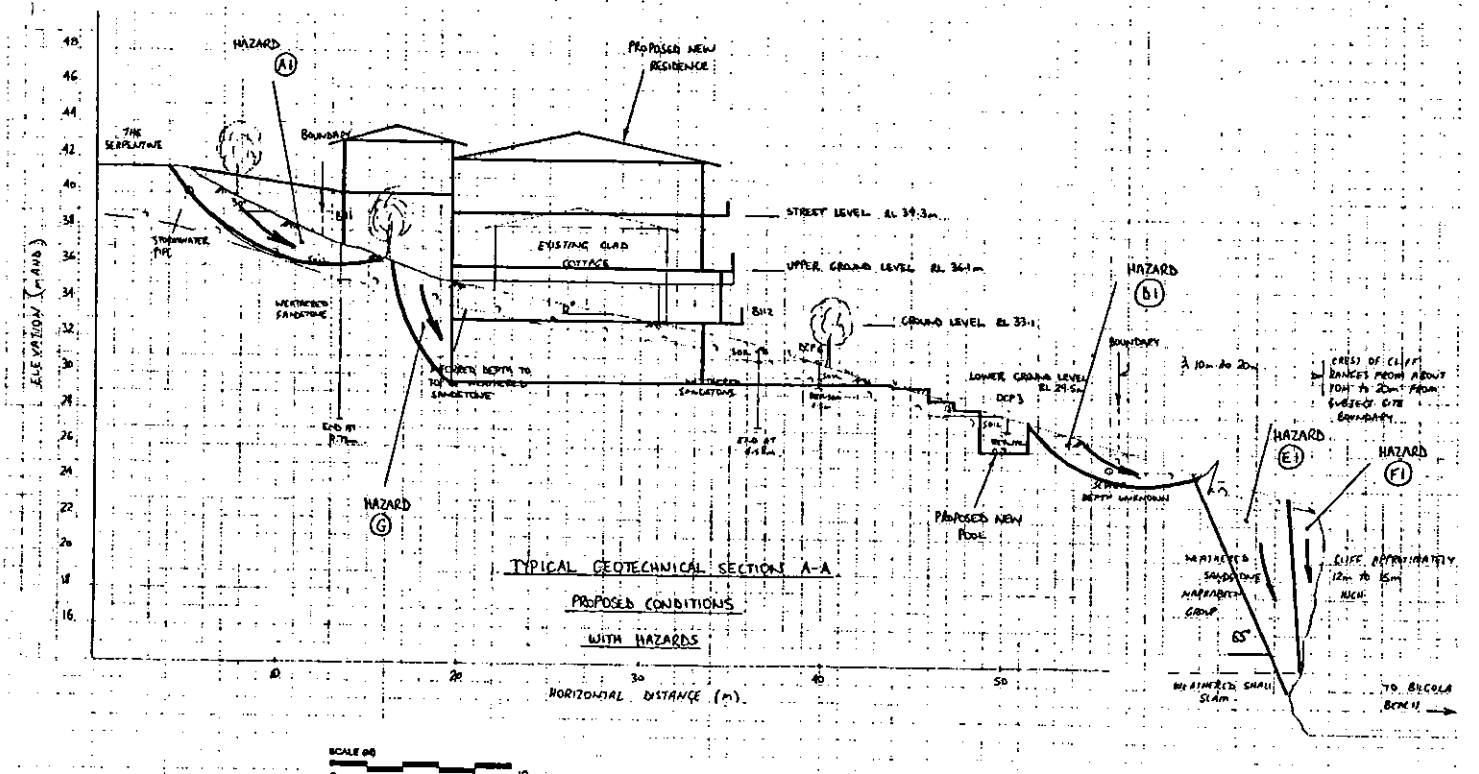
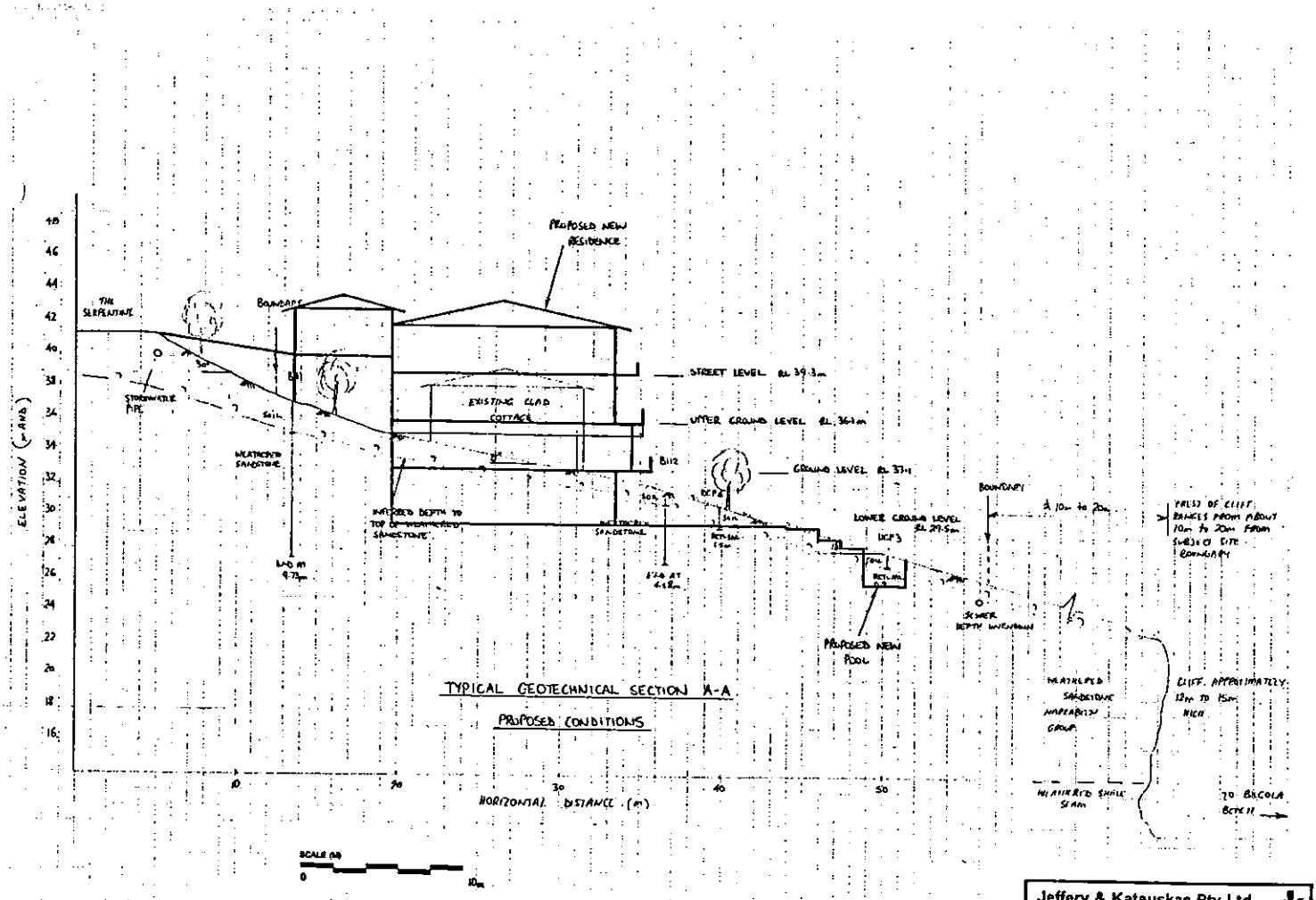
Report No. 20608SL Figure No. 5



Jeffery & Katauskas Pty Ltd

Report No. 20608SL Figure No. 6



TYPICAL GEOTECHNICAL SECTION A-A

PROPOSED CONDITIONS

Jeffery & Katauskas Pty Ltd

Report No. 20608SL Figure No. 4

TOPOGRAPHY

Symbol *Ground Profile*

convex
concave
} well defined or angular break of slope

convex
concave
} poorly defined or smooth change of slope

breaks of slope
changes of slope
} convex and concave too close together to allow the use of separate symbols

sharp
rounded
} ridge crest

3 Cliff or escarpment or sharp break 40° or more (estimated height in metres)

15 Uniform Slope
10 Concave Slope
8 Convex Slope
} Slope direction and angle (Degrees)

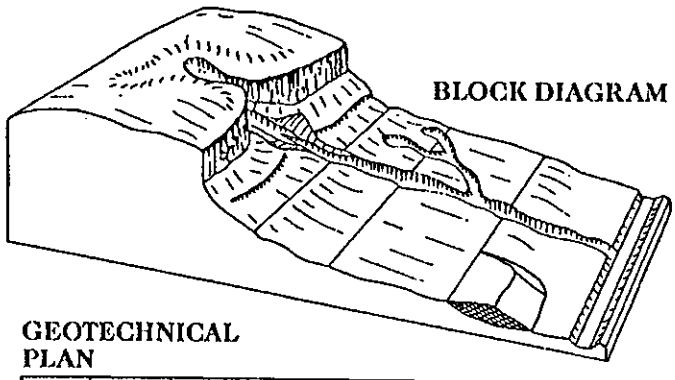
Top
Bottom
} Cut or fill slope, arrows pointing down slope

Hummocky or irregular ground

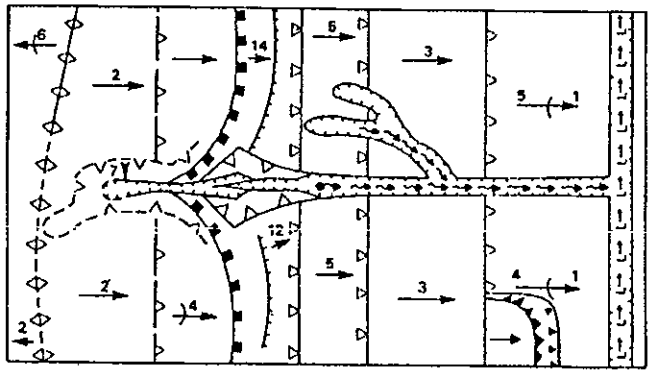
OTHER FEATURES

Boulder
Seepage/spring
Swallow hole for runoff
Natural water course
Open drain, unlined
Open drain, lined
Fenceline
Property boundary
Dry Stone Wall
J —— J 200 Major joint in rock face (opening in millimetres)
– T – T – 10 Tension crack (opening in millimetres)
Masonry or concrete wall
Ponding water
Boggy or swampy area

EXAMPLE OF USE OF TOPOGRAPHIC SYMBOLS:



GEOTECHNICAL PLAN



GEOTECHNICAL MAPPING SYMBOLS

Jeffery and Katauskas Pty Ltd
Report No. 20608SL Figure No. 7

LETTER OF CONSENT

OWNERS CONSENT

I/we the owners of the subject property hereby give consent for the lodgement all relevant applications (i.e. for Construction Certificate/s, Complying Development Certificate/s, Occupation Certificate/s, Compliance Certificate/s) and associated documentation to Local Certification Services Unit Trust for consideration.

I/we also declare that all documentation presented as part of an application for a Construction Certificate has remained unaltered from that issued with any Development Consent or that any changes have been documented and Local Certification Services Unit Trust have been advised accordingly.

In the event that the nominated Principal Certifying Authority resigns form his employment position with Local Certification Services Unit Trust my signature provided below will also serve as the authorisation for the transfer of the role and responsibilities of the Principal Certifying Authority from the nominated person to Mr Craig Hardy.

PRINCIPAL CERTIFYING AUTHORITY

With reference to this proposed development I/we the owners of the subject property hereby advise of our decision to appoint ☐ Andrew Dean ☐ Callan Blackwell ☐ Craig Hardy ☐ Danial Powell ☐ Michael Shanahan ☑ Paul Gearin ☐ Trent McCurley ☐ Paul Morgan ☐ to fulfil the role of Principal Certifying Authority (PCA) as outlined in the Environmental Planning and Assessment Act, 1979 (as amended).

I/we understand that this engagement shall be subject to the Terms and Conditions outlined in this application and the associated Schedule and I/we further understand that he will carry out all mandatory inspections required by the Act during the course of construction along with any others that he deems to be necessary and referred to the abovementioned Agreement.

I/we also advise that I/we are aware of the conditions attached to any Development Consent (i.e. Local Development Consent or Complying Development Consent) and are aware of our responsibilities in relation to those conditions.

SIGNATURES

APPLICANT

Signed:

Name *(Please Print)*: LOUIS QUATTROMANI **Date:** 2/8/07

OWNER/S

Signed:

Name *(Please Print)*: LOU ZIVANOVIC **Date:** 2/8/07

Signed:

Name *(Please Print)*: **Date:**

Signed:

Name *(Please Print)*: **Date:**

Signed:

Name *(Please Print)*: **Date:**

PITTWATER COUNCIL

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CONSENT NO: N0784/06

ENVIRONMENTAL PLANNING & ASSESSMENT ACT, 1979 (AS AMENDED)
NOTICE TO APPLICANT OF DETERMINATION OF A DEVELOPMENT APPLICATION

Applicants Name and Address:
CABE DEVELOPMENTS PTY. LTD
PO BOX 6924
BAULKHAM HILLS 2153

Being the applicant in respect of Development Application No N0784/06

Pursuant to section 80(1) of the Act, notice is hereby given of the determination by Pittwater Council, as the consent authority, of Development Application No N0784/06 for:

Demolition of the existing dwelling and construction of a new dwelling, garage and swimming pool.

At: 32 THE SERPENTINE, BILGOLA (Lot 1 DP 546543)

Decision:

The Development Application has been determined by the granting of consent based on information provided by the applicant in support of the application, including the Statement of Environmental Effects, and in accordance with:

Drawings Numbered: DA03 Revision H, DA04 Revision I, DA05 Revision I, DA06 Revision J, DA07 Revision J, DA20 Revision H, DA21 Revision H, DA22 Revision I, DA23 Revision G, DA30 Revision F, DA31 Revision E. All drawings prepared by Turner + Associates and all drawings date 3/07/07. Landscape Plan LC01B Prepared by Selena Hannan Landscape Design and dated 30/11/2006.

as amended in red (shown clouded) or as modified by any conditions of this consent.

The reason for the imposition of the attached conditions is to ensure that the development consented to is carried out in such a manner as to achieve the objectives of the Environmental Planning and Assessment Act 1979 (as amended), pursuant to section 5(a) of the Act, having regard to the relevant matters for consideration contained in section 79C of the Act and the Environmental Planning Instruments applying to the land, as well as section 80A of the Act which authorises the imposing of the consent conditions.

Endorsement of date of consent 10 August 2007

Mark Ferguson
GENERAL MANAGER
Per:

PITTWATER COUNCIL

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Conditions of Approval

This consent is not an approval to commence building work. The works associated with this consent can only commence following the issue of the Construction Certificate.

Note: Persons having the benefit of development consent may appoint either a council or an accredited certifier as the principal certifying authority for the development or for the purpose of issuing certificates under Part 4A of the Environmental Planning and Assessment Act. When considering engaging an accredited certifier a person should contact the relevant accreditation body to ensure that the person is appropriately certified and authorised to act in respect of the development.

A. Prescribed Conditions:

1. All works are to be carried out in accordance with the requirements of the Building Code of Australia.

2. In the case of residential building work for which the Home Building Act 1989 requires there to be a contract of insurance in force in accordance with Part 6 of that Act, there is to be such a contract in force.

3. Critical stage inspections are to be carried out in accordance with clause 162A of the Environmental Planning & Assessment Regulation 2000. To allow a Principal Certifying Authority or another certifying authority time to carry out critical stage inspections required by the Principal Certifying Authority, the principal contractor for the building site, or the owner-builder must notify the Principal Certifying Authority at least 48 hours before building work is commenced and prior to further work being undertaken.

4. A sign must be erected in a prominent position on any site on which building work, subdivision work or demolition work is being carried out:

   a. showing the name, address and telephone number of the Principal Certifying Authority for the work, and
   b. showing the name of the principal contractor (if any) for any building work and a telephone number on which that person may be contacted outside working house, and
   c. stating that unauthorised entry to the work site is prohibited.

   Any such sign is to be maintained while the building work, subdivision work or demolition work is being carried out, but must be removed when the work has been completed.

5. Residential building work within the meaning of the Home Building Act 1989 must not be carried out unless the Principal Certifying Authority for the development to which the work relates (not being the Council) has given the Council written notice of the following information:

   a. in the case of work for which a principal contractor is required to be appointed:

      i. the name and licence number of the principal contractor, and

      ii. the name of the insurer by which the work is insured under Part 6 of that Act.

   b. in the case of work to be done by an owner-builder:

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i. the name of the owner-builder, and
ii. if the owner-builder is required to hold an owner-builder permit under that Act, the number of the owner-builder permit.

6. If arrangements for doing the residential building work are changed while the work is in progress so that the information notified under subclause (2) becomes out of date, further work must not be carried out unless the Principal Certifying Authority for the development to which the work relates (not being the Council) has given the Council written notice of the updated information.

7. The hours of construction are restricted to between the hours of 7.00am and 5.00pm Monday - Friday and 7.00am to 1.00pm on Saturdays. No works are to be carried out on Sundays or Public Holidays. Internal building work may be carried out at any time outside these hours, subject to noise emissions from the building or works not being audible at any adjoining boundary.

8. The landscape plan is to ensure that 80% of plantings are to be comprised of locally native species (in terms of both species used and number of total plantings).

B. Matters to be incorporated into the development and maintained over the life of the development:

1. The recommendation of the risk assessment required to manage the hazards as identified in Geotechnical Report prepared by Jeffrey and Katauskas are to be incorporated into the construction plans.

2. As part of an integrated on-site stormwater management system, a rainwater tank for non-potable purposes is to be installed that meets the commitments of the submitted BASIX certificate.

3. As part of an integrated on-site stormwater management system, stormwater overflow from the rainwater tank is to be discharged to the proposed dispersion trenches.

4. As part of an integrated on-site stormwater management system, stormwater overflow from the rainwater tank is to be discharged into the adjacent coastal area with erosion minimisation facilities installed.

5. Where not previously obtained, street levels / driveway profiles must be obtained from Council for all access driveways across the public road verge from the road edge to the property boundary. Street levels provided must be incorporated into the design.

6. This approval/consent relates only to the new work nominated on the approved consent plans and does not approve or regularise any existing buildings or structures within the property boundaries or within Council's road reserve.

7. The pool backwash water is to be disposed to the Sydney Water sewer.

8. All noxious weeds and listed undesirable species are to be removed from the site.

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9. Pool fencing is to be designed and located and maintained in accordance with the Swimming Pool Act 1992, AS 1926.1-1993 *Fencing for swimming pools*, AS 1926.1-1995 *Location of fencing for private swimming pools.*

10. A Resuscitation and External Cardiac Compression Chart is to be affixed and maintained in a prominent location adjacent to the pool / spa.

11. The spa/pool is to be covered by a ridged child safety cover complying with the current Australian Standard, which is fastened to the spa/pool by a child resistant device when the spa/pool is not in use.

12. The solid fuel or wood burning appliances shall comply with Australian Standard AS 4013-1992 or any subsequent amending standard.

13. All pool overflow water and waste water from the filtration process is to be directed to the sewer.

14. No water pollution shall result from the operation of any plant or equipment or activity carried out.

15. Noise from the operation of any plant or equipment at the premises shall not exceed 5dB(A) above the background noise level.

16. All plumbing and drainage fixtures associated with stormwater and sewer services are to be concealed and not exposed to public view.

17. All external glazing is to have a maximum reflectivity index of 25%.

18. New electrical connections are to be carried out using underground cabling.

19. Materials and colour schemes are to be in accordance with the samples submitted to Council with the application. No white or light coloured roofs are permitted.

20. The underside of the elevated pool is to be painted in natural tones to blend with the surrounding landscape.

21. The pool concourse, walkway or deck is to be a minimum 900mm clear of the boundary.

22. The side and rear fencing shall be deleted from all plans and specifications.

23. The commitments identified in the BASIX Certificate and on the plans or specifications are to be fulfilled and maintained for the life of the development.

24. Five (5) locally native canopy trees are to planted on the site. Canopy tree species are to be from the vegetation community(s) on the site as per the lists in the Pittwater Book Native Plants for Your Garden book available from Council and on the Pittwater Web Site. All native trees are to be retained for the life of the development, or for their safe natural life. Trees that die or are removed must be replaced with another locally native canopy tree.

25. For the life of the development Cats are to be kept in a cat run and / or inside the dwelling such that they are prevented from entering wildlife habitat areas at all times. Dogs are to be

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kept in an enclosed area such that they cannot enter areas of bushland, unrestrained, on the site or surrounding properties.

26. Over the life of the development all declared noxious weeds under are to be managed / removed in accordance with the Noxious Weeds Act 1993. Environmental weeds are to be removed and/or controlled.

27. No environmental weeds are to be planted on the site.

28. For the life of the development no bush rock is to be removed or destroyed without prior approval from NSW Department of Environment and Conservation and Pittwater Council. The removal or destruction of bush rock has been listed as a Key Threatening Process under the NSW Threatened Species Conservation Act, 1995.

C. Matters to be satisfied prior to the issue of the Construction Certificate:

Note: All outstanding matters referred to in this section are to be submitted to the accredited certifier together. Incomplete Construction Certificate applications / details cannot be accepted.

1. The garage including the blade walls shall be setback 1.4m from the front property boundary incorporating a setback to the garage door of minimum 2.52m.

2. A 1.4m setback shall be provided from the eastern boundary for the length of the garage and screen planting to a height of 3.0m consisting of locally native species provided within the setback to screen the built form from 34 The Serpentine. Existing ground levels shall be maintained in this setback. An espalier is to be provided for the length and width of the eastern wall of the garage to permit the growing of climbing plants and vines.

3. Prior to issue of the Construction Certificate, details are to be submitted to the Principal Certifying Authority that include, but are not limited to, all of the recommended conditions in the Geotechnical Report. Form 2 of the Geotechnical Risk Management Policy for Pittwater is to be completed and submitted with the above details before issue of the Construction Certificate.

4. Engineering details showing stormwater disposal are to be submitted to the Accredited Certifier or Council with the Construction Certificate application. Such details are to be accompanied by a certification by a qualified practising Civil Engineer with corporate membership of the Institute of Engineers Australia (M.I.E), or who is eligible to become a corporate member and has appropriate experience and competence in the related field, confirming that the plans/details comply with B5.5 of Pittwater 21 DCP.

5. Plans and details demonstrating that the following issues have been addressed are to be submitted to the Accredited Certifier or Council with the Construction Certificate application. Access driveways are to be 3.5m wide (maximum) at the junction of the driveway and the road.

   (a) Street Levels must be obtained from Council for all access driveways across the public road verge to road edge. The street levels provided by Council must be incorporated into and attached to design plans for the access driveway and internal driveway.

   (b) A Deed of Agreement indemnifying Council must be entered into for construction of a cosmetic access driveway across the public road verge i.e. other than a plain concrete finish, within the public road reserve.

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(c) All construction of the access driveway across the public road verge must be undertaken by a Council authorised contractor.

(d) Councils Fees and Charges apply to Street Levels and Deed of Agreement for Access Driveway.

6. Plans and street Levels provided by Council and a certificate submitted by a chartered Professional Engineer, Architect or Surveyor, confirming to the satisfaction of the Accredited Certifier or Council that the access driveway and internal driveway complies with the requirements of Pittwater 21 DCP Control B6.1 and the Council street levels are to be submitted with the Construction Certificate application.

7. Civil engineering details of the proposed excavation/landfill are to be submitted to the Accredited Certifier or Council with the Construction Certificate application. Each plan/sheet is to be signed by a qualified practising Civil Engineer who has corporate membership of the Institution of Engineers Australia (M.I.E) or who is eligible to become a corporate member and has appropriate experience and competence in the related field.

8. Submission of construction plans and specifications and documentation which are consistent with the approved Development Consent plans, the requirements of Building Code of Australia and satisfy all conditions shown in Part B above are to be submitted to the Principal Certifying Authority.

9. Any proposed demolition works shall be carried out in accordance with the requirements of AS2601-1991 *The Demolition of Structures.*

   Amongst others, precautions to be taken shall include compliance with the requirements of the WorkCover Authority of New South Wales, including but not limited to:

   1. Protection of site workers and the general public.
   2. Erection of hoardings where appropriate.
   3. Asbestos handling and disposal where applicable.
   4. Any disused service connections shall be capped off.

   Council is to be given 48 hours written notice of the destination/s of any excavation or demolition material. The disposal of refuse is to be to an approved waste disposal depot.

10. Structural Engineering details relating to the dwelling and swimming pool are to be submitted to the Accredited Certifier or Council prior to release of the Construction Certificate. Each plan/sheet is to be signed by a qualified practising Structural Engineer with corporate membership of the Institute of Engineers Australia (M.I.E), or who is eligible to become a corporate member and has appropriate experience and competence in the related field.

11. All landscape works are to comply with Pittwater DCP21.At least 80% of the plant material, including turf, is to be locally indigenous.

12. No works are to commence until suitable tree, vegetation and site protection measures are in place. All existing trees to be retained are to be protected in accordance with the arborists reports and current best arboricultural practices to mitigate any adverse impacts associated with the works for the development. The establishment of tree and vegetation protection, including sediment control barriers, is to be undertaken under direction and

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supervision of an AQF5 or university qualified arborist. Prior to the commencement of any site works, the arborist is to certify that suitable tree protection measures are in place and a copy of the certification is to be forwarded to the Certifying Authority.

13. All works within 5 metres of the existing trees to be retained, including pruning, demolition, excavation, civil works, fencing and the like must be carried out be hand under the supervision of an AQF5 or higher qualified and experienced arborist. Should roots larger than 30mm be encountered, all excavation works are to cease immediately and an AQF5 or higher qualified arborist is to advise on the impacts of the roots removal on the trees survival and on how the tree is to be managed. A copy of the arborists recommendations for management is to be forwarded to the Principal Certifying Authority.

14. Plans and details demonstrating that the commitments identified in the BASIX Certificate that apply to the construction certificate or complying development plans and specifications are fulfilled.

15. Planting shall be provided in the road reserve adjacent to the driveway walls and pedestrian entry. Planting shall comprise of locally native species and be in accordance with Council's Road Reserve Policy.

D. Matters to be satisfied prior to the commencement of works and maintained during the works:

Note: It is an offence to commence works prior to issue of a Construction Certificate.

1. All excavated material is to be removed from the site. This is due to the sites location in an area identified as being subject to possible landslip.

2. All excavations and backfilling associated with the erection or demolition of a building must be executed safely and in accordance with appropriate professional standards.

3. All excavations associated with the erection or demolition of a building must be properly guarded and protected to prevent them from being dangerous to life or property.

4. Where excavations extend below the level of the base of the footings of a building on an adjoining allotment of land, the person causing the excavation must preserve and protect the building from damage and, if necessary, underpin and support the adjoining building in an approved manner.

5. Temporary sedimentation and erosion controls are to be constructed prior to commencement of any work to eliminate the discharge of sediment from the site.

6. Sedimentation and erosion controls are to be effectively maintained at all times during the course of construction and shall not be removed until the site has been stabilised or landscaped to the Principal Certifying Authoritys satisfaction.

7. Adequate measures shall be undertaken to remove clay from vehicles leaving the site so as to maintain public roads in a clean condition.

8. No works are to be carried out in Councils Road Reserve without the written approval of the Council.

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9. A Road Opening Permit, issued by Council, must be obtained for any road openings, or excavation within Councils Road Reserve associated with the development on the site, including stormwater drainage, water, sewer, electricity, gas and communication connections. During the course of the road opening works the Road Opening Permit must be visibly displayed at the site.

10. No skip bins or materials are to be stored on Councils Road Reserve.

11. A site fence and silt and sediment control fence is to be erected and maintained during the course of works along any street boundary and park/reserve boundary to the site.

12. Access to the site through an adjoining park/reserve is prohibited without the written approval of the Council

13. A clearly legible *Site Management Sign* is to be erected and maintained throughout the course of the works. The sign is to be centrally located on the main street frontage of the site and is to clearly state in legible lettering the following: -

    The builders name, builders telephone contact number both during work hours and after hours.

    That no works are to be carried out in Councils Road Reserve without the written approval of the Council.

    That a Road Opening Permit issued by Council must be obtained for any road openings or excavation within Councils Road Reserve associated with development of the site, including stormwater drainage, water, sewer, electricity, gas and communication connections. During the course of the road opening works the Road Opening Permit must be visibly displayed at the site.

    That no skip bins or materials are to be stored on Councils Road Reserve.

    That the contact number for Pittwater Council for permits is 9970 1111.

14. All construction in the public road reserve must be undertaken by a Council authorised contractor.

15. A satisfactory construction traffic management plan (CTMP) prepared by a suitably qualified traffic consultant is required to be submitted to the Private Certifying Authority prior to the commencement of any site works. The plan is to detail:

    - Quantity of material to be transported
    - Proposed truck movements per day
    - Proposed hours of operation
    - Proposed traffic routes, noting that 3 tonne load limits apply to some roads within Warriewood Valley

    This plan must be adhered to by all parties associated with the development. No truck movements will be permitted in Garden Street south of Mullet Creek or in Mona Vale Road between Tumbledown Dick and Mona Vale.

16. A stamped copy of the approved plans is to be kept on the site at all times, during construction.

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17. Contractors and visitors to the site are to be advised of the purpose for the tree/ native vegetation/ habitat protection/exclusion fencing installed in accordance with this consent by the placement of a suitable warning sign on the fence. The sign is to include advice that no works or storage of materials is to take place within the dripline of existing trees.

18. The project manager is to erect signs advising all contractors and visitors to the site that no works or storage are to take place within the dripline of existing trees.

19. When working within the drip line of the trees, hand digging is to occur in sensitive areas. Liaison on a daily basis is to be maintained during the excavation works between the Builder and Arborist. No filling or compaction shall occur over tree roots within the area defined by the outer drip line of the crown. Root protection/ compaction mitigation in the form of planks or metal decking supported clear of the ground fixed to scaffolding is to be installed as required.

20. No storage of building materials or building waste, excavated fill or topsoil storage is to occur within the dripline of trees shown on the approved landscape working drawing(s) as being retained or within protective fenced areas.

    Drainage is to be arranged such that fill, building materials or contaminants are not washed

21. The developer or contractor will take all measures to prevent damage to trees and root systems during site works and construction activities including provision of water, sewerage and stormwater drainage services. In particular, works, erection of structures, excavation or changes to soil levels within 5 metres of the trunks of trees to be retained are not permitted unless part of the development as approved, and the storage of spoil, building materials, soils or the driving or parking of any vehicle or machinery within 5 metres of the trunk of a tree to be retained, is not permitted.

    NOTE: Trees that are part of an Endangered Ecological Community or are habitat for threatened species and endangered populations must comply with the requirements of the Threatened Species Conservation Act, 1995. Failure to do so may result in a penalty up to a maximum of $250,000.00 and jail sentences.

    Failure to comply with the requirements of the Pittwater Council Tree Preservation and Management Order may result in a penalty up to a maximum of $20,000.00.

22. Demolition works must be carried out in compliance with WorkCovers *Short Guide to Working with Asbestos Cement* and Australian Standard AS 2601 1991 The Demolition of Structures.

    The site must be provided with a sign containing the words *DANGER ASBESTOS REMOVAL IN PROGRESS* measuring not less than 400mm x 300mm and be erected in a prominent visible position on the site. The sign is to be erected prior to demolition work commencing and is to remain in place until such time as all asbestos cement has been removed from the site and disposed to a lawful waste disposal facility.

    All asbestos laden waste, including flat, corrugated or profiled asbestos cement sheets must be disposed of at a lawful waste disposal facility. Upon completion of tipping operations the applicant must lodge to the Principal Certifying Authority, all receipts issued by the receiving tip as evidence of proper disposal.

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23. Protection measures are to be installed in accordance with all approved plans including the Arborist Report prepared by Urban Forestry Australia Pty Ltd. Protection measures are to be maintained for the duration of the works.

24. Screen planting is to be provided, which after three years will, in conjunction with the canopy planting, screen 50% of the built form when viewed from the street. Species selection is to incorporate locally native species. This screen planting is to be retained over the life of the development and replaced if any part of it should die or be destroyed or removed.

E. Matters to be satisfied prior to the issue of Occupation Certificate:

Note: Prior to the issue of an Occupation Certificate the principal certifying authority is to ensure that Council's assets, including road, kerb and gutter and drainage facilities adjacent or near to the site have not been damaged as a result of the works. Where such damage has occurred, it is to be repaired to Council's written satisfaction prior to the issue of an Occupation Certificate or suitable arrangements put in place to effect those repairs at a future date to Council's written satisfaction. Should this process not be followed, Council will pursue action against the principal accredited certifier in relation to the recovery of costs to effect such works.

Note: It is an offence to occupy the building or part thereof to which this consent relates prior to the issue of an Occupation Certificate.

1. A positive covenant/ restriction on the use of land is to be created prior to the issue of the Occupation Certificate where the recommendations of the approved Geotechnical Report requires on-going maintenance / inspections to ensure that the development achieves the acceptable level of risk criteria over the life of the development, the terms of which are to require the landowner to comply with the recommendations contained in that report.

2. Prior to issue of the Occupation Certificate, Form 3 of the *Geotechnical Risk Management Policy* is to be completed and submitted to the Principal Certifying Authority.

3. Certification is to be provided to Private Certifying Authority by an experienced civil engineer who is NPER accredited by the Institution of Engineers (Australia) that the drainage/stormwater management system has been installed to the manufacturers specification and completed in accordance with the engineering plans and specifications required under this consent.

4. The redundant driveway is to be reinstated with kerb, footpath and suitably landscaped.

5. Plans together with street levels provided by Council and a certificate submitted by a Chartered Professional Engineer confirming to the satisfaction of the Principal Certifying Authority that the works in the public road reserve comply with Council requirements and street levels are to be provided with the Occupation Certificate application.

6. Prior to issue of an Occupation Certificate photographic evidence of the condition of the street trees and road reserve and area adjoining the site after the completion of all construction, must be submitted to the Principal Certifying Authority showing that no damage has been done and if damage has been done that it has been fully remediated. The photographs shall be accompanied by a statement that no damage has been done (or where damage has been remediated that Council has approved that work). In this regard Councils written agreement that all restorations have been completed satisfactorily must be obtained prior to the issue of any Occupation Certificate.

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7. Restoration of all damaged public infrastructure caused as a result of the development to Councils satisfaction. Councils written approval that all restorations have been completed satisfactorily must be obtained must be provided to the Private Certifying Authority with the Occupation Certificate application.

8. An Occupation Certificate application stating that the development complies with the Development Consent, the requirements of the Building Code of Australia and that a Construction Certificate has been issued must be obtained before the building is occupied or on completion of the construction work approved by this Development Consent.

9. All existing and /or proposed dwellings/sole occupancy units are to have approved hard-wired smoke alarms installed and maintained over the life of the development. All hard-wired smoke alarms are to be Australian Standard compliant and must be installed and certified by any appropriately qualified electrician prior to the issue of any Occupation Certificate.

10. A qualified acoustic engineer is to certify that the maximum noise level associated with the pool filter does not exceed 5dB(A) above ambient background level, when measured from any adjoining premises.

11. Certification is to be provided that the commitments identified in the BASIX Certificate have been fulfilled.

12. Where planting is required in areas outside approved landscape zones species are to be the same as native plants growing on site and / or selected from the list pertaining to site from the Pittwater Book *Native Plants for Your Garden* - available from Council and on the Pittwater Web Site. Planting to be certified as adequate by Bushland Management Consultant.

13. Protection fencing that is no longer required for protection is to be removed.

F. Matters to be satisfied prior to the issue of Subdivision Certificate:

Nil

G. Advice:

1. Failure to comply with the relevant provisions of the Environmental Planning and Assessment Act, 1979 (as amended) and/or the conditions of this Development Consent may result in the serving of penalty notices (on-the-spot fines) under the summary offences provisions of the above legislation or legal action through the Land and Environment Court, again pursuant to the above legislation.

2. The applicant is also advised to contact the various supply and utility authorities, ie Sydney Water, Sydney Electricity, Telstra etc. to enquire whether there are any underground utility services within the proposed excavation area.

3. It is the Project Manager's responsibility to ensure that all of the Component Certificates/certification issued during the course of the project are lodged with the Principal Certifying Authority. Failure to comply with the conditions of approval or lodge the Component Certificates/certification will prevent the Principal Certifying Authority issuing an Occupation Certificate.

PITTWATER COUNCIL

ABN61340837871
Telephone 02 9970 1111
Facsimile 02 9970 7150
Postal Address
PO Box 882
Mona Vale NSW 1660
DX 9018, Mona Vale

4. In accordance with Section 80A(1)(d) and (e) of the Act, any consent given shall be void if the development to which it refers is not commenced within two (2) years after the date of approval, provided that Council may, if good cause be shown, grant an extension of renewal of such consent beyond such period.

   NOTE: Council may be prepared to consider an extension of this Consent period for a further 12 months, however, the request for extension would have to be received during the initial 2 year period.

5. To ascertain the date upon which the determination becomes effective, refer to Section 83 of the Environmental Planning and Assessment Act, 1979 (as amended).

6. Should any of the determination not be acceptable, you are entitled to request reconsideration under Section 82A of the Environmental Planning and Assessment Act, 1979. Such request to Council must be made in writing, together with appropriate fees as advised at the time of lodgement of such request, within 1 year from the date of determination.

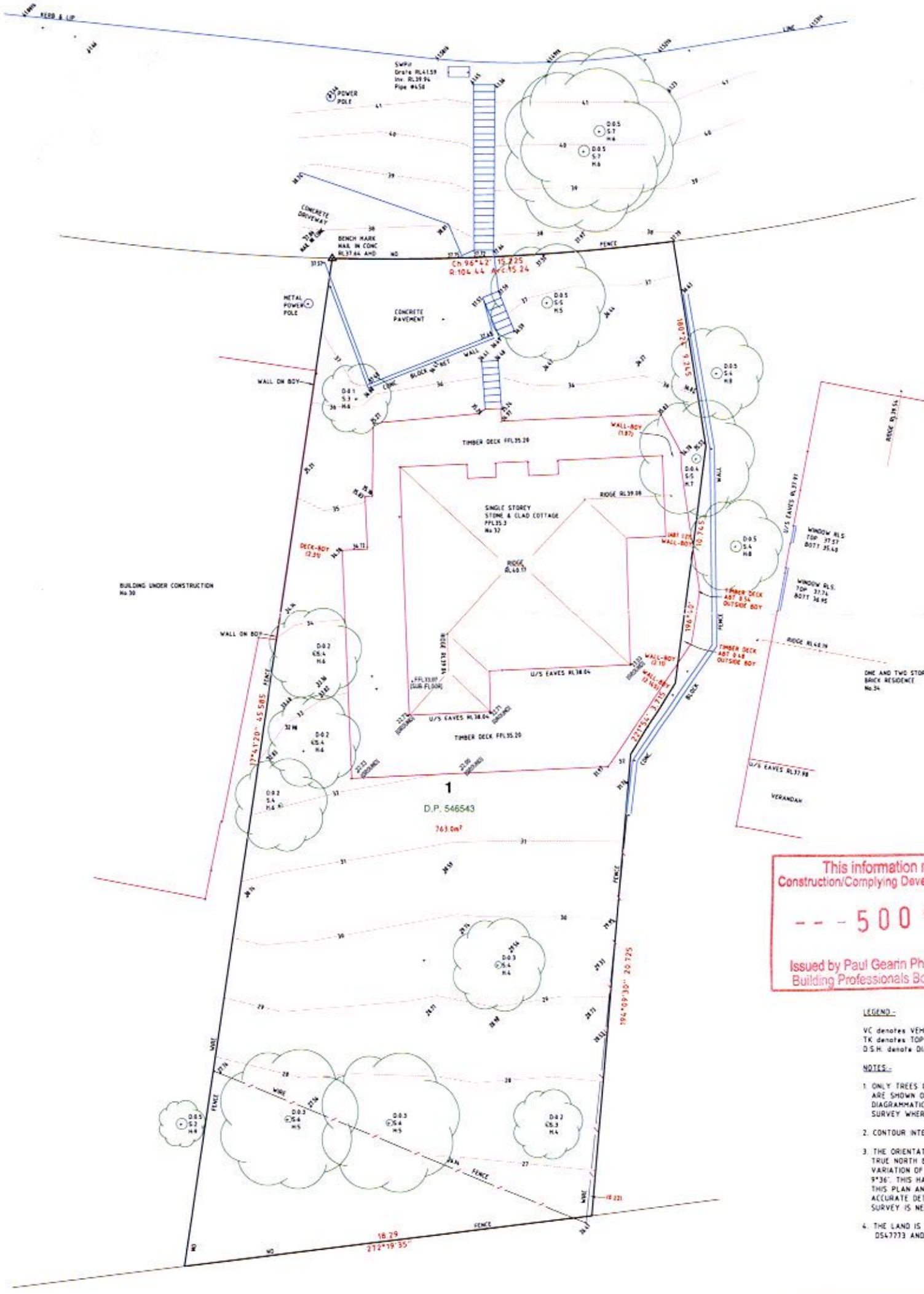
7. If you are dissatisfied with this decision, Section 97 of the Environmental Planning and Assessment Act, 1979, gives you a right of appeal to the Land and Environment Court within 12 months of the date of endorsement of this Consent.

8. The approved plans must be submitted to a Sydney Water Quick Check agent or Customer Centre to determine whether the development will affect Sydney Water's sewer and water mains, stormwater drains and/or easements, and if further requirements need to be met. The approved plans will be appropriately stamped. For Quick Check agent details please refer to the web site at www.sydneywater.com.au then see Building Developing and Plumbing then Quick Check, or telephone 13 20 92.

9. Electrical insect killing light devices should not be outside and not installed anywhere that they can attract and kill micro-bats and killing insects reduces bat food and insects.

THE SERPENTINE

MM BY DP546543
APPROX TRUE NORTH
9°36'



This information relates to
Construction/Complying Development Certificate
---5001468
Issued by Paul Gearin Ph (02) 4655
Building Professionals Board (BPB

LEGEND -

VC denotes VEHICLE CROSSING
TK denotes TOP OF KERB
D.S.H. denote DIAMETER, SPREAD and HEIGHT of TREE

NOTES -

1. ONLY TREES GREATER THAN 3.5 METRES IN HEIGHT ARE SHOWN ON THIS PLAN AND THEIR POSITION IS DIAGRAMMATIC ONLY AND MAY REQUIRE ADDITIONAL SURVEY WHERE CRITICAL TO DESIGN
2. CONTOUR INTERVAL 1 m.
3. THE ORIENTATION OF THIS PLAN IS APPROXIMATE TRUE NORTH BASED ON THE ASSUMPTION THAT THE VARIATION OF TRUE NORTH TO MAGNETIC NORTH IS 9°36'. THIS HAS NOT BEEN VERIFIED AS PART OF THIS PLAN AND SHOULD YOU REQUIRE A MORE ACCURATE DETERMINATION OF TRUE NORTH A FURTHER SURVEY IS NECESSARY.
4. THE LAND IS AFFECTED BY COVENANTS IN C746430, D547773 AND N843683

GARY EDWARDS and ASSOCIATES Pty Ltd
CONSULTING SURVEYORS
ABN 28 001 418 867

Tel. (02) 9630 7968
Fax (02) 9683 4808
8 Kissina Road
NORTHMEAD 2152
P.O.Box 2572
NORTH PARRAMATTA 1750
E-mail: Surveyor@SpatialData.com.au

DWG REF. 2699	SCALE 1:100	CONTOUR AND BOUNDARY SURVEY	
DATUM AHD	DATE 10-3-2006	32 THE SERPENTINE	
BM PM 6898	DRAWN/CHECKED RM/GE	BILGOLA	
RL 47.412	SHEET 1 OF 1		