PLANNING
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CITY PLAN SERVICES

22 October 2004

The General Manager
Pittwater Council
PO Box 882
MONA VALE NSW 1660

Dear Sir/Madam

1148-1152 BARRENJOEY ROAD, PALM BEACH
DEVELOPMENT APPLICATION NO. N 1233/00
CONSTRUCTION CERTIFICATE NO. 24-582

City Plan Services have issued a Construction Certificate under Part 4A of the Environmental Planning and Assessment Act 1979 for the above premises.

Please find enclosed the following documentation:

- Construction Certificate No. CC 24-582
- Copy of application for Construction Certificate.
- Documentation used to determine the application for the Construction Certificate as detailed in Schedule 1 of the certificate.
- Notice of Appointment of Principal Certifying Authority.
- Cheque for Council's registration fee.

Our client has been advised of the necessity to submit to Council the notice of commencement of building works 48 hours prior to the commencement of works.

Should you need to discuss any issues, please do not hesitate to contact the Project Building Surveyor Brendan Bennett on 8270-3500.

Yours Sincerely

Brendan Bennett
Managing Director
encl

rec: 154468

M:\PROJECTS\CP2004\24-582\Letter CC Council.doc
TELEPHONE 8270 3500
FACSIMILE 8270 3501
LEVEL 1 364 KENT STREET
SYDNEY NSW 2000
WWW.CITYPLAN.COM.AU
ABN 30 075 223 353

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NOTICE OF APPOINTMENT OF PRINCIPAL CERTIFYING AUTHORITY

Made under Part 4 of the Environmental Planning and Assessment Act 1979
Sections 81A(2)(b1)(i) & 86(1)(a1)(i)

PROPOSAL

Address of land on which the work is to be carried out:	**1148-1152 Barrenjoey Road, Palm Beach (Site 3)**
Description of building works covered by this Notice:	**Excavation/ Stabalisation Works**

APPLICANT

Name of person having benefit of the development consent:	**Raypond P/L**
Address:	**PO Box 1346 Dee Why 2099**
Contact Details:	**Phone: 0412 226 044 Fax: 9944 0316**

The applicant has appointed Brendan Bennett as the Principal Certifying Authority as stated in the Construction Certificate Application lodged with City Plan Services for the building works identified in this Notice.

RELEVANT CONSENTS

Development Consent No:	**N 1233/00**
Date of Development Consent:	**24.01.02**
Construction Certificate No:	**CC 24582**
Date of Construction Certificate:	**22.10.04**

CERTIFYING AUTHORITY	Brendan Bennett for and on behalf of City Plan Services
ACCREDITATION BODY	Planning Institute Australia NSW Accreditation Scheme Registration No. 3004

That I, Brendan Bennett, of City Plan Services located at Level 1, 364 Kent Street, Sydney accept the appointment as the Principal Certifying Authority for the building works identified and covered under the relevant Construction Certificate as stated in this Notice.

~~DATED THIS~~ **22nd day of October 2004**

Brendan Bennett
Director

M:\PROJECTS\CP2004\24-582\Notice of appointment.doc

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1148-1152 Barrenjoey Road, Palm Beach (Site 3)
Construction Certificate No. 24-582

TELEPHONE 8270 3500
FACSIMILE 8270 3501

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CONSTRUCTION CERTIFICATE NO. 24582

Issued under Section 81A(5) and Part 4A Sections 109C of the Environmental Planning and Assessment Act 1979

APPLICANT	
Name of person having benefit of the development consent:	**Raypond P/L**
Address:	**PO Box 1346 Dee Why 2099**
Contact Details:	**Phone: 0412 226 044 Fax: 9944 0316**
OWNER	
Name:	**Raypond P/L**
Address:	**PO Box 1346 Dee Why 2099**
Contact Details:	**Phone: 0412 226 044 Fax: 9944 0316**
DEVELOPMENT CONSENT	
Consent Authority/Local Government Area:	**Pittwater Council**
Development Consent No:	**N 1233/00**
Date of Development Consent:	**24.01.02**
PROPOSAL	
Address of land on which the work is to be carried out:	**1148-1152 Barrenjoey Road, Palm Beach (Site 3)**
Building Classification:	**Class 1a**
Type of Construction:	**N/A**
Scope of building works covered by this Notice:	**Excavation/Stabalisation Works**
Value of Construction Certificate (Incl GST):	**$715,000.00**
Plans and Specifications approved:	**Schedule 1**
Fire Safety Schedule:	**N/A**
Critical stage inspections;	**See attached Notice**
Exclusions:	**Construction of dwelling**
Conditions (Clause 187 or 188 of the Environmental Planning & Assessment Regulation 2000):	**Nil**
PROJECT BUILDING SURVEYOR	Please contact **Brendan Bennett** for any inquiries
CERTIFYING AUTHORITY	**Brendan Bennett** for and on behalf of **City Plan Services Pty Ltd**
ACCREDITATION BODY	**Planning Institute Australia NSW Accreditation Scheme** Registration No. 3004

That I, Brendan Bennett, as the certifying authority, certify that the work if completed in accordance with the plans and specifications identified in Schedule 1 (with such modifications verified by the certifying authority as may be shown on that documentation) will comply with the requirements of the Environmental Planning & Assessment Regulation 2000 as referred to in section 81A(5) of the Environmental Planning and Assessment Act 1979.

DATED THIS **22nd** **day** **of** **October** **2004**

Brendan Bennett
Managing Director

NB: Prior to the commencement of work S81A(2)(b)(i) and (ii) and (b2)(i) and (ii) and (iii) and (c) of the Environment Planning and Assessment Act 1979 must be satisfied.

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SCHEDULE 1
APPROVED PLANS AND SPECIFICATIONS

1. Endorsed landscape plans prepared by Footprint Green

Plan Title	Drawing No	Revision	Date
Cover Sheet	cpbmp3	0.2	07.09.04
Existing Site Analysis	sabmp3	0.2	07.09.04
Works Prior to & During Excavation & Construction	pwbmp3	0.2	07.09.04
Bushland Revegetation & Regenration	pwbmp3	0.2	07.09.04

2. Endorsed landscape plan prepared by Selena Hannan Landscape Design

Plan Title	Drawing No	Revision	Date
Landscape Plan	LP10 D	-	11.10.04

3. Endorsed hydraulic plans prepared by Northern Beaches Consulting Engineers P/L

Plan Title	Drawing No	Revision	Date
On-Site Detention Tank DT3 Plan & Drainage Details	C17	C	23.08.04
Drainage Plan	C14	B	09.09.04

4. Endorsed stormwater plans prepared by Northern Beaches Consulting Engineers P/L

Plan Title	Drawing No	Revision	Date
Stormwater & Erosion Control Plan	D01	-	September 2004
Stormwater & Erosion Control Details	D02	-	September 2004

5. Endorsed structural plans prepared by Northern Beaches Consulting Engineers P/L

Plan Title	Drawing No	Revision	Date
General Notes & Drawing Index	S01	A	14.09.04
Level 1 – Footing, Slab Plan & Details	S02	A	14.09.04
Level 1 – Detail Sheet	S03	A	14.09.04
Level 2 – Floor Framing Plan & Details	S04	A	14.09.04
Level 3 – Floor Framing Plan & Details	S05	A	14.09.04
Miscellaneous Detail Sheet	S06	A	14.09.04
Roof Framing Plan Sections & Details	S07	A	14.09.04
Roof Framing Detail Sheet	S08	A	14.09.04
Shoring Sections	S09	-	-

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Anchor Details	S10	-	-

6. Other documents relied upon

Title	Prepared By	Reference	Date
Long Service Levy Receipt	LSBC		28.09.04
Black Plum Letter	GIS Environmental Consultants		25.01.02
Natural Resources Unit Site Inspection B8 & B10	Pittwater Council		30.08.04
Landscape Site Inspection	Pittwater Council		14.09.04
Proposed Method Statement for Excavation	Douglas Partners		16.03.04
Conditions of Consent Letter	Selena Hannan Landscape Design		11.10.04
On Site Detention & Site Stormwater Design Certificate	NB Consulting Engineers		30.09.04
Structural Certificate	NB Consulting Engineers		07.10.04
Consent Condition B17 Letter	Selena Hannan Landscape Design		05.10.04
Tree Management Report	Pan Civil		23.04.04
Pre-Construction Arboricultural Assessment	Urban Forestry Australia		September 2004
Landscape Softworks Specification	Selena Hannan Landscape Design		September 2004
Construction Management Plan	Raypond Developments		20.09.04
Bushland Management Plan	GIS Environmental Consultants		May 2003

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NOTICE TO APPLICANT OF CRITICAL STAGE INSPECTIONS

Made under Part 4 of the Environmental Planning and Assessment Act 1979 Sections 81A(2)(b1)(ii)

PROPOSAL

Address of land on which the work is to be carried out:	**1148-1152 Barrenjoey Road, Palm Beach (Site 3)**
Description of building works covered by this Notice:	**Excavation/Land Stabalisation**

APPLICANT

Name of person having benefit of the development consent:	**Raypond P/L**
Address:	**PO Box 1346 Dee Why 2099**
Contact Details:	**Phone: 0412 226 044Fax: 9944 0316**

RELEVANT CONSENTS

Development Consent No:	**N 1233/00**
Date of Development Consent:	**24.01.02**
Construction Certificate No:	**CC 24-582**
Date of Construction Certificate:	**22.10.04**

INSPECTION TELEPHONE NUMBER

Please telephone the following number to book a critical stage inspection: Ph8270 3500
A minimum period of 48 hours is to be provided

CERTIFYING AUTHORITY	Brendan Bennett for and on behalf of CPS
ACCREDITATION BODY	Planning Institute Australia NSW Accreditation Scheme Registration No. 3004

MANDATORY CRITICAL STAGE INSPECTIONS

That I, Brendan Bennett, of City Plan Services located at Level 1, 364 Kent Street, Sydney acting as the principal citifying authority hereby give notice in accordance with Section 81A(2)(b1)(ii) of the Environmental Planning and Assessment Act 1979 to the person having the benefit of the development consent that the mandatory critical stage inspections identified in Schedule 1 & Schedule 2 are to be carried out in respect of the building work.

The applicant, being the person having benefit of the development consent is required under Section 81A(2)(b2)(Iii) of the Environmental Planning and Assessment Act 1979 to notify the principal contractor (if not an owner-builder) of the applicable mandatory critical stage inspections specified under this notice.

To allow a principal certifying authority or another certifying authority time to carry out mandatory critical stage inspections, 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 at the site if a mandatory critical stage inspection is required before the commencement of the work in accordance with Clause 163 of the Environmental Planning & Assessment Regulation 2000.

Failure to request a mandatory critical stage inspections will prohibit the principal certifying authority under with Section 109E(3)(d) of the Environmental Planning and Assessment Act 1979 to issue an occupation certificate.

DATED THIS **22nd** **day of** **October** **2004**

Brendan Bennett
Managing Director

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SCHEDULE 1
MANDATORY CRITICAL STAGE INSPECTIONS

NO.	CRITICAL STAGE INSPECTION	INSPECTOR
1.	At commencement of building work	Certifying Authority
2.	Prior to covering of waterproofing in any wet areas, for a minimum of 10% of rooms with wet areas within a building. At least **1** units are to be inspected.	Certifying Authority
3.	Prior to covering any stormwater drainage connections	Certifying Authority
4.	After the building work has been completed & prior to any occupation certificate being issued in relation to the building	Principal Certifying Authority

SCHEDULE 2
OTHER MANDATORY INSPECTION SPECIFIED BY THE PRINCIPAL CERTIFYING AUTHORITY

NO.	OTHER CRITICAL STAGE INSPECTIONS	INSPECTOR
	None have been specified in this instance	N/A

24-582

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CONSTRUCTION CERTIFICATE APPLICATION

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

IDENTIFICATION OF BUILDING

Address 1148-1152 BARRENJOEY Rd.
Lot, ~~DP/MPS etc~~ 3
Suburb or town PALM BEACH Post Code

DESCRIPTION OF DEVELOPMENT

Detailed Description: EXCAVATION / CIVIL WORKS

APPLICANT

Name Company RAYMOND P/L
Address C/ P.O BOX 1364
Suburb or town DEE WHY Post Code 2099
Phone B/H 0412226044 Fax No 9944 0316
Mobile 0412 226 044 Email darrenleete@ozemail.com.au

As the applicant, I/we hereby:

1. *Submit this Construction Certificate Application under the Environmental Planning & Assessment Act 1979.*
2. *Appoint Brendan Bennett of City Plan Services Pty Ltd as the Principal Certifying Authority for the building work identified in this application.*

Signature of applicant:

Sign Date 23/9/04

CONSENT TO ALL OWNER(S)

Name Company RAYMOND P/L
Address C/ P.O BOX 1364
Suburb or town DEE WHY Post Code 2099
Phone B/H 0412226044 Fax No 9944-0316
Mobile 0412 226 044 Email darrenleete@ozemail.com.au

As the owner of the above property, I/we consent to this application

Signature of Owner

Sign (Director) Date 23/9/04

TELEPHONE 8270 3500
FACSIMILE 8270 3501
LEVEL 1, 384 KENT STREET
SYDNEY NSW 2000
WWW.CITYPLAN.COM.AU
ABN 30 075 223 300

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VALUE OF WORK

Estimated Cost of work: $ 650,000.00

GST: $ 65,000.00

For developmonte over $5 million, a Quantity Surveyors Certificate verifying the cost must be submitted on lodgement of the application.

DEVELOPMENT CONSENT

Development Consent No No. N1233/00

Date of Determination Date 24.01.02

BUILDING CODE OF AUSTRALIA BUILDING CLASSIFICATION

Nominated on the Development Consent Class 1a dwelling

RESIDENTIAL BUILDING WORK

Relevant only to residential building work

Owner-builder Permit No.

or

Name of Builder

Address

Telephone Fax

Contractor License No.

REQUIRED ATTACHMENTS

- Note 1 details the information that must be submitted with an application for a construction certificate for proposed building works
- Note 2 details the additional information that may be submitted with an application for a construction certificate for proposed residential building work.

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Schedule 1 Information to be Collected for ABS Particulars of the proposal

DESCRIPTION

What is the area of the land (m^2)

Gross floor area of existing building (m^2)

What are the current uses of all or parts of the building(s)/land?

(if vacant state vacant)

Location Use

Does the site contain a dual occupancy?

What is the gross floor area of the proposed addition or new building (m^2)

What are the proposed uses of all parts of the building(s)/land?

Location Use

Number of pre-existing dwellings

Number of dwellings to be demolished

How many dwellings are proposed?

How many storeys will the building consist of?

MATERIALS TO BE USED

Walls	Code		Roof	Code	
Brick veneer	12		Aluminium	70	
Full brick	11		Concrete	20	
Single brick	11		Concrete tile	10	
Concrete block	11		Fibrous cement	30	
Concrete/ masonary	20		fibreglass	80	
Concrete	20		Masonry/terracott a shingle tiles	10	
Steel	60		Slate	20	
Fibrous cement	30		Steel	60	
Hardiplank	30		Terracotta tile	10	
Timber/weatherboard	40		Other	80	
Cladding aluminium	70		Unknown	90	
Curtain glass	50				
Other					
Unknown	90				

Floor	Code		Frame	Code	
Concrete	20		Timber	40	
Timber	10		Steel	60	
Other	80		Other	80	
Unknown	90		Unknown	90	

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NOTES
For Completing Construction Certificate Application

Note 1

The following information must accompany applications for a construction certificate for building and subdivision work.

Building Work

In the case of an application for a construction certificate for **building work:**

a) Copies of compliance certificates relied upon

b) Four (4) copies of detailed plans and specifications

The plan for the building must be drawn to a suitable scale and consist of a general plan and a block plan. The general plan of the building is to:
- show a plan of each floor section
- show a plan of each elevation of the building
- show the levels of the lowest floor and of any yard or unbuilt on area belonging to that floor and the levels of the adjacent ground
- indicate the height, design, construction and provision for fire safety and fire resistance (if any).

Where the proposed building work involves any alteration or addition to, or rebuilding of, an existing building the general plan is to be coloured or otherwise marked to the satisfaction of the certifying authority to adequately distinguish the proposed alteration, addition or rebuilding.

Where the proposed building work involves a modification to previously approved plans and specification the general plans must be coloured or otherwise marked to the satisfaction of the certifying authority to adequately distinguish the modification.

The specification is:
- to describe the construction and materials of which the building is to be built and the method of drainage, sewerage and water supply
- state whether the materials proposed to be used are new or second hand and give particulars of any second-hand and give particulars of any second-hand materials to be used.

c) Where the application involves an alternative solution to meet the performance requirements of the BCA, the application must also be accompanied by:
- details of the performance requirements that the alternative solution is intended to meet, and
- details of the assessment methods used to establish compliance with those performance requirements.

d) Evidence of any accredited component, process or design sought to be relied upon.

e) Except in the case of an application for, or in respect of, a class 1a or class 10 building*
- a list of any fire safety measures that are proposed to be implemented in the building or on the land on which the building is situated; and
- if the application relates to a proposal to carry out any alteration or rebuilding of, or addition to, an existing building, a separate list of such of those measures as are currently implemented in the building or on the land on which the building is situated.

The list must describe the extent, capacity and basis of design of each of the measures concerned.

Note 2

Home Building Act Requirements

In the case of an application for a construction certificate for residential building work (within the meaning of the *Home Building Act 1989*) attach the following:

a) In the case of work by a licensee under that Act:
(i) a statement detailing the licensee's name and contractor licence number, and
(ii) documentary evidence that the licensee has complied with the applicable requirements of that Act*,
or

b) In the case of work done by any other person:
(i) a statement detailing the person's name and owner-builder permit number, or
(ii) a declaration signed by the owner of the land, to the effect that the reasonable market cost of the labour and materials involved in the work is less than the amount prescribed for the purposes of the definition of ***owner-builder work*** in section 29 of that Act.
(iii)

*A certificate purporting to be issued by an approved insurer under Part 6 of the *Home Building Act 1989* to the effect that a person is the holder of an insurance contract issued for the purposes of that Part, is sufficient evidence that the person has complied with the requirements of that Part.

LONG SERVICE
BUILDING & CONSTRUCTION

28 September 2004

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

RAYPOND P/L
PO BOX 1364
DEE WHY NSW 2099

Levy Receipt

Receipt No.
00031140

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

RAYPOND P/L

the amount of

$1,300.00

Payment details:

Direct Deposit $1,300.00

being payment for Long Service Levy as detailed below

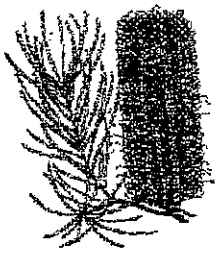
Levy Payment Form number	0272497
Council/Department/Authority	PITTWATER COUNCIL
D.A. Number	N1233/00
Work address	LOT 3 1148-1152 BARRENJOEY RD PALM BEACH NSW
Estimated value of work	$650,000.00
Levy payable (No exemption)	**$1,300.00**
Total levy paid	**$1,300.00**

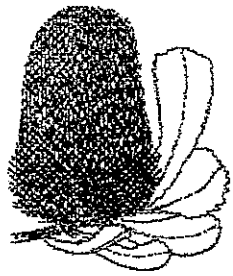
Signed: (Signature of authorised person)

Date

28-9-04

38643





GIS Environmental Consultants

45 Austin Avenue, North Curl Curl 2099
Mobile Ph: 041 943 8672, Ph: (02) 9939 5129, Fax: 9401 715, Email: nicksk@mail.usyd.edu.au

Darren Leete
Raypond Developments, Salga Pty Ltd.
C/o Simon Thorne
Crone Associates
364 Kent St, Sydney

Date: 25 January 2002

Dear Darren,

I spoke to Grayham Mc Donald from Toona Rainforest Nursery in Mudgeeraba North NSW coast and Sally at Burringbah Rainforest Nursary. He said this species propagates from seed readily, and will germinate in 3-4 months. We will need to clean the flesh off the fruit and this is the only treatment needed.
In this species there is only one seed in each drupe (fruit). Birds are known to take the fruit.
In good conditions the trees are likely to be 8 cm high after 1 year.
I can get 4 plants that are 30 cm high that are grown from local stock from a local nursery.
It is my opinion that this species is unlikely to be able to be propagated by cuttings.

On the 23 of January we bagged unripe Black Plum fruit in situ and collected 200 fruit. See Photo 1. The bagging was to catch the fruit as they ripens and to prevent bird predation. See Photo 2. Some of the trees did not have any fruit. There is not viable seed in many of the fruit. The trees with bags were 102, 105 and 402. The trees where fallen seed was collected were 182 105 and 402.

We will harvest the bagged fruit and collect more fallen fruit in 2 weeks and send this new fruit to Tharwa.

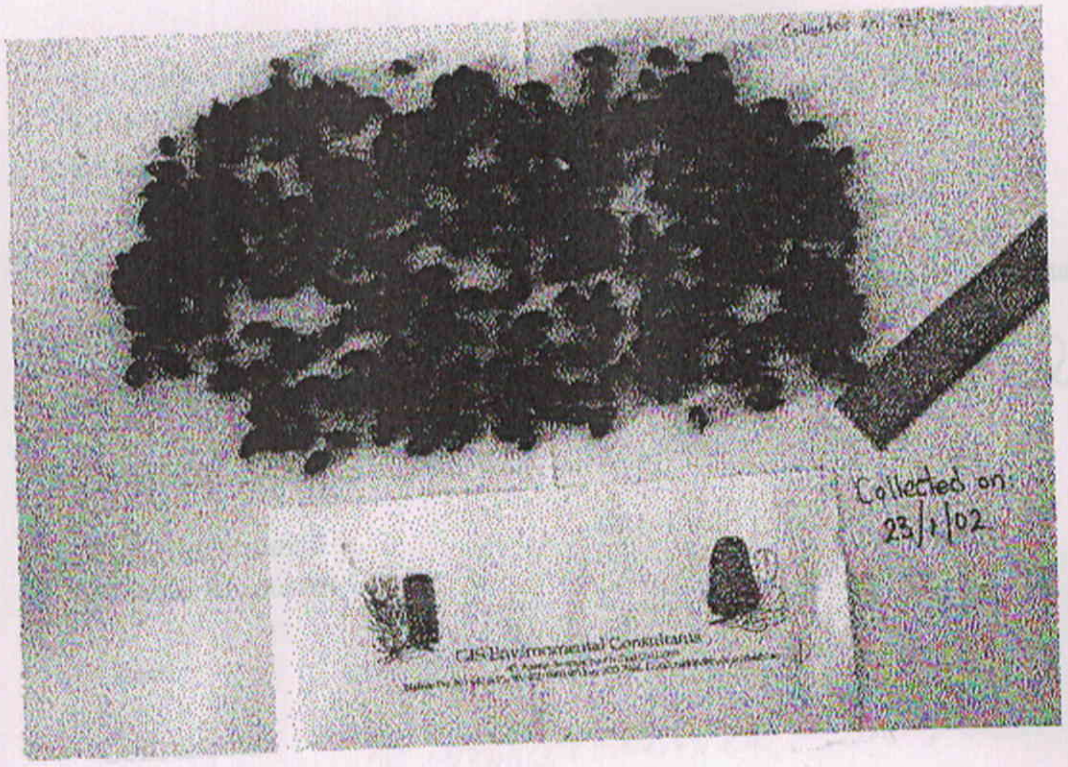
This initial collection of fruit was divided into 2 parts and taken the next day to two nurseries, Wirreanda Nursery and Tharwa Propagation Nursery with instructions to grow the seed and phone GIS Environmental Consultants when they germinate.

When we are informed of the germination we will instruct the nurseries to transfer a total of approximately 100 plants to pricked to tube stock, then 90 tube stock to be potted up to 8 inch pots when ready.

I will ring you to let you know of progress at each stage of the process.

Yours sincerely

Nick Skelton



The first harvest of seed

Bagged branches with unripe fruit.

30 August 2004

Re: 1148 – 1152 Barrenjoey Road, Palm Beach, NSW
DAN1233/00, Development Consent for Construction of dwelling house on proposed Lot 3 (House 3).

This is to confirm that an officer from Pittwater Council's Natural Resources Unit has attended a site inspection with regards to specific Conditions of Consent, being items B8, ~~B17~~ and B30, of the above Consent.

Date of site inspection: Eva Woolcombe 3/9/04

Attendees _____ Name and Signature

Pittwater Council
Natural Resources Officer

Client

Consultants

14 September 2004

Re: 1148 – 1152 Barrenjoey Road, Palm Beach, NSW
DAN1233/00, Development Consent for Construction of dwelling house on proposed Lot 3 (House 3).

This is to confirm that a Landscape Officer from Pittwater Council has attended a site inspection with regards to item B8 of the above Conditions of Consent.

Date of site inspection:

Attendees	Name and Signature
Pittwater Council Landscape Officer	Susan Hobley
Client	DARREN LEECE
Consultants	Selena Hannan

Douglas Partners
Geotechnics · Environment · Groundwater

Douglas Partners Pty Ltd
ABN 75 053 980 117
96 Hermitage Road
West Ryde NSW 2114, Australia

FACSIMILE TRANSMISSION

Our Fax No: (02) 9809 4095
Our Phone No: (02) 9809 0666
e-mail: sydney@douglaspartners.com.au

	Organisation	Attention	Fax No
To	RAYPOND PTY LTD	DARREN LEETE	9944 0316
cc	*WARREN LAVIS*		*9979 6174*
From:	JOHN BRAYBROOKE	Date: 16/3/04	Total pages: 3

Subject: OBSERVATION POINT	Project No:

COPY OF AMENDED PROPOSED METHOD STATEMENT FOLLOWS.

REGARDS.......JCB

JCB:ss
Project 35515C
16 March, 2004

OBSERVATION POINT
PROPOSED METHOD STATEMENT FOR EXCAVATION AND SUPPORT OF BATTERS

1.	Clear Site.	Contractor (Pan Civil
2.	Peg top of batter.	Surveyor (Bowdens)
3.	Excavate test holes at 5 – 10 m centres (closer if necessary) to determine depth to extremely to highly weathered rock. **Hold Point**	Contractor + DP
4.	If colluvium/residual soil ≤ 2.5 m thick to be supported by mesh reinforcement, shotcrete and M28 dowels at 2 m spacings. If colluvium/residual soil > 2.5 m thick design soil nailed (dowelled) or other support to be advised.	
5.	Depending on profile identified and 3 day weather forecast, open up to 10 m length (or such a length as can be supported on the same day) of face to a maximum depth of 2 m, cut at 1 horizontal to 5 vertical.	
6.	Douglas Partners to inspect during/following excavation.	
7.	Depending on exposed conditions either: • install strip drains (as per above Drawings), • apply 60 mm shotcrete (if unstable face only), • stand and fix mesh, • install dowels/rock bolts, • install shotcrete depth pins, • apply remaining shotcrete.	
8.	Douglas Partners/Northern Beaches Consulting Engineers to inspect during and following installation.	
9.	Repeat process to top of very low to low strength rock (if necessary).	
10.	HOLD POINT – Douglas Partners to inspect and sign off on Form 35515C, if correctly stabilised at this point the probability of failure of the colluvium slope will be 'Unlikely' (i.e. the event might occur under very adverse circumstances with indicative annual probability of about 1×10^{-4}) **Note:** At this point continue to next stage of excavations if applicable.	
11.	HOLD POINT released – repeat items 6 to 9.	

12. For cuttings which extend into very low to low strength rock, excavate a further 2 m – HOLD POINT.

13. Douglas Partners to inspect for adversely oriented joints/faults. If present, requiring dowels/bolts additional to those designed for joints dipping out of face at 60° specific additional bolting on Form 35515C/2 – HOLD POINT released.

14. Repeat Items 6 and 7.

    If satisfactory repeat 11 to 13.

15. HOLD POINT on reaching base of cutting.

16. Douglas Partners/Northern Beaches to carry out final inspection for sign off on each cutting (Form 35515C/2).

SELENA HANNAN LANDSCAPE DESIGN

Landscape Design and Horticultural Consultation

Date:	11 October 2004
To:	Natural Resources Unit, Pittwater Council
Attention:	Eva Twarkowski
From:	Selena Hannan
Cc:	Darren Leete, fax 9944 0316
Re:	**House 3, Observation Point DA N1233/00**

Dear Eva,

We are forwarding the following material as required by the Conditions of Consent, B5, B7, B17, B26, B27, and B32:

- Landscape Plan, LP10D, by Selena Hannan Landscape Design, dated 11 October 2004
- Bushland Management Plan, by Footprint Green, dated 7 September 2004, and signed by Mark Cousten on 8 September, 2004.
- Pre-Construction Arboricultural Assessment, House 3, by Urban Forestry Australia, dated September 2004.
- Copy of evidence of Black Plum seed collection.

We also write to confirm the outcomes of the meeting that was held today at your office, at Darren Leete's request, with regards to clarification of a few outstanding issues.

Attending the meeting were, from Council, Mia Dalby Ball, Eva Twarkowski, Mark Beharrel, Sue Hobley. Also present were Darren Leete and Selena Hannan.

Several issues were raised with regards to the approved PSB Landscape Plan L03A, dated 25 May 2001, PSB Tree Plan TP06B dated 8 January 2002, and the following Conditions of Consent:

- *Condition B16. states 'Prior to issue of Construction Certificate provide plans detailing the exclusion fencing/ tree protection as marked in green on drawing no TP06B …Exclusion fencing is to be installed within 1 metre of house 3 and the driveway.'*

The plan TP06B, marked up in colour by Natural Resources, shows the line of protection fencing to be very close to the line of the actual building footprint. NR agreed that the correct location would be as per the written Condition. The proposed location is shown on both Bushland Management Plan and Landscape Plan.

1/59 Central Road, Avalon, NSW 2107
Phone 02 9973 3247 Fax 02 9973 3247 Mobile 0403 041 187
Email selena@tech2u.com.au
ABN 33 990 514 397

- *Condition B23 states 'amend the Landscaping Plan for House 3. Identify bush regeneration/ revegetation zones (marked in blue and orange on …TP06...)*

At the meeting it was agreed that much of the area to the north of the house footprint is to be replanted. As part of the area is to be excavated to rock, retaining walls and new soil will be required. Areas under the canopy of T23 as shown on Bushland Management Plan are to be revegetated and regenerated. The proposed area of landscaping is shown on the Landscape Plan and was agreed by NR.

- *Condition B28 states '…replacement planting is to be carried out to the north of House 3…provide maps/ plans detailing the location of the following species…'*

There are a total of 26 small and large trees required to be located. It was agreed that these trees will not fit into the area to the north of the house and that the trees may be planted in bush revegetation areas only, elsewhere on Lot 3.

Should you require any further information please contact the undersigned.

Yours sincerely,

Selena Hannan

1/59 Central Road, Avalon, NSW 2107
Phone 02 9973 3247 Fax 02 9973 3247 Mobile 0403 041 187
Email selena@tech2u.com.au
ABN 33 990 514 397

DIRECTORS
Stewart McGeady Rick Wray Lucas Molloy

On Site Detention & Site Stormwater Design Certificate

Date: 30 September 2004 Job No. 030704
Client: Raypond Engineer: Rick wray

Site: House 3, 56 Palm Beach Rd, Palm Beach.

Rick Wray of NB Consulting Engineers P/L designed the stormwater management system at the above site.

We hereby certify that the design is in accordance with Pittwater Councils Stormwater Policy and OSD Technical Specification.

We trust that this certificate meets with your requirements. Please contact the author if further clarification is required.

NB CONSULTING ENGINEERS P/L

Rick Wray
BE Cpeng NPER Director

N:\ENG NBC\2003\030704\SC001SW Cert.doc

DIRECTORS
Stewart McGeady Rick Wray Lucas Molloy

Structural Certificate

Date: 7 October 2004 Job No. 030704
Engineer: Rick wray

HOUSE 3

Barrenjoey and Palm Beach Roads Palm Beach

We hereby certify that the following structural drawings have been designed in accordance with the Architectural plans by Crone Associates Architects dated 29.09.2000.

Structural Drawings:
S01/a - General Notes and Drawing Schedule
S02/a - Level 1 footing, slab plan and details
S03/a - Level 1 detail sheet
S04/a - Level 2 floor framing plan and details
S05/a - Level 3 floor framing plan and details
S06/a - Miscellaneous detail sheet
S07/a - Roof framing plan, sections and details
S08/a - Roof framing detail sheet
S09 - Shoring sections
S10 - Anchor details

Architectural drawings:
20006 / ADA3 1001 / C - House 3 Floor Plans Sheet 1
20006 / ADA3 1002 / B - House 3 Floor Plans Sheet 2
20006 / ADA3 1003 / B - House 3 Floor Plans Sheet 3
20006 / ADA3 2001 / B - House 3 Elevations
20006 / ADA3 3001 / B - House 3 Sections

We trust that this certificate meets with your requirements. Please contact the author if further clarification is required.

NB CONSULTING ENGINEERS P/L

Rick Wray
BE Cpeng NPER Director

Northern Beaches Consulting Engineers Pty Ltd Structural, Civil & Stormwater Engineers ACN 076 121 616 ABN 24 076 121 616
Suite 207, 30 Fisher Road Dee Why, NSW 2099 Tel 9984 7000 Fax 9984 7444 Email nb@nbconsulting.com.au

SELENA HANNAN LANDSCAPE DESIGN

Landscape Design and Horticultural Consultation

Date:	5 October 2004
To:	City Plan Services
Attention:	Brendan Bennett
Fax:	8270 3501
From:	Selena Hannan
Cc:	Darren Leete, fax 9944 0316
Re:	**Construction Certificate Application** **House 3, Observation Point DA N1233/00, Condition B17.**

DRAFT

Dear Brendan,

I write with regards to Consent Condition B17, which requires 'plans/maps detailing the deletion of altered contours (on drawing TP06B) within the dripline of all trees. This is to be forwarded to a Natural Resources Officer.'

This Condition refers particularly to T23. The architectural and landscape drawings prepared for the issue of CC for the subdivision, including the following documents addressed this issue:
PSB Landscape Plan House 3 L03B dated 19.11.02
PSB Tree Protection Plan TP10B dated15.11.02.
Crone Nation Site Works AWDS0008 dated 11.11.02.

In accordance with the documents above the contours are shown to be unaltered on the Landscape Plan LP10C, to be issued with the House 3 CC application.
The architectural drawings above show the construction of a proposed retaining wall at 5 metres distant, with another wall below this to reduce the visual impact of the upper wall. In the process of preparation of landscape drawings for House 3, an assessment of the levels and site conditions has required that an additional boulder wall, approx. 750mm in height, be constructed to retain the soil of the slope to the south of T23 away from the house, this has been shown on Landscape Plan LP10C, and discussed in the Arboricultural Assessment report for House 3, dated September 2004. The arborist has recommended hand digging in the proposed location of the footings of this wall to ascertain location of any large diameter roots and has recommended that some flexibility in the construction of this wall be considered should a conflict arise.

Yours sincerely,

Selena Hannan

1/59 Central Road, Avalon, NSW 2107
Phone 02 9973 3247 Fax 02 9973 3247 Mobile 0403 041 187
Email selena@tech2u.com.au
ABN 33 990 514 397

[redacted]

1148-1152 Barrenjoey Road
Palm Beach, NSW

Prepared for
Pan Civil

Naturally Trees Arboricultural Consulting

Table of Contents

Naturally Trees
59/2 Forest Road
Warriewood, 2102
Phone: (02) 9979 4429
Mobile: 0417 250 420

24th February 2004

TREE MANAGEMENT REPORT

1.0 Introduction

This report has been commissioned by Pan Civic to satisfy Pittwater Councils guidelines for tree care and protection prior to a development application for 1148-1152 Barrenjoey Road, Palm Beach.

I personally conducted a site inspection on surveyed trees located within 5.0 metres of proposed works on the subject site.

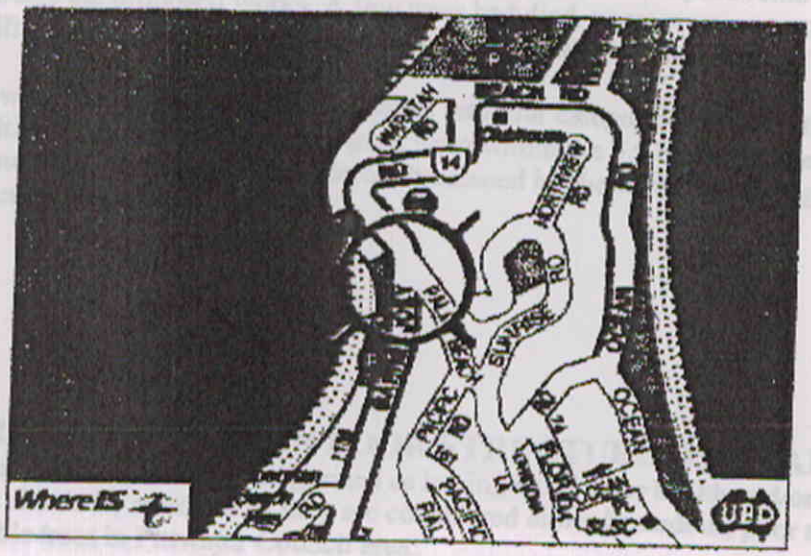
Following the original tree assessment by Pittendrigh Shinkfield Bruce Pty Ltd (18 November 2002) a small number of trees required re-assessment in relation to proposed batters cuts and fills within the subject site. This report assesses those trees that will need alterations to the original recommendations. This will include trees within 5 metres of the proposed driveways, turning bays, catch drains and access areas. This report will not address trees within proposed house allotments.

The report will comprise the following based on observations and details recorded at the time of inspection, 23rd February 2004:

- Possible effects of proposed development on subject trees
- Recommendations for removal or retention of trees
- Tree management recommendations and procedures

This report is based on site plans TP11 A and TP14 A, 1:100, 17.10.02 (copies located in rear of report)

2.0 Location



Location Map: www.Whereis.com.au

3.0 Discussion

Under Pittwater Councils Conditions for Consent C1. (i) & (a), pg 10, - a number of trees included in the bank guarantee bond (for the subject site) will require removal to accommodate the proposed works. A few trees had died, some were non existent and others will suffer major damage if retained insitu, resulting in unsafe trees.

The following section places individual trees into four categories based on there location and condition in the landscape. Other trees were within the 5.0 metres of the proposed works, however they were not considered threatened by the works providing adequate tree protection is applied.

3.1 TREES THAT ARE IN POOR STRUCTURE OR HEALTH

The following trees have been categorized as having either poor health and/or structure. These trees should be removed as they are considered either hazardous, poor specimens or undesirable trees in Pittwater Council area:

18 **Forest Oak** (Allocasuarina torulosa) – this tree was within close proximity to the proposed works on site. The tree was not considered worthy of retention as it had an included bark union at the first main fork (see figure 1).

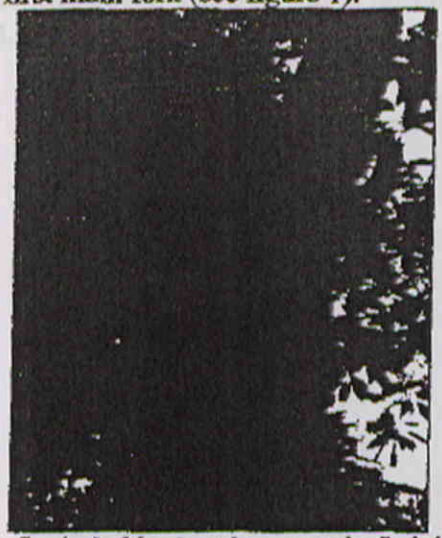


Figure 1: Included bark union at main fork junction.

123 Blueberry Ash (Elaeocarpus reticulatus) – this tree has been severely 'lopped to accommodate overhead powerlines (see figure 2). The structure of the tree was considered poor. The re-growth will consist of epicormic shoots and therefore a hazardous tree.

Figure 2: Lopped limbs under wires.

144 Corymbia maculata (Spotted Gum) – this tree was dead and not considered worthy of retention (see figure 3). Replacement species should be considered.

146 Corymbia maculata (Spotted Gum) – this tree had poor health with approximately 30% live foliage cover. The tree was in decline and not considered worthy of retention (see figure 3).

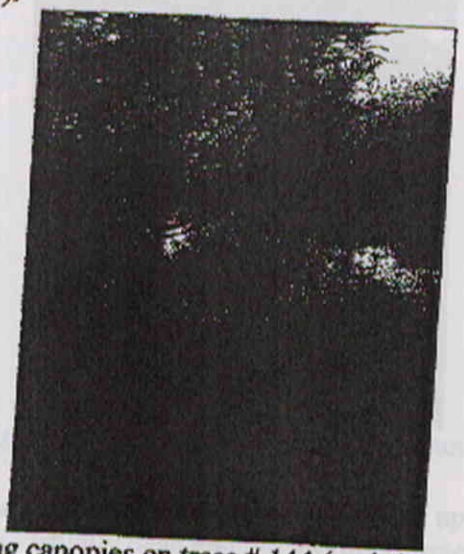


Figure 3: Declining canopies on trees # 144 (on left) and 146 (on right).

151 Coastal Banksia (Banksia integrifolia) – tree #150 has fallen onto this subject tree resulting in its failure (see figure 4). The subject tree has uprooted and considered hazardous. The tree should be removed.

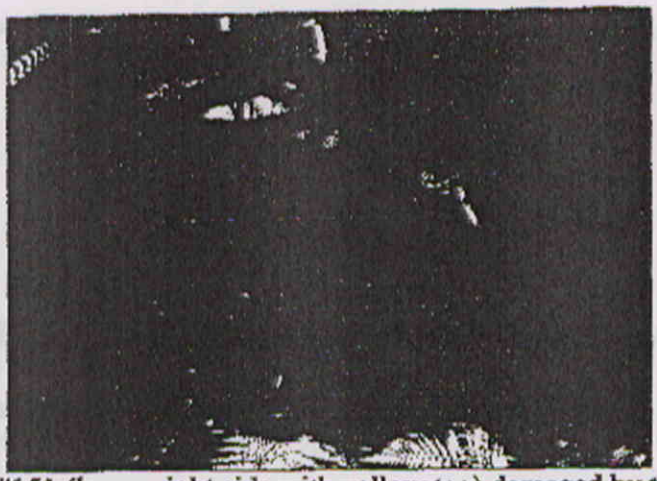


Figure 4: Tree #151 (lower right side with yellow tag) damaged by tree #150 above.

225 Forest Oak (Allocasuarina torulosa) – this tree was not considered worthy of retention. Bracket fungi were present along the trees trunk (see figure 5). This tree was considered hazardous and should be removed.

Figure 5: Bracket fungi present on trunk.

226 Lilly Pilly (Acmena smithii) – this young sapling had approximately 10% live foliage cover. The tree was virtually dead and not worthy of retention.

3.2 TREES THAT ARE NO LONGER PRESENT ON SITE

107 **Black Plum** (Diospyros australis) – this tree was absent from the subject site.

249 **Coastal Banksia** (Banksia integrifolia) – this tree did not exist in its proposed location.

3.3 TREES THAT REQUIRE REMOVAL TO ACCOMMODATE WORKS

The following trees are located directly within the proposed works area. These trees will require removal before works commence:

90 **Forest Oak** (Allocasuarina torulosa) – this tree was located directly within the proposed works area. The tree was classified as significant tree, however it only had fair health and poor structure (see figures 6 & 7). The majority of upper carry the damaged of many storms. This has resulted in a large proportion of dead stubs within the tree. The tree will require removal to accommodate work on site.

Figure 6: Tree #90 canopy.

Figure 7: White peg indicates top of batter.

99 **Cheese Tree** (Glochidion ferdinandi) – the proposed works will impede directly with the root system of this tree resulting in an unstable tree. The tree will require removal to accommodate works.

100 **Forest Oak** (Allocasuarina torulosa) – this tree was within the proposed works area. The tree will require removal to accommodate work on site.

104 **Black Plum** (Diospyros australis) – works will come within very close proximity to this tree. The tree will require removal to accommodate works.

148 **Lilly Pilly** (Acmena smithii) – the catch drain, pit and batter will impede directly with this tree. This tree was not considered significant due to its small size.

149 **Cheese Tree** (Glochidion ferdinandi) – the proposed works will impede with the root system of this tree resulting in an unstable tree.

152 **Black Plum** (Diospyros australis) – the works will impede with the root system of this tree, therefore should be removed. This tree was not considered significant due to its small size.

154 **Coastal Banksia** (Banksia integrifolia) – this tree will require removal to accommodate works. The proposed cut out will impede with too many roots from this tree.

157 **Cheese Tree** (Glochidion ferdinandi) – this tree will require removal to accommodate works. This tree was not considered significant due to its small size.

178 **Forest Oak** (Allocasuarina torulosa) – this tree was within the proposed works area. The tree will require removal to accommodate work on site. This tree was a young specimen and can be replaced with an advanced tree.

179 **Blueberry Ash** (Elaeocarpus reticulatus) – this tree was within the proposed works area. A drainage pit is proposed near this tree resulting in its removal. This tree was small and can be easily replaced.

201 **Lilly Pilly** (Acmena smithii) – the catch drain will impede with this tree. The tree should be removed. This tree was not considered significant due to its small size.

208 **Lilly Pilly** (Acmena smithii) – the catch drain will impede with this tree. The tree should be removed. This tree was not considered significant due to its small size.

409 **Black Plum** (Diospyros australis) – works will come within very close proximity to this tree. The tree will require removal to accommodate works.

3.4 TREES WHICH CAN BE RETAINED WITHIN CLOSE PROXIMITY TO PROPOSED WORKS

The following paragraphs will discuss trees that will fall within 5.0 metres of the proposed works. Special care will be required to protect these trees throughout construction (see recommendations).

45 **Black Plum** (Diospyros australis) – this tree can be retained in its current location. The driveway in this area is suspended on pier/pole footings and will not impede with the subject tree.

98 **Coastal Banksia** (Banksia integrifolia) – this tree was worthy of retention. Proposed works are positioned outside the TPZ of this tree. "Soils must not be allowed to slump during excavation" (Pittendrigh Shinkfield Bruce Pty Ltd). Follow tree protection guidelines in rear of report.

130 **Port Jackson Fig** (Ficus rubiginosa) – this large fig is located on the upper side of the sandstone boulder. Although the tree will be clear of most construction impacts, one large root runs over the boulder to the underside of the rock (see figure 8). The root is classified as significant. The subject root will require pruning to accommodate works.

Figure 8: Large fig root towards centre of photo.

132 **Native Daphne** (Pittosporum undulatum) – this tree is located on the upper side of the sandstone boulder and will not impede with works on site.

182 **Black Plum** (Diospyros australis) – works will not impede on this tree provided the catch drain is relocated to the south of tree #183. This tree is located on a higher level and will not interfere with works.

183 **Cheese Tree** (Glochidion ferdinandi) – this tree can be retained providing the catch drain is relocated to the south side of the tree. The drain should be located as far south of the trunk as possible.

199 **Lilly Pilly** (Acmena smithii) – catch drain to be relocated to accommodate this tree. A set back of 1.0 metre is required.

202 **Cheese Tree** (Glochidion ferdinandi) – catch drain to be relocated to accommodate this tree. A set back of 300mm is required.

203 **Lilly Pilly** (Acmena smithii) – catch drain to be relocated to accommodate this tree. A set back of 300mm is required.

204 **Lilly Pilly** (Acmena smithii) – catch drain to be relocated to accommodate this tree. A set back of 500mm is required.

4.0 Recommendations

Tree Care Procedures

The following tree care procedures are to be in force for the entire duration of site works where applicable:

Tree Protection Zone (TPZ)

Trees that will be directly affected by the development are ones where earth works will conflict with the tree protection zone of a tree. The Australian Standard for protecting trees (Draft Australian Standard, Protection of Trees on Construction Sites, 1999) suggests the TPZ (the minimal critical area that is required so a tree can be preserved and facilitate development) should be set out an average distance of 10x the trunk diametre at 1.2 metres above existing ground level. Therefore a tree with a 100mm diameter trunk would require a 1000mm radius TPZ.

- This area must be made visible with a tree protection fence (see below).
- No chemical, fuel or material storage, soil build up or concrete wash out is to take place within this zone.
- Do not use grading or trenching equipment within TPZ.

All work to be performed within TPZ must be performed by hand under the supervision of a consulting Arborist. Branches that may extend beyond the fencing must be protected from all construction machinery. If pruning is required it must be carried out in accordance with Australian Standards AS4373, Pruning of Amenity Trees.

Exemptions within TPZ

I recommend hand excavations be carried out within TPZ to a depth of any footing design. This will expose any roots that may be directly affected (footings to be relocated if possible when roots are present). Tree roots 40mm or greater should not be cut before consulting with site Arborist about tree stability. (This should be carried out before any earth works commence)

- Critical Protection Zone (CPZ) - should be set out an average distance of 5x the trunk diametre at 1.2 metres above existing ground level. Therefore a tree with a 100mm diameter trunk would require a 500mm radius CPZ. This zone is highly sensitive to trees and should not be interfered with unless consulting site Arborist.

  This critical zone may only be built in under strict instruction and only within one quarter tangent of a root plate.

- Locate major tree roots (≥40mm diametre) by hand excavating at the edge of any proposed footing/slab. Consult with Arborist to determine tree stability.

- Footings are to be designed to minimize root disturbance. (This may include bridging major roots and/or relocating piers.)

- Access within the TPZ can be achieved by laying course mulch 100mm deep covered with plywood boards (or similar) over the root plate to protect roots of the tree. This would allow access (only if necessary) whilst construction is carried out. The access would be limited to light traffic only.

Protective Fencing
Erection of 1800mm high chain wire fencing or similar covered in shade cloth to be erected before any construction or site works commence. Fence is to be maintained throughout the entire construction period.

Soil Improvement during Construction
A beneficial mulch layer and provision of adequate irrigation could be maintained within the TPZ throughout the construction period.

- A75-100mm layer of (leaf and woodchip) mulch can be applied within the TPZ. This will assist in stabilising soil moisture and surface temperatures and acts as a slow release fertilizer.

- Ensure adequate irrigation to trees. This may consist of a dripper system (soaker hose or similar) installed within TPZ. Additional watering will reduce stress to the subject tree during the proposed works.

Naturally Trees
59/2 Forest Road
Warriewood, 2102
Phone: (02) 9979 4429
Mobile: 0417 250 420

18th March 2004

TREE MANAGEMENT REPORT (Amendment)

The following amendment is to be included with the Tree Management Report (dated: 24th February 2004, Naturally Trees). The amendment includes assessment and recommendations for tree number #T141.

All recommendations in original report (dated: 24th February 2004, Naturally Trees) should be followed as a general guide for protection of the subject tree.

141 **Coastal Banksia** (Banksia integrifolia) – this tree was in fair condition at time of inspection. The tree only consists of one trunk with a diametre of 200mm. The low limb was completely dead (see figure 1). The tree had approximately 75% live crown cover. The subject tree is located 1200-1500mm from the edge of the proposed works on site. There are many rock outcrops within this area and therefore difficult to assess the location of woody roots. Although the tree would generally require a tree protection zone of 1500mm, I believe that with careful tree protection the tree could be retained on site.

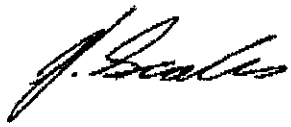
Figure 1: Tree #141, arrow indicates deadwood.

5.0 References

Draft Australian Standard - Protection of Trees on Construction Sites, 1999

Should you wish to discuss any issue raised within this report, please feel free to contact me at anytime, either through the office (9979 4429) or on my mobile phone (0417 250 420).

Yours sincerely



Andrew Scales

Manager/ Consultant
Dip. Horticulture, Cert. Arboriculture
Member NAAA

TREE MANAGEMENT CONSULTING ARBORICULTURISTS

PRE- CONSTRUCTION ARBORICULTURAL ASSESSMENT

A Report on the Potential Development Impacts on Trees to Be Retained

for

RAYPOND PTY LTD
PO Box 1364
DEE WHY NSW 2099

SITE ADDRESS
LOT 3 (HOUSE THREE)
1148 – 1152 BARRENJOEY ROAD
PALM BEACH NSW

SEPTEMBER 2004

MEMBER OF
INSTITUTE OF AUSTRALIAN
CONSULTING ARBORICULTURISTS

URBAN FORESTRY AUSTRALIA

ABN 90 639 906 218

www.urbanforestry.com.au

Correspondence:

PO Box 151
NEWPORT NSW 2106

Telephone: (02) 9918 9833
0414 997 417

Facsimile: (02) 9918 9844

Email: cmackenzie1@bigpond.com

CONTENTS

1 INTRODUCTION

1.1 This Arboricultural Assessment was commissioned by Mr Darren Leete of Raypond Pty Ltd, owners of the subject site.

1.2 The subject site is identified as Lot 3, and known as House 3 at 1148 -1152 Barrenjoey Road, Palm Beach, New South Wales.

1.3 This Arboricultural Assessment addresses Pittwater Council Development Consent DA N1233/00. This assessment intends to meet the arboricultural requirements for the issue of the Construction Certificate for House 3, specifically addressing Conditions B9, B22, B27, and B32.

1.4 This Arboricultural Assessment briefly assesses the health and condition of trees to be retained, and examines the possible development impacts on trees in proximity to the approved development.

1.5 This assessment is not a tree audit and uses the previous Tree Report dated April 2003 by Pittendrigh Shinkfield Bruce Pty Ltd for tree details. All trees referenced in this assessment use the numbers accorded them in the Tree Report by Pittendrigh Shinkfield Bruce Pty Ltd.

1.6 This Arboricultural Assessment gives recommendations as to the retention or removal of trees on the site, and gives recommendations to minimize any identified impacts from the proposed development.

1.7 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.

1.8 This Arboricultural Assessment 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.

2 METHODOLOGY

2.1 In preparation for this report preliminary and site meetings were attended by Mr Darren Leete (Raypond Pty Ltd), Ms Selena Hannan (Selena Hannan Landscape Design), and Mr Mark Couston (Footprint Green Pty Ltd) and myself on 5 and 16 August 2004.
A further site visit was carried out by myself and Ms Hannan on 23 August 2004 to identify all trees for removal, retention, or as bonded trees by tagging them in colour coded tape.
During this visit any trees which needed further investigation were also addressed.

2.2 The inspection was limited to generally brief examination of some trees, relying on the previous report (April 2003) by Pittendrigh Shinkfield Bruce Pty Ltd for specific tree details.

2.3 No aerial (climbing) inspections, woody tissue testing, dissection, excavation, probing, coring or tree root investigation was undertaken as part of this site or tree inspection.

2.4 Plans and/or documentation used for the preparation of this Arboricultural Assessment include:

- Pittwater Development Consent (modified 2003) DA No: N01233/00;
- Pre-Construction Tree/Vegetation Report, dated 10 April 2003, prepared by Pittendrigh Shinkfield Bruce Pty Ltd;
- Tree Management Report, dated 24 February 2004, prepared by Naturally Trees Consulting;
- Bushland Management Plan, dated May 2003, prepared by GIS Environmental Consultants;
- Tree Survey - House Three Plan TP06B and Tree Protection Plan - House Three TP10A, prepared by Pittendrigh Shinkfield Bruce Pty Ltd;
- Landscape Plan LP10, dated September 2004 prepared by Selena Hannan Landscape Design; and
- Sewerage plans, File No. 13701WW, prepared by Sydney Water.

3 DISCUSSION

3.1 Current health and condition of trees to be retained.

3.1.1 The health of trees currently growing on the site can only be described as fair, and is likely to be due in some part to the unfavourable soil moisture content resulting from prolonged drought conditions.

The structure and form of many trees is compromised by suppression from other trees, and competition for root space, soil moisture, etc. Secondary problems are evident, such as poor extension growth and foliage density of Cheese Trees due to repeated defoliation by insects. Storm damage, stem and branch inclusions, and high amounts of deadwood are also noted in Forest Oaks.

These problems are typical of a dense woodland/rainforest community, particularly when affected by drought.

3.2 Potential impacts on trees within 5 metres of House 3.

3.2.1 In accordance with Consent Condition B9, the potential impacts of works on trees within 5 metres of the dwelling and the house access driveway were assessed.

Note: For impacts on trees in proximity to the main driveway, please refer to the Pre-construction Tree/Vegetation Report by Pittendrigh Shinkfield Bruce, 10 April 2003, which deals with subdivision works (DA N1228/00), and Tree Management Report from Naturally Trees, dated 24 February 2004.

The following trees have been identified as being located within the nominated 5 metre setback, and were shown on plans to exist at the time of Development Application.

Trees in bold are bonded trees as per Condition C7. Trees in brackets are identified as having been already removed.

Refer Notes following.

Trees 23, 25, 30, **31**, 167, (168), (**285**), (**286**), **287**, 289, **290**, **292**, **293**, **297**, **298**, **299**, 300, 301, **302**, 309, **310**, 311, 313, **317** and 374.

Notes: Observations on trees outside the 5-metre zone: Trees 151 and 152 are recommended for removal in the Tree Management Report (February 2004) for Civil works by Naturally Trees. Trees 124 and 168 appear to have been removed during civil works.
Trees 285 and 286 (both bonded) also appear to have been removed during the civil works. T167 has been observed as being negatively impacted by civil works and is unlikely to survive.

3.2.2 As shown on Landscape Plan LP10 a series of retaining walls are to be constructed to retain the slope away from the northeast wall of the dwelling. The closest wall, located at a distance approximately 1.5 metres from the dwelling, will be approximately 750mm high and be constructed from sandstone boulders. Some excavation would be required to seat the base course.
At its closest point to Tree 23 this wall is approximately 3.0 to 3.5 metres, and at the limit of the tree's *Critical Root Zone* (CRZ) – a radial setback of 3.5 metres measured from the centre of the tree stem.
It is expected that the majority of the tree root system will be upslope of the tree and not within the area where the wall is proposed. To avoid potential conflict of wall construction with tree roots, hand digging shall be carried out by, or under the supervision of the project arborist. Some flexibility with the method of construction must be considered should a conflict arise.

The other walls shown are located at a minimum distance of 5 metres away from the trunk of T23. These walls have been specifically located so as to have minimal impact on the roots of T23. The walls have been designed to enable the retention of the existing grades/contours of the slope.
The tree should be able to tolerate the impacts of these walls without detriment to its health or stability.

3.2.3 Tree 101 (Bangalay) is located within 4.5 metres of the retaining walls east of the approved driveway. The CRZ of the tree is 3.0 metres. As these new walls are downslope of the tree the likelihood of encountering significant roots is small, but should be considered. During excavation works within 6.0

metres (i.e. the *Primary Root Zone* - PRZ) supervision by an arborist would determine the presence of roots.

3.2.4 A small group of bonded trees (T297, 298, 299 and 302), are located directly in front of the deck on the southwestern side of the dwelling.
Tree 298 is a *Notelaea longifolia* (Mock Olive) of average condition, and T302 is a *Glochidion ferdinandi* (Cheese Tree) of poor condition.
The remaining two (T297 and 299) are a Cheese Tree of poor condition and a Mock Olive of good condition.
The retention of all trees will be possible without the need for decreasing the deck area to retain them.

3.2.5 Tree 317 may need some canopy reduction and shaping to prevent any potential damage to the tree or eaves of the new dwelling. Excavation is to be carried out at approximately 1200mmm to the southeast of the tree. This cut is outside the CRZ of 1.0 metre, however it should be subject to arboricultural supervision during excavation works to avoid or minimise any potential damage to tree roots.
The tree should be provided with trunk protection. Refer to Figure 1, page 12 of this report.

3.2.6 Trees 31, 287, 290, 293, 297, and 299 are generally located within a metre or so of the deck area. It is not expected that the installation of posts supporting the deck will have any appreciable impacts, particularly as the post locations can be flexible to avoid significant woody roots.
Some judicious pruning would be required to prevent damage to trees and the deck structure where the tree canopies and the deck may be in conflict. This pruning would need to take into account the percentage of canopy requiring removal, and the requirements for screening of the structure.

3.2.7 Trees 292, 309, 310, 311 and 313 are set back a considerable distance from any primary excavation works, and from the deck areas. Typical tree and site protection requirements would suffice for these trees.

Tree 374 is at an adequate setback for retention and the works will be well outside the estimated root zone.

3.2.8 In consideration of Condition B27 and B9 .

In accordance with instructions from Geotechnical Engineers the indicative location of Pits 9 and 10 and underground stormwater lines connecting pits with detention tank DT3 has been provided as draft plan (Drainage Plan, Proposed Access Road, dated November 2003, updated 1/10/04, by Northern Beaches Consulting). This plan shows indicative locations for these structures. The drainlines are to be laid in an excavated trench. The actual location will be decided on site, from information to be gathered with project arborist in attendance. The method of determining the location of pits and lines is proposed to be thus: All roots over 50mm in diameter of potentially affected trees in this area (Trees 146, 144, 143, 157, 141, 156) are to be located by hand excavation at the depths required for the trench and pits. The most appropriate trench and pit location will be determined from this information. The arborist will make informed decisions as to which roots, if any, may be cut so as to minimise impacts on the trees. The trench is to be backfilled by firstly replacing site subsoil to equal previous depth, then site topsoil to equal previous depth. The locations of these trees, tanks, pits and lines has been shown on the Landscape Plan LP10 and it is not considered necessary to repeat this information on a separate plan.

3.2.9 With reference to Condition B27and B9 the previous 3.2.8 addresses stormwater pipe installation. There will be no impact to trees from sewer connection as this will be subject to future location through the construction access easement, an already highly disturbed area without any existing trees. Other utilities e.g power and telecommunications are to be located wholly within the building footprint and driveway area. They will be well outside the root zone of any trees to be retained on Lot 3.

3.2.10 Impacts on trees located within 5 metres of pathways and stairs located next to the main drive have been addressed in the subdivision tree report.

These pathways and stairs do not impact on any additional trees to be retained.

The patio below T25 will have no additional impacts than those commented on below in 3.3.2

3.3 Tree removal

3.3.2 Of the above trees to be retained, Trees 25 and 30 were subject to further investigation as outlined in Condition B22. Further assessment was carried out on 23 August 2004.

Tree 25 (Cheese Tree), is located within 1.5 metres of the line of excavation for construction of two retaining walls. The tree is of fair health due to significant insect attack and defoliation of the canopy.

The incursion into the root zone resulting in a removal of an estimated minimum of 50% of the root system is likely to be less than 1.0 metres away, on two sides, and within the tree's CRZ. Apart from the potential root damage it will suffer, the tree may become destabilised as it matures.

This tree must be subject to close supervision by an arborist during construction within 3 metres. Hand excavation will be required within one metre of the tree.

Refer to detail plan in Appendix B of this report.

3.3.3 Tree 30 is a Forest Oak of poor condition and form. The tree's central leader has died, and there is significant decay into the stem and root crown. The tree has significant storm damage to its branch architecture and will not continue to develop into a sound structure.

To accommodate the deck area the tree will likely require some pruning.

The tree should be provided with trunk protection. Refer to Figure 1, page 12 of this report.

3.3.4 The condition of the trees and the conflict between development and retention of these trees was discussed at a site meeting on 3 September 2004 between Eva Twarkowski (Pittwater Council's Natural Resources Officer), Mr Darren Leete (Raypond Pty Ltd) and myself.

Ms Twarkowski verbally agreed to the potential removal of the two trees based on her own observations of the condition of Tree 30, and agreement that retention of Tree 25 would be difficult due to the impacts on the tree's root system.

3.4 Additional comments

3.4.1 The majority of trees to be retained are located within bush regeneration/revegetation areas where no paths or other works are to be constructed.

The exception to this is where a new retaining wall is to be constructed at distance of 3.0 metres to Tree 23.

The Landscape Plan LP10.shows this wall clearly and the requirement of Consent Condition B27 for additional plans/maps detailing this is not considered to be necessary.

As the location of services are within driveway areas and well away from any trees to be retained this also does not require additional documentation.

In reference to the second part of this consent condition, methods for hand digging within the canopy dripline of Tree 23 is included in the recommendations 5.3 *Hand digging near trees.*

3.4.2 Tree 98 has been approved by Council for removal as it in a hazardous condition. (Application No. P/1706, dated 5/08/04).

3.4.3 Tree 317 is a bonded tree, but should be eventually removed as it is in very poor condition. This may be done as a separate application under Pittwater Council's Tree Preservation and Management Order.

4 CONCLUSIONS

4.1 Most of the trees within this area are of average to poor condition with identifiable defects, suppressed growth, storm damage, effects of ongoing drought conditions and the secondary problems associated with these factors.
Several of these trees are bonded.

4.2 The majority of trees to be retained will experience little, if any, impacts on their current health and condition as a result of the approved works.
Impacts on trees close to the development can be minimized, if not avoided entirely, by the presence and supervision of an experienced arborist during works in proximity to trees.

4.3 The two trees subject to further investigation were found to be too close to the approved works. Their current health and/or condition is not considered to be good enough to justify redesigning the approved dwelling to ensure their retention.

5 RECOMMENDATIONS

5.1 Tree Protection Zones (TPZ)

5.1.1 Provide a Tree Protection Zone (TPZ) to all trees to be retained. This may be in the form of extended protective fencing, individual tree guards and other protective devices, depending on the specific requirements of each tree or group of trees to be retained. Refer to Landscape Plan LP10 for general protection fencing locations.

5.1.2 The most appropriate procedure for protecting trees to be retained is to firstly arrange a site meeting with the arborist and fencing contractor. This must be carried out prior to erecting any fencing or other tree protection devices.

It is important to remember that there may be many surface roots which could be damaged or crushed during site works and this issue needs to be addressed at the time of the site meeting with the contractor. This will require very specific and individual assessment of the protection devices used for each tree or group of trees.

To ensure the contractor has met with the arborist, and understands the requirements for protection of each tree as directed by the arborist, it is recommended the contractor provide written confirmation of that meeting and their understanding of those tree protection requirements. Alternatively, the arborist is to supervise the erection of Tree Protection Zones and other tree protection devices.

Where trees cannot be fenced adequately due to the proximity to the dwelling or deck the arborist must specify the type of protective measures e.g. fabrics, mulches, tree guards, etc to ensure that these trees are well protected before any tree removal or other site works are undertaken.

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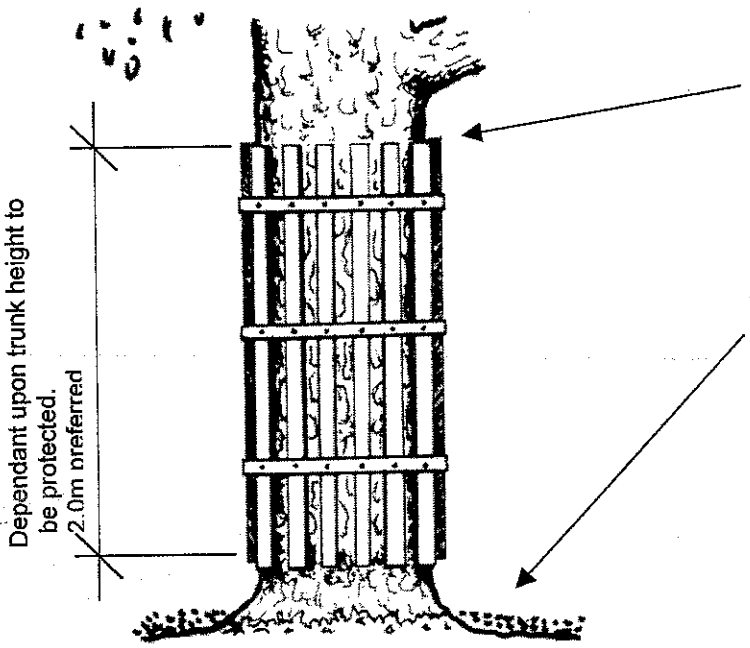
To ensure the contractor has met with the arborist, and understands the requirements for protection of each tree as directed by the arborist, it is recommended the contractor provide written confirmation of that meeting and their understanding of those tree protection requirements. Alternatively, the arborist is to supervise the erection of Tree Protection Zones and other tree protection devices.

Where trees cannot be fenced adequately due to the proximity to the dwelling or deck the arborist must specify the type of protective measures e.g. fabrics, mulches, tree guards, etc to ensure that these trees are well protected before any tree removal or other site works are undertaken.

The arborist must also take into account the requirement for access for construction activities and provide a reasonable space for work between protective fencing and those activities.

Figure 1 TREE GUARD DETAIL



5.1.3 The following recommendations for protection of trees to be retained are:

- Tree Protection Zones must be established and installed before any site works are carried out including any clearing or grading or approved tree removals;
- Provide Tree Protection devices to all trees to be retained;
- Provide Protection fencing as far as practicable from the trunk of the trees, and preferably outside the PRZ of the tree. Where possible the fencing should be placed to encircle the whole tree;
- The most appropriate fencing is 1.5m chainlink with 50mm metal picket supports. During installation care must be taken to avoid damage to significant roots;

- Nothing should occur inside the TPZ of the tree, so therefore all access to personnel and machinery, and storage of fuel, chemicals, cement or site sheds is prohibited;
- Signage should explain exclusion from the fenced off areas and carry a contact name for access or advice; and
- The TPZ may only be removed, altered, replaced or relocated with the authorisation of the project arborist.

5.2 Bonded Trees

5.2.1 Bonded trees should be photographed prior to works commencing on the site; during works; at completion of works; and prior to application for the release of the bond. A written record of their health and condition during all works phases must be kept by the project arborist and forwarded to the project supervisor.

5.3 Minimising impacts on tree to be retained.

5.3.1 Arboricultural supervision

The arborist must supervise all works, particularly demolition, excavation, trenching, subgrade preparations, foundations and other associated procedures within the *Primary Root Zone* (PRZ) of the trees.

Each site visit and all observations, details etc, must be recorded by the project arborist.

5.3.2 Construction access

Where practicable construction access for all vehicles must be located outside the Primary Root Zone (PRZ) of trees to be retained.

5.3.3 Landscape plantings

Any proposed planting locations within the PRZ of trees to be retained must remain flexible so as to avoid damage to existing roots.
In some cases, tubestock container size may be the only suitable size for planting within the root zone of a tree.

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

5.3.4 **Mulching**

The inclusion of a temporary mulch layer of composted leaf and woodchip to a depth of 75mm within TPZ will help retain soil moisture, protect soil from contaminants and reduce soil compaction.

5.4 Hand digging near trees.

5.4.1 With reference to Condition B32, the method of hand digging within the canopy dripline of Tree 23 would be subject to the constraints of the soil depth and underlying rock where the retaining wall is to be located. The following should be carried out under the supervision of an arborist:

- Determine the required depth of soil and/or rock removal to provide base for new wall;
- Carefully remove the organic layer (leaf litter and other organic material) by hand, and place aside;
- Using a small hand tool such as a trowel, carefully remove topsoil along the proposed location for the retaining wall, and place aside, and outside the canopy dripline of the tree (Do not mix topsoil with organic layer);
- Any subsoil encountered may require the use of a narrow spade (e.g trenching or post-hole shovel) to remove it. Place aside and away from stockpiled topsoil.
- If rock is encountered, expose required area. A 'kanga' rock breaker can be used to remove rock to the required level for the new wall;
- If roots belonging to Tree 23 are encountered do not cut them.
- Wrap or cover exposed roots with damp fabric to minimise root moisture losses.
- The level base where the wall is to be located must be exposed and any roots greater than 50mm diameter must be left for the arborist to determine which, and how many, may be cut without impacts on the trees health or stability;

- Any soil to be reused as backfill must be placed as it was removed i.e. subsoil first, followed by topsoil and organic layer on top.

Where practicable the boulder wall must bridge any roots which are to be left intact and undamaged.

5.4.2 Where significant tree roots are encountered which coincide with the desired location for a pier or deck posts, the location should be moved so as to avoid the root/s. In the event this is not possible to achieve, the arborist should be consulted to assess the impacts of the removal of further significant roots on the trees health and stability.

5.5 Tree Pruning

5.5.1 Pruning methods and techniques

Contracted tree workers must have a minimum Level 2 qualification in Tree Surgery to carry out any pruning works on this site.

Pruning methods and techniques used are to be in accordance with these written specifications complying with Australian Standard AS 4373 – 1996 *Pruning of Amenity Trees*.

A copy of this document must be available and held on site by the supervisor.

5.5.2 Safe work practices

When pruning trees the following are to be complied with:

- Australian Standard AS4373 – 1996 *Pruning of Amenity Trees*; and
- The Workcover Authority's *Code of Practice for the Amenity Tree Industry*, No. 34, May, 1998.

5.5.3 Supervision of pruning works

Pruning work is to be carried out under the direct supervision of a nominated qualified tree worker or the project arborist.

5.4.4 During all pruning works any defective or diseased tree parts encountered by tree workers are to be reported to the site supervisor.

5.6 General

5.6.1 General recommendations during development, construction and post-construction are as follows:

- No stock-piling should take place around the root zone of trees. Providing a regular supply of water to the trees during the period of works is recommended.
- Do not allow excavation vehicles or equipment to rip at, or remove the roots along the face of any excavation adjacent to a 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.
- Regular monitoring of the tree during development works for unforeseen changes or decline will help maintain the tree in a healthy state.
- Irrigation – An arborist should determine whether irrigation should be carried out during extended periods of drought.
- 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.
- Pest management – Monitoring is required as trees under stress are more prone to insect attack.
- Hazard Management – monitoring and management of the trees and re-assessment by a qualified arborist is required for adequate long-term safety of site users.

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

Catriona Mackenzie
Consulting arborist and landscape designer.
Member Australian Institute of Horticulture
Member Institute of Australian Consulting Arboriculturists

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(ie 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.

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

Hazard refers to anything with the potential to harm health, life or property.

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.

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.

Scaffold branch A primary structural branch of the crown.

Stem/bark inclusion, a genetic fault and potentially a weak point of attachment.

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.

Within Building Footprint (WBF) refers to those trees within the footprint of the proposed development.

APPENDIX B – DETAIL PLANS

SELENA HANNAN LANDSCAPE DESIGN
Landscape Design and Horticultural Consultation

LANDSCAPE SOFTWORKS SPECIFICATION

HOUSE 3

LOT 3, OBSERVATION POINT
1148 – 1152 BARRENJOEY ROAD
AND 56 PALM BEACH ROAD
PALM BEACH

SEPTEMBER 2004

To be read in conjunction with Landscape Plan,
Selena Hannan Landscape Design, LP10

1/59 Central Road, Avalon, NSW 2107
Phone 02 9973 3247 Fax 02 9973 3247 Mobile 0403 041 187
Email selena@tech2u.com.au

CONTENTS

Note: VEGETATION PROTECTION AND REMOVAL SPECIFICATION (dated 18 November 2002, by PITTENDRIGH SHINKFIELD BRUCE, was issued as part of contract set for CC for subdivision. Pages 2 – 5 inclusive have been referenced for use in this document for sections 2 to 9).

1.0 GENERAL

SCOPE
Planting works including tree and vegetation protection, soils, edging, plant and associated materials, planting, mulches, irrigation and establishment.

REFERENCED DOCUMENTS
AS 4419 (1981) Soils for Landscaping and Garden Use
AS 4454 (1997) Composts, Soil Conditioners and Mulches
AS 4373 (1996) Pruning of Amenity Trees

2.0 INSPECTION

NOTICE: Give sufficient notice so that inspection may be made of the following:

- Supervision of installation of protective fencing, tree trunk protection, root/ground protection and protection of natural rock features as shown on Landscape Plans.
- Supervision of all excavation works around trees to be retained and protected.

3.0 WORK NEAR TREES

GENERAL
All existing trees that are to remain undisturbed are indicated on the drawings and shall be adequately protected for the duration of the building works.

REQUIREMENTS
Storage of materials, mixing of materials, vehicle parking, disposal of liquids, machinery repairs and refuelling, site office and sheds, and the lighting of fires, stockpiling of soil, rubble or any debris shall not be carried out within the dripline of trees. No excavation or backfilling shall occur within the dripline of existing trees unless approved by qualified arborist. Trees shall not be removed or pruned unless specific instruction is given in writing by Superintendent. Should a tree or trees listed for retention be damaged or removed without prior consent in writing, a penalty may be applied. All tree protection works shall be carried out before excavation, grading and site works commence.
Contractor to refer to specific DA Conditions of Consent regarding consultants and others required to attend site to approve installation of tree protection measures, and ensure adequate notice is given for them to attend.

PROTECTION
Protect trees specified or shown to be retained from damage by groundworks with temporary Protective Fencing (Refer **PROTECTIVE FENCING, TRUNK PROTECTION, GROUND PROTECTION**). Take necessary precautions, including the following:

- Harmful materials: Do not store or otherwise place bulk materials and harmful materials under or near trees. Do not place spoil from excavations against tree trunks. Prevent wind-blown materials such as cement from harming trees and plants.
- Damage: Prevent damage to tree bark. Do not attach stays, guys and the like to trees, unless specifically instructed to do so as a temporary stability measure.
- Work under trees: Do not add or remove topsoil within the dripline of trees. If it is necessary to excavate within the dripline, use hand methods such that root systems are preserved intact and undamaged. Open up excavations under tree canopies for as short a period as possible.
- Roots: Do not cut tree roots exceeding 50mm diameter unless permitted by qualified consulting arborist. Where it is necessary to cut tree roots, use means such that cutting does not unduly disturb the remaining root system. Immediately after cutting with a clean sharp instrument, the tree should be watered and treated with a liquid rooting hormone to stimulate the production of new roots. Examples include Formula 20® or Hormone 20®.

- Compacted ground: Avoid compaction of the ground underneath trees.

WARNING SIGN
Display a sign in a prominent position near the entrance to the site warning that trees and plantings are to be protected during the Contract period. Lettering shall be road sign-type sans-serif letters, 100mm high in red or black on a white background, to AS 1744. Remove sign on completion of works.

4. PROTECTIVE FENCING

Refer Landscape Plan for location. Trees and vegetation to be retained throughout the site must be protected by stout fencing or have trunk protection installed, enclosing a sufficient area so as to prevent damage to the critical root zone and the trunk. Fencing should be erected before any materials are brought onto the site or before any site works, civil works or construction is commenced and shall remain in place for the duration of the building works. The fences are to be erected as indicated on plans and should be erected to enclose the Primary Root Zones, where practicable. (Primary Root Zone = DCH x 9 (Diameter at Chest Height) expressed as a radius from the trunk). The fence should comprise:

- 2.1m high steel star pickets, driven 0.4m into the ground.
- Run three strands of fencing wire through top, central and lower positions of pickets.
- Fix hinged ring lock wire mesh to stranded wires already in place through star pickets.
- Fix orange safety mesh to hinged ring lock mesh to full height of fence.
- No storage of building materials, tools, paint, fuel or contaminants shall occur within the fenced area.
- Ropes or ties shall not be attached to any part of the trees.

Where construction works are to be carried out upslope of protected, fenced areas, the protective fencing shall incorporate sediment control fencing installed to manufacturer's instructions (ie silt/sedimentation cloth partially buried and securely attached to base of wire mesh fencing) to create a barrier at ground level to potentially contaminated run-off or excess silt).

Advise contractors and visitors to the site of the purpose for fencing and protecting the trees by the placement of suitable warning signs on fences.

5.0 TRUNK PROTECTION

Where space does not permit the placement of protective fencing as instructed by arborist or as shown on plans, install trunk protection to individual trees. Trunk protection shall be by the placement of 2.0 metre lengths of 50mm x 100mm hardwood timbers spaced at 150mm centres and secured by 10-guage wires on steel straps at 300mm centres. Place hessian padding to ends of battens to prevent damage to bark. The trunk protection shall be maintained intact until the completion of building works.

6.0 GROUND PROTECTION

Where construction occurs close to or beneath the dripline of trees to be retained, or as instructed by arborist, it shall be necessary to install ground protection to avoid compaction of the ground surface, lateral and absorbing roots. Where machinery is used close to or beneath the dripline of trees to be retained the ground is to be protected by way of an elevated timber platform supported clear of the ground on horizontal timber planks or scaffolding.

7.0 PROTECTION OF ROCKS

Where rocks to be retained and protected are located outside of the line of Protective Fencing, place recycled carpet or carpet underlay over faces of rock outcrops to prevent mechanical damage or surface defacement by accidental spillage of paints, concrete etc.

Weight protective material temporarily with concrete blocks to prevent movement. Carpet may then be pegged into adjacent ground if this will not cover or damage vegetation. Fix into ground by means of U-shaped steel pegs, minimum 450mm long, as many as required to fix in place.

8.0 VEGETATION TO BE REMOVED

MARKING
Trees to be removed are to be marked with yellow spray paint on tree trunk approx. 1000mm above ground level. All other trees are to be retained for the duration of the works. **Do not confuse yellow spray paint with the yellow tape with tree identification number written on it.**
Trees to be retained are marked with green tape.
Trees to be retained and bonded are marked with both green tape and CAUTION tape.

REMOVAL
All felling, root removal and pruning is to be carried out in strict accordance with **Australian Standard AS4373 –Pruning of Amenity Trees** and **Occupational Health and Safety Act 2001.** The arborist should be fully insured. No tree or trees are to be removed or pruned unless written approval/permission is given by Council.

No work is to commence until all works as specified in Bush Management Plan as having to be done prior to construction are completed, ie translocation of tagged plants.

WORK ON TREES
If it is necessary to perform any work on trees to be retained, notify Superintendent.

REPAIR
Should existing trees to be retained be damaged by the works, make good any damage and undertake tree surgery. All work shall be carried out under the supervision of an approved tree surgeon.

REMOVAL
If repair work is impracticable, or is attempted and is rejected, remove the tree and root system if directed, make good, and either replace the tree with a replacement tree of the same species and similar size, or pay damages.

DAMAGES
If replacement is not approved, damages may be liable to be paid. Refer to the specific DA Conditions of Consent.

9.0 CLEARING AND GRUBBING

GENERAL
The work to be executed under this specification consists of the clearing of vegetation both living and dead, all man-made structures, all rubbish and other materials that are unsuitable for use in the works and the grubbing of trees and stumps, from the areas to be landscaped, unless otherwise noted on Landscape Plan. It does not include any work in any areas that are located behind the Protective Fencing, eg areas of bush revegetation or bush regeneration.
The work includes the disposal of all material that has been cleared and grubbed.
In advance of clearing works, effective erosion and sedimentation control measures shall be implemented as required, as per documentation by others.

CLEARING
The area to be cleared is defined as being enclosed by the line of Protective Fencing shown on the drawings, (generally incorporating the building footprint, an area adjacent to the building footprint for construction access, and an area to the north of the footprint). All operations shall be planned, and protective measures to be taken as itemised elsewhere in this specification, to ensure that there is no damage to trees and vegetation outside the approved limits of clearing.

GRUBBING
All trees and stumps within the limits of clearing, that are unable to be felled and removed by the clearing methods used by the Contractor without threatening to, or directly damaging trees or tree root systems of trees to be retained, shall be removed by use of a manually portable stump grinder. Grubbing operations are to be carried out to a depth of 500mm below the natural surface. Promptly backfill grubbed holes with inert sand where the hole is located in an area subject to landscaping.

DISPOSAL OF MATERIALS
Unless otherwise specified, all materials cleared and grubbed shall become the property of the Contractor and shall be removed from the site, and disposed of in an approved manner. Vegetation and other waste shall not be burnt. **Note that leaf litter mulch may be able to be made from removed trees**. Refer Mulch.

10.0 SOILS

GENERAL
Where existing soil quantity or quality is insufficient use imported topsoil and subsoil.

SOIL DEPTH
Minimum total soil depth for areas to be turfed to be 400mm, being min. depth 100mm of subsoil and min. depth 300mm of topsoil.
Minimum total soil depth for areas where shrubs and trees are to be planted to be 500mm, being min. depth 200mm of subsoil and min. depth 300mm of topsoil.

DEFINITIONS
Imported Topsoil
Soil and compost or other additives defined as loamy sand or equivalent which complies generally with the texture classifications and typical uses of AS 4419 and thoroughly mixed before placing.
To contain approximately:
80% crushed Hawkesbury Sandstone, gap-graded to replicate a well-structured natural soil (free from soluble salts, neutral pH),
20% Nutrihumus Compost (aged, no toxins, free from seeds and reproductive parts of weeds)

The product is to be equivalent to Benedict SmartMix No 6, W117, Native Garden Mix. Refer Technical Data Sheet in Appendix.

Soil shall comply generally with the texture classifications and typical uses of AS4419 and be free from unwanted matter such as:
Stones over 75mm diameter,
Clay lumps over 75mm diameter,
Weeds,
and tree roots greater than 75mm in size.

Imported Subsoil
To contain approximately:
40% crushed Hawkesbury Sandstone,
60% washed medium sand,
Organic content of subsoil mix to be <1% by mass.
<10mm graded, silt and clay content maximum 15%.

The product is to be equivalent to Benedict Subsoil Mix W110.

11.0 SOIL PREPARATION AND SUBSOIL DRAINAGE

11.1 SUBSOIL

PREPARATION
Remove all weeds, roots, builders rubbish and other debris.

EXCAVATION
Excavate to bring subsoil to a minimum of 300mm below finished design levels. Shape the subsoil to fall to subsoil drains where applicable. Break up

the newly excavated subsoil surface to a further depth of 100mm. Should the subsoil base be rock, excavate rock as necessary to ensure adequate drainage.

CULTIVATION
Cultivate subsoil to all grass and planting areas ongrade to a depth of 100mm. Do not disturb services or tree roots, if necessary cultivate these areas by hand. During cultivation thoroughly mix in any materials required by testing, eg gypsum. Hand-cultivate within 300mm of structures. Trim the surface to required levels after cultivation.

IMPORTED SUBSOIL
Where required, place imported subsoil to required depths to finish 300mm below finished design levels.

11.2 SUBSOIL DRAINAGE

REQUIREMENT
Install subsoil drains where required to intercept ground water seepage and prevent surface water build-up. Connect subsoil drains to surface drains or to stormwater drainage system as applicable. All retaining walls are to be provided with subsurface drains located behind walls.

MATERIALS
Drainage line shall be perforated plastic piping 100mm diameter, with geofabric sock. Joints, couplings, elbows, tees and end plugs shall conform to manufacturer's specification.
Sand shall be clean, coarse, washed river sand, free from deleterious material.
Filter fabric shall be to AS 3705 and be either, or equivalent to Terram 700 by Nylex Co Pty Ltd or Propex 4545 by Humes Concrete.
Drainage aggregate shall be 20mm blue metal.

INSTALLATION
Subsoil drains shall be installed to the rear of all retaining walls and excavated to the required line and depth, providing clearance for laying and jointing of pipes (approx. 200mm wide trench). Grade of trench behind wall to be approx 1:100. Lay pipes to the required line and grade, bedded with drainage aggregate, connect pipes to stormwater and backfill with drainage aggregate to within 300mm of surface. The top 300mm shall be sandy topsoil.

11.3 SITE TOPSOIL

Where existing soil horizon is unaffected by building works, and there is no requirement to preserve existing vegetation, cultivate topsoil by hand to a depth of 300mm.

Where landscaping works require alterations to levels, use **imported topsoil** as defined in SOILS.

INSTALLATION
Install 300mm depth of topsoil over prepared subsoil (refer SUBSOILS). Compact lightly and uniformly in 150mm layers. Prevent areas of excess compaction from being caused by construction machinery or traffic.

The finished topsoil surface should be:

- At design levels,
- Smooth and free from lumps of stone or soil,
- Graded to freely drain, without ponding, to catchment points,
- Graded evenly into adjoining ground surfaces and,
- Ready for planting.

CONTAMINATION
Where diesel oil, cement, paint or other phytotoxic material has been spilt on the topsoil, excavate the contaminated soil and dispose of it offsite. Replace with appropriate topsoil to required levels.

12.0 BRICK-ON-EDGE GARDEN EDGING

LOCATION
As per Landscape Plan where a junction between garden beds and lawn, or between gravel areas and lawn is shown.

MATERIALS
Bricks shall be clay pressed building brick commons laid on edge in a running bond on a 1:1:6 mortar haunch with 3mm maximum joints, struck flush. The edge shall be evenly aligned and free from dips, humps and bends. Acid wash mortar from visible surfaces on completion.

13.0 PLANTS AND PLANTING

SCOPE
Provide and install plants to garden beds and other areas as per Landscape Plan.

GENERAL REQUIREMENTS
Supply plants which:

- have well formed, healthy root systems, with no evidence of girdling, restriction or damage
- are vigorous, well established and true-to-type
- are of good form, and have foliage size, texture and colour consistent with that shown in healthy specimens of the species
- have pests or diseases to less than 10% of the foliage, such that potential for long term success of the plant is not affected
- shrubs or small trees are self-supporting unstaked
- comply with the recommendations of AS 4373
- are hardened off, not soft or forced, and suitable for planting in the natural climatic conditions of the site
- trees, unless specified to be multi-stemmed, to have single leader, the terminal shoot should be healthy

SUBSTITUTIONS
Make no substitutions. Contractor must apply in writing to the Superintendent with available substitutions for approval.

LABELLING
At least one plant of each species or cultivar in a batch should have a readable tag.

REPLACEMENTS
Replace any plants that are damaged or fail under the terms of the Contract, with plants of the same type, quality and size.

STORAGE
Plants should be delivered on a day-to-day basis, and planted immediately. Do not store plants on site unless authorised.

LOCATIONS
Do not vary the locations from those indicated. Should the need arise to vary for any reason, eg to avoid service lines, apply for directions to the Superintendent.

PLANTING CONDITIONS
Do not plant in extreme cold, heat, wind or rain.

PLANTING
Dig planting hole to twice the diameter of the root ball and at least 100mm deeper than the root ball. Do not dig the holes into clay subsoil where there is no free drainage. Roughen the sides of the planting hole. Remove pot and place the root ball into the hole, keeping the soil level at the base of the stem equal to the finished level of the garden bed topsoil. Backfill with topsoil from planting hole, do not compact. Create watering saucer with backfill to minimum 200mm diameter around base of plant.

WATERING
Thoroughly water plants in containers immediately before planting and immediately after planting. Maintain stress-free growth rates of the plant with watering as required.

FERTILISING
Provide Aboska Native Plant Food, N(8):P(1):K(5), or product with similar N:P:K ratio, suitable for use on native plants. Place fertiliser pellets around the plants on the soil at the time of planting, before the mulch is laid, to manufacturer's recommended dose (50g/sq. metre for sandy soils).

STAKES AND TIES
Install timber stakes and hessian ties to shrubs and trees with Superintendent's approval only if it is deemed not sufficiently self-supporting, or if it is in an area of high traffic. Stakes and ties to be regularly checked and removed as soon as tree is self-supporting.

14.0 MULCH

SCOPE
Mulch all garden beds in landscaped areas as shown on Landscape Plan. Refer to Bush Management Plan for mulching in revegetation and regeneration areas.

REQUIREMENTS
Generally, use mulch that conforms to AS 4454, that is free of deleterious material such as soils, weeds, sticks and stones.

MATERIAL
Leaf Litter Mulch
Leaf mulch processed from native trees, to pieces not larger than 75 x 50 x 15mm. Mulch to be free of weed species such as Privet, Camphor Laurel, Coral Tree.
Gravel Mulch
Gravel mulch to be 10 – 20mm graded quartz or river pebbles, no fines.

PLACING
Spread evenly to thickness nominated, after planting and fertilising. Leaf litter mulch to be placed to a thickness of 75mm. Gravel mulch to be placed to a thickness of 50mm. Ensure that mulch is not placed in contact with plant stems. Apply mulch to all bare soil so that after settling it is smooth and evenly graded between design surface levels, and flush with adjacent finished levels of paving, etc.
Note that gravel mulch where indicated as path surface on plan is to be laid over uncompacted soil for water and air permeability.

15.0 IRRIGATION

GENERAL
Manual or automatic irrigation systems are not to be installed. Watering to establish plants is to be by hand, and is to be undertaken by the contractor. The contractor is to ensure that water supply of suitable pressure is available at the time of planting and throughout the Plant Establishment Period.

WATERING
From the time of planting, and throughout the first six (6) months of plant establishment, all newly planted areas, including lawn areas, are to receive a minimum of one (1) complete watering per week, so that soil is soaked to a depth of 150mm, irrespective of natural rainfall. NOTE: Should it be observed that the plants are under stress, ie if the planting works occur in the summer months, a once-weekly watering as described may not be adequate to maintain healthy plants. The contractor shall be responsible for adjusting the frequency of watering required to maintain healthy plant growth.

16.0 ESTABLISHMENT AND MAINTENANCE

GENERAL
The contractor shall maintain the contract areas for a set period after the date of Practical Completion, with any maintenance of the works prior to the date of Practical Completion not to be included as part of this period.

PRACTICAL COMPLETION
Practical Completion of all works shall include, but not be limited to, the installation of soils and subsoil drainage, of establishment of turfed areas and

garden areas, replacement of plants that have failed and/or died, been damaged or stolen during the Contract.

PLANTING ESTABLISHMENT PERIOD
Twenty six (26) weeks. Throughout the Planting Establishment Period, the Contractor is to continue to carry out recurrent works of a maintenance nature including, but not limited to, watering, mowing, weeding, rubbish removal, fertilising, pest and disease control, returfing, staking and tying, replanting, topping-up mulch, cultivation, pruning, hedge clipping, aerating, renovating, top dressing, and keeping the site neat and tidy.

DEFECTS LIABILITY PERIOD
The Contractor shall be liable for defects for all works undertaken within this contract for a period of twenty six (26) weeks to run after the date of Practical Completion, to run concurrently with the nominated Plant Establishment Period.

MAINTENANCE LOGBOOK
The Contractor is to supply a maintenance logbook, to include a proposed maintenance program, and record what has been done and what materials, including toxic materials have been used, and when.

PLANTING
The Contractor is to continue to ensure that the general appearance and presentation of the landscape and the quality of the plant material at date of Practical Completion is maintained for the full Planting Establishment Period.
Existing planting: Where existing planting is within the landscape contract area, maintain it as if for new planting.
Replacements: Continue to replace failed, dead and/or damaged plants at minimum 2 to 3 week intervals as necessary throughout the Plant Establishment Period.
Pruning: Pruning of shrubs will be required during Spring and may be necessary at other times of the year. Pruning should reflect the natural growth, flowering habits and regrowth habit of individual species. Refer to Landscape Plan for intent of hedging and other specialised pruning requirements. Generally prune shrubs after flowering.
Generally trees are to be pruned to remove diseased or damaged growth, rubbing branches, or to be directionally or formatively pruned. Work on trees, even young trees, should be performed by an experienced horticulturist/arborist/tree surgeon with advanced knowledge of trees. Young trees that are showing signs of unhealthy or poor development, or are damaged (for instance damage to terminal leader, development of included bark at branch junctions, or damage at root crown) should be replaced while young. Good initial stock selection is vital to help avoid these and other problems. No topping, lopping, flush cuts or overthinning to be performed.

FERTILISING
Fertilising should be done at periods as indicated by soil testing results and in response to plant performance. Soil should be tested every two years, more frequently if conditions require it or where specific problems exist. Generally, a twelve-month all-purpose slow release fertiliser of N:P:K ratio appropriate to the plant material may be applied at manufacturer's recommended rates, normally in early Spring.

PEST AND DISEASE CONTROL
The Contractor shall be responsible for control of any pest or disease which may affect plants or turf. Correct identification and treatment will be required, with strict adherence to manufacturer's recommended rates, and safe handling and application practices.

STAKES AND TIES
Adjust stakes and ties where necessary. Remove stakes and ties when plants are sufficiently robust, or if stakes and ties have been provided as protection measures, when the protection is no longer required.

WEEDING
Remove all weed growth by hand or spray with approved herbicide throughout all planting and mulched areas. Execute regularly, minimum monthly intervals. Vigorous ground covers to be maintained 200mm away from the base of any shrub or tree.

RUBBISH REMOVAL
Any bottles, papers, etc shall be removed from site.

LEAF LITTER
Leaf litter shall be removed from turf and pavement areas and re-distributed over mulched garden beds.

MULCHED AREAS
Depth of shall be inspected and maintained at approx. 75mm cover to ensure weed suppression. Keep mulch away from base of plants.

DRAINS
Drainage structures shall be inspected and cleaned out at minimum six-monthly intervals to ensure that they are in proper working order.

WATERING
From the time of planting, and throughout the six (6) months of plant establishment, all newly planted areas, including lawn areas, are to receive a minimum of one (1) complete watering per week, so that soil is soaked to a depth of 150mm, irrespective of natural rainfall. NOTE: Should it be observed that the plants are under stress, ie if the planting works occur in the summer months, a once-weekly watering as described may not be adequate to maintain healthy plants. The contractor shall be responsible for adjusting the frequency of watering required to maintain healthy plant growth.

BENEDICT

Benedict *SmartMix*™ No. 6 Native Garden Mix

Product Code (s): W117 (N/MIX)
Source: Belrose

Description: A well balanced mix based on a minus 25mm gap graded Hawkesbury sandstone. Low phosphorous and good drainage makes this ideal for most native plantings. Fertiliser additions will improve the suitability of this mix for exotic plants.

80% Crushed Hawkesbury Sandstone
20% Nutrihumus Compost

Uses: W117 is designed to meet the needs of phosphorous sensitive plants preferring a low pH. The high permeability makes this mix suitable for both on-grade and slab applications.

Benefits:

- gap graded sandstone replicates a well structured natural soil.
- sandstone to sandstone contact buffers the soil mix from excessive compaction.
- high porosity allows for easy root expansion, good aeration and drainage.

Handling/ Transport/ Storage: Native Garden Mix is a gap-graded blend. It is important that the mix is well turned prior to placement. There may be some particle segregation if the mix is allowed to dry out. Install at a maximum depth of 300mm in lifts not exceeding 200mm. Where planter depth

Native Garden Mix (cont.)

Handling/ Transport/ Storage: (cont.)

exceeds 300mm, we recommend a sub-soil mix such as our W110 (40% crushed sandstone : 60% washed medium sand) be installed. The organic matter content of this sub-soil mix should be <1% by mass

Characteristics: (a)Chemical Properties:

	Result	Ideal Range
pH in water (1:2)	5.8	5.0 - 6.0
pH in CaCl (1:2)	5.5	5.0 - 6.0
Electrical conductivity	0.17mS/cm	

Soluble Cations	mg/kg	% ECEC	Ideal Range
Sodium	34.5	7.35	<5
Potassium	70.2	6.97	5 - 15
Calcium	154.0	58.17	60 - 75
Magnesium	46.7	18.4	5 - 25
Calcium:magnesium ratio	3.3	-	3 - 6

Nutrient	mg/kg	Ideal Range
Phosphate	7.23	10 - 50
Ammonium	5.15	<100
Nitrate	3.55	<100
Sulphate	19.85	>40<100

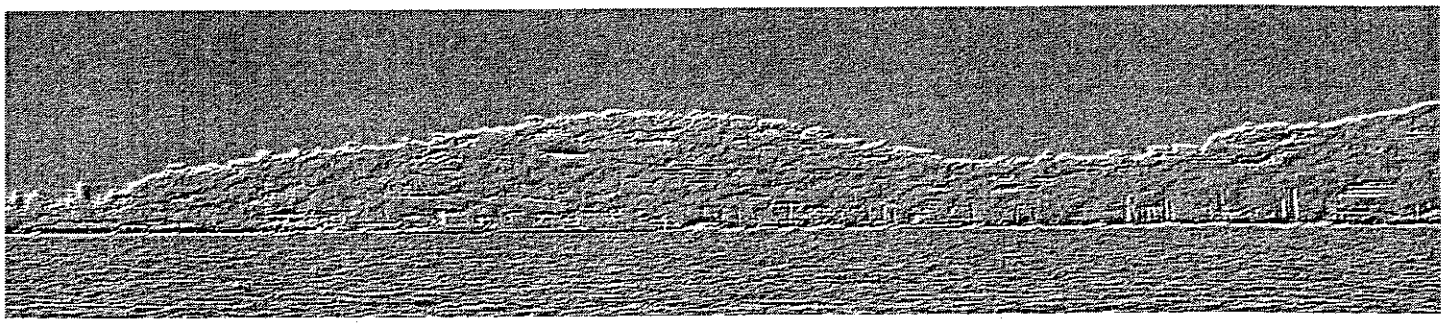
Characteristics: (b) Physical Properties

	Result	Ideal Range
Permeability	27cm/hour	2 - 80cm/hour
Water holding capacity	40 to 45%	
Air filled porosity	18 to 23%	
Organic matter (% by mass)	13.23	5 - 15%

Alternative Products: See BS133, W13, R111, R101

Technical Enquiries:

BENEDICT SAND & GRAVEL
PH: 02 99863500 FAX: 02 99863555
CONTACT: MURRAY FRASER BSc(Ag)



CONSTRUCTION MANAGEMENT PLAN
for
HOUSE 3
OBSERVATION POINT
at
1148-1152 Barrenjoey Road
56 Palm Beach Road
Palm Beach

CONTENTS

Revision History

Revision	Date	Comment
Draft	23 August 2002	Draft issued for comment
0	24 September 2002	Issued to Client
A	19 November 2002	Issued for Council submission
B	20 September 2004	Issued for House 3

1.0 INTRODUCTION

1.1 Purpose

The following Construction Management Plan (CMP) has been prepared by the owner Raypond Pty Ltd. It is provided at the request of Council and sets out the approach for the management of the works for the erection of A dwellings at 1148 – 1152 Barrenjoey Road, and 56 Palm Beach Road, Palm Beach.

This plan is proposed to satisfy Condition B4 of Development Consent No.N1233/00 dated 24 January 2002 which grants approval for the construction of a dwelling at 1148 Barrenjoey Road Palm Beach.

The plan will outline other documents to be considered and implemented in conjunction with this plan, the sequence of works, and material delivery, handling and storage.

A further Construction Management Plan shall be developed by the successful building contractor, in consultation with Council and/or the independent certifier.

1.2 Controls

The following documents have been considered in the preparation of this construction management plan;

- Bushland Management Plan (Dated September 2004) by Footprint Green
- Geotechnical Report (December 2000) by Shirley Engineering
- Geotechnical Site Investigation Report (29 July 2002) by Shirley Engineering
- Approved DA Consent No. N1233/00 to be issued by Pittwater Council on 24 January 2002.
- Landscape Works Specification (Dated September 2004) by Selena Hannan Landscape Design
- Hydraulic Engineers temporary & permanent stormwater drainage works by Northern Beaches Engineers.
- Hydraulic Engineers Soil & Erosion Control Plan by Northern Beaches Engineers.
- Civil drawings by Northern Beaches Engineers.
- Sewerage diagram by Michael Bell & Partners.
- Architectural Drawings prepared by Crone Associates.

1.3 Final Setout Plan

The final setout plan is attached in Appendix 1.

2.0 STAGING

2.1 Sequence

Site establishment will require final surveying and identification of trees to be removed and the erection of all exclusion fencing of areas to remain undisturbed during the works. The site appointed arborist shall certify the erection of the protective fencing prior to the commencement of any other works.

Site procurement works shall be undertaken such as the provision of a site shed for staff, an ablution block and temporary power. The location of these facilities shall be in accordance with the plan to be prepared by the successful tenderer and submitted to Council prior to commencement of works.

Existing services shall be surveyed to determine if any services diversions are to occur to facilitate the proposed works. Any service diversion works shall be programmed as a specific task and where possible and practicable shall be undertaken prior to the commencement of any other works. Disruption to services shall be kept to a minimum and where necessary as a last resort temporary services shall be provided to maintain the provision of the utility.

The construction of the driveway including the associated earthworks will be the first stage of the works and will be used for the main point of access during construction.

2.2 Construction Programme

The successful contractor shall provided a detailed construction programme that shall identify time allocation to each task involved in this process and the sequencing of the tasks.

2.3 Construction Methodology Statement

A detailed Construction Methodology Statement shall be provided by the successful contractor that shall stipulate the process involved in each task.

2.4 Construction Working Hours

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 Sunday or Public Holidays.

Construction works to the public road shall be undertaken outside peak traffic periods and in strict accordance with the requirements of the Roads & Traffic Authority requirements.

3.0 MATERIALS – DELIVERY AND HANDLING

3.1 Site Access

All suppliers and subcontractors shall be notified of the intended route for offsite and onsite traffic. The supply of materials to the site shall be strictly controlled to minimize the storage.

Materials will generally be delivered via the driveway access from Palm Beach Road. All vehicular traffic is to enter & leave the site in a forward direction, with the exception of heavy delivery vehicles and during initial excavation phase. The construction access to the site shall be via the approved driveway only.

A temporary concrete pump shall be located just beyond the driveway widening when required allowing concrete trucks to reverse from Palm Beach Road into the driveway crossing.

Other materials can be unloaded in a similar manner with delivery vehicles reversing into the base of the driveway. All delivery vehicles shall be co-ordinated with the site manager. Traffic management strategies shall be implemented during the delivery of heavy materials or concrete that would require reversing onto the site. Queuing of delivery vehicles shall not be permitted within 100m of the intersection between Palm Beach Road & Barrenjoey Road.

All vehicles leaving the site shall have any clay or debris removed from the wheels in accordance with the Erosion & Sediment Management Plan.

3.2 Materials Storage & Handling

Three options to move the materials up the site exist and the successful tender will confirm their preferred option. (alternatively any other low impact method proposed by a successful contractor)

These options include the use of a small utility to run materials up and down the driveway, the usage of four wheel ride-on front loading wheel borrows, or the erection of a lightweight boom crane positioned near house 2 to lift materials from the delivery location and place them directly on the individual driveway zones in front of each dwelling proposed for materials holding.

As described it is proposed to store materials on the individual driveway crossing for each dwelling, and later in the garages of each dwelling. This process is to be confirmed by the successful contractor.

No storage of building materials, waste, excavated fill or topsoil storage shall occur within the drip line of trees. All storage of materials shall occur within the designated locations. The site manager shall be responsible to supervise and enforce this requirement.

3.3 Site Shed & Facilities

The site shed shall be positioned on the existing disturbed zone at the top of the driveway during the construction of the driveway or any other location as set out on drawing required by Section 2.1 of this report. Site toilets shall be provided between dwellings 2 – 3 and one between dwellings 1 – 4 at the edge of driveway and within identified disturbance zones.

3.4 Contractor Parking

There will be opportunity for contractors to use the proposed visitor spaces and available space on the driveway crossing outside each dwelling not used for materials storage. Parking opportunities also exists further along Palm Beach Road and down at the community carpark approximately 150m from the site.

Due to the complex nature of the site, sub-contractors will be strategically co-ordinated on site, potentially limiting numbers on site, thus minimising impact of tradesmen's vehicles. Most should be accommodated on site.

4.0 SITE RESPONSIBILITY

The following people have responsibility for the effective implement the Construction Management Plan;

Applicant	Company:	Raypond Pty Ltd
	Contact:	Darren Leete
	Address;	PO Box 1364
	Numbers	0412 226 044
		Fx 9944 0316

Architect	Company:	Crone Nation Architects
	Contact:	Simon Thorne
	Address:	Level 2, 364 Kent Street, Sydney NSW 2000
	Numbers:	Ph 8295 5300
		Fx 8295 5301
Structural Engineer	Company:	NBC
	Contact:	Rick Wray
	Address;	207/30 Fisher Road, Dee Why NSW 2099
	Numbers	Ph 9984 7000
		Fx 9984 7444
Geotechnical Engineer For Works	Company:	Douglas & Partners
	Contact:	John Braybrooke
	Address;	96 Hermitage Road West Ryde NSW 2144
	Numbers	Ph 9809 0666
		Fx 9809 4095
Arborist	Company:	Urban Forestry Australia
	Contact:	Catronia Mackenzie
	Address;	PO BOX 151, Newport NSW 2106
	Numbers	Ph 9918 9833
		Fx 9918 9844
Traffic Consultant	Company:	John Hewitt Traffic Planning Assoc
	Contact:	John Hewitt
	Address;	7 Vincent Pl, Davidson NSW 2085
	Numbers	Ph 9451 2629
		Fx 9453 3349
Traffic Management Consultant	Company:	HVS Services
	Contact:	Bill Ralston
	Address;	11 Arkley St Bankstown NSW 2200
	Numbers	Ph 9790 5077
		Fx 9790 6799

Environ Consultant	Company:	Footprint Green
	Contact:	Mark Couston
	Address;	5 Watkins Road, Avalon NSW 2107
	Numbers	Ph 9918 8877
		Fx 9918 8876
Driveway Contractor	Company:	To be advised
	Contact:	XXXXXXXXX
	Address;	XXXXXXXXXXXXXXX
	Numbers	XXXXXXXXX
		XXXXXXXXX
Driveway Contractor (Site Manager)	Company:	To be advised
	Contact:	XXXXXXXXX
	Address;	XXXXXXXXXXXXXXX
	Numbers	XXXXXXXXX
		XXXXXXXXX
Building Contractor	Company:	To be advised
	Contact:	XXXXXXXXX
	Address;	XXXXXXXXXXXXXXX
	Numbers	XXXXXXXXX
		XXXXXXXXX
Building Contractor (Site Manager)	Company:	To be advised
	Contact:	XXXXXXXXX
	Address;	XXXXXXXXXXXXXXX
	Numbers	XXXXXXXXX
		XXXXXXXXX
Authority	Company:	Pittwater Council
	Contact:	John Raven
	Address;	9, 11 & 12/5 Vuko Pl, Warriewood NSW 2102
	Numbers	Ph 9970 1111
		Fx 9970 7150
Roads	Company:	RTA
	Contact:	Lyn Van Putten
	Address;	PO Box 558, Blacktown NSW 2148
	Numbers	Ph 9672 2536
		Fx 9831 0932

Accredited Certifier	Company:	City Plan Services
	Contact:	Brendan Bennett
	Address;	Level 1, 364 Kent St, Sydney NSW 2000
	Numbers	Ph 8270 3500
		Fx 8270 3501

5.0 SAFETY PROCEDURES

5.1 Emergency Procedure

The Site Manager shall be responsible for implementation of the Site Emergency Procedure.

- Appropriate first aid supplies shall be kept on site within the site shed.
- All accidents and near accidents shall be reported.

Ambulance / Police / Fire Brigades 000	**Workcover Authority 9370 5029**
Pittwater Council (Environ Officer) 9970 1111	**State Emergency Services 9517 1107**
EPA 13 15 55	**Poisons Information Centre 13 11 26**
Sydney Water 13 30 90	**Energy Australia 13 13 88**
AGL 13 19 09	

5.2 Site Hoarding / Barricade

The site shall be secured from the public by the erection of a Type A hoarding or equivalent for the staging and location of works. An application for the approval of a hoarding shall be lodged with Council prior to the commencement of work.

The works on the public road are to be suitable barricaded to protect the public. A detailed Pedestrian & Traffic Management Plan Shall be prepared and implemented. RTA approval is to be obtained where required. (See Appendix 3)

6.0 OPERATIONAL MATTERS

6.1 Legislative Requirements

The construction team shall be aware of their legislative requirements in respect to the follow legislation and any other relevant legislative requirements.

General NSW Legislation

- Environmental Planning & Assessment Act 1979
- Heritage Act 1977
- Local Government Act 1993
- Occupational Health & Safety Act 1983
- Soil Conservation Act 1983

NSW Environmental Legislation

- Environmentally Hazardous Chemicals Act 1985
- Protection of the Environment Administrations Act 1991
- Protection of the Environment Operations Act 1997
- Resources & Recovery Act 2001

Regulations

- Environmentally Hazardous Chemicals Regulation 1994
- Protection of the Environment Administrations Regulation 1997
- Protection of the Environment Operations (General) Regulation 1998
- Protection of the Environment Operations (Amendments & Repeals) Regulation 1998
- Protection of the Environment Operations (Amendment) Regulation 1999
- Protection of the Environment Operations (Further Amendment) Regulation 1998
-

6.2 Water

Objectives

- To ensure water pollution is not caused by construction activities;
- To develop preventative measures to mitigate water pollution during construction activities;
- To minimize generation of contaminated stormwater;
- To appropriately dispose of excess water pooling on the site, particularly in the excavated areas.

Responsibility; Site Manager & Site Team

Procedures

6.2.1 Implement the Erosion & Sediment Management Plan on site before the commencement of any works

6.2.2 Implement the recommendations of the Hydraulic Engineer on site to minimize stormwater run-off.

6.2.3 Differential between clean & dirty stormwater.

6.2.4 Temporary stormwater management system will be installed before land disturbance activities commence. Divert upstream clean stormwater from the works area as much as possible.

6.2.5 Sweep the roads and footpaths every day before finishing work. Do not hose down footpaths and roads. Do not allow silt laden stormwater to escape and pollute surface water.

6.2.6 Conduct routine site inspections to review the effectiveness of protection measures.

6.3 Air

Objectives

- To manage construction activities so as not to prejudice air quality;
- To ensure no health risk or environmental risk occurs due to emission of exhaust gases, fumes or dust.

Responsibility; Site Manager & Site Team

Procedures

6.3.1 All construction plant & equipment with access to the site will be properly maintained.

6.3.2 Mufflers, plant and machinery will be in good working order.

6.3.3 Equipment emitting visible smoke for longer than 10 seconds while operational on site will be taken out of service and corrected to ensure smoke is no longer visible in accordance with the EPA Guidelines.

6.3.4 Trucks transporting materials to & from the site, such as soil, will be covered and tailgates secured.

6.3.5 There will be no incineration or open burning on site of waste materials.

6.3.6 Prompt action will be taken to extinguish fires.

6.3.7 Water spray or dust retardant will be used on exposed areas to prevent dust lift off.

6.3.8 All endeavours will be used to ensure the use of materials of a non-toxic nature

6.4 Noise & Vibration

Objectives

- Ground vibrations as a result of construction activities will not exceed the objectives of relevant legislation; and Construction and demolition activities will not cause undue or annoyance, and will comply with time limitations imposed by the relevant authorities.;

Responsibility; Site Manager & Site Team

Procedures

6.4.1 No demolition or construction noise should be discernible from a habitable room of a sensitive use between 10pm and 7am Monday to Sunday.

6.4.2 Activities that cause a nuisance to noise sensitive activities will not occur outside the approved work hours for the site.

6.4.3 If noise emitting activities are likely to happen in sensitive areas, noise monitoring devices will be used to measure db levels emitted.

6.4.4 Only silenced air compressors with noise cables attached indicating L(A) maximum sound pressure level not exceeding 75 db(A) will be used on site. Any equipment exceeding this level will be taken out of service and repaired before operating on site again.

6.4.5 During operation, if equipment is likely to cause excessive vibration, it will be monitored for vibration levels.

6.4.6 Rock breaking times will be limited to comply with the consent.

6.4.7 Where vibration is an issue consideration will be given to implementing a notification plan for nearby residents.

6.4.8 The road cut shall be undertaken strictly in accordance with the instructions provided within the geotechnical reports.

6.5 Waste Minimisation & Management

Objectives

- To reduce waste sent to landfill by reduction, redirection and management of waste materials. Waste can be avoided through design, reducing waste at the source, reusing waste both on and off site and to recycle waste on-site through separation.

Responsibility; Site Manager & Site Team

Procedures

6.5.1 Develop a waste minimization and management plan for the site.

6.5.2 Sub-contractors to develop a waste minimization plan for their scope of work. Sub-contractors will undertake as part of their contract to minimise the packaging they bring onto the site and to reuse off-cuts where possible.

6.5.3 Pallets and reels will be returned with reusable packaging to the suppliers.

6.5.4 Stockpile materials (clean fill) on site will be reused for back fill or landscaping as approved by the consent. NB: Stockpiles are to be restricted in accordance with the Geotechnical Report and Bushland Management Plan.

6.5.5 Supplies and deliveries will be monitored to reduce overestimating.

6.6 Excavation

Bulk excavation of the driveway shall be carried out under the direct supervision of the Geotechnical Engineer and shall be undertaken in strict accordance with the requirements of the Geotechnical Report and the Construction Methodology Statement.

The successful tenderer shall identify duration of the excavation and the average volume of material that will need to be removed each day. Some material may be retained on site and be stored in an approved location for backfilling of the building platforms. All other material shall be removed to an approved landfill site. Details of the approved landfill site shall be provided to the Principal Certifying Authority prior to removal of any material from site.

No excavation shall commence until all environmental works including but not limited to vegetation exclusion fencing, weed removal, silt fences, stormwater management devices, silt fences etc have been install.

During excavation all necessary environmental controls will be carried out in accordance with the relevant EPA guidelines for the following;

- Site Plant
- Stormwater runoff
- Dust Generation
- Truck Movements

6.7 Archeological Relics

All works shall cease immediately if any Aboriginal Engravings or Relics are unearthed during the excavation works. The Metropolitan Local Aboriginal Land Council (MLALC) and National Parks and Wildlife Services (NPWS) are to be contacted immediately.

7.0 CONCLUSION

This Construction Management Plan has been prepared to confirm a viable set of options existing for the management and co-ordination of the works and handling of materials as part of the works. The Construction Management Plan will be developed prior to application for the Construction Certificate for the houses and in response to any conditions council impose as part of the development consent.

No works are to commence on site until the following documents have been lodged to the satisfaction of the private accredited certifier;

- Site shed & facilities plan
- Construction programme
- Detailed Construction Methodology Statement
- Details on dumping of materials

Bushland Management Plan

Observation Point

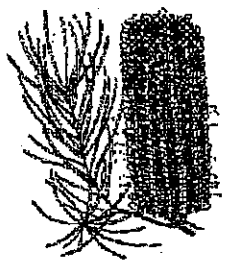
1148 – 1152 Barrenjoey Road, Palm Beach

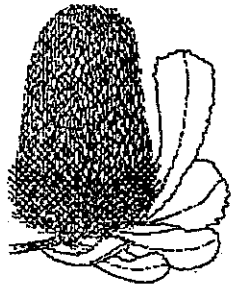
By

Nicholas Skelton, B. Sc. (Hons) M. App. Sc.
&
Tony Gilson, B. Env. Sc.

May 2003

Prepared for
Raypond Pty Ltd.
C/-P.O. Box 1364
Dee Why 2099





GIS Environmental Consultants
45 Austin Avenue, North Curl Curl 2099
Mobile Ph: 041 943 8672, Ph: (02) 9939 5129, Fax: 9401 715, Email: nicksk@mail.usyd.edu.au

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Status: Final
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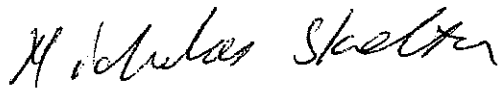


GIS Environmental Consultants
45 Austin Ave North Curl Curl NSW 2099
ABN 66 011 504 399
Phone: 9939 5129
Fax: 9401 0715
Mobile: 041 943 8672
Email: nick_skelton@bigpond.com

1. Contents

2. Acknowledgments and Responsibilities

This project was managed and the report was written by Nicholas Skelton (B. Sc. (Hons), M. App. Sc.), Director of GIS Environmental Consultants. Editorial assistance was provided by Tony Gilson, Ecologist, (B. Env. Sc.).

3. Qualifications and Experience of the Authors

Nicholas Skelton's formal qualifications include a Bachelor of Science with Honours (B. Sc. (Hons)) and a Masters in Applied Science (M. App. Sc.). Mr Skelton has been an environmental scientist for 14 years, a bush regenerator for 6 years and a landscaper for 4 years. This experience has been in the northern beaches area of Sydney working with the local soils, the climate of this area and the local indigenous plants and animals. This experience has led to an extensive knowledge of the environmental conditions, a deep understanding of the local ecology and the habitat requirements of the local native fauna.

Tony Gilson is a project officer for GIS Environmental Consultants, and has a Bachelor of Environmental Science from the University of Newcastle and a Bush Regeneration Certificate 2 from Ryde TAFE. Mr Gilson has been with GIS Environmental Consultant for 2 years, and is also an experienced bush regenerator of 2 years and a landscaper for 6 years.

4. Introduction

4.1 Background

This Bushland Management Plan has been prepared by GIS Environmental Consultants for Raypond Developments Pty Ltd. This report will be part of the Construction Certificate Application for a subdivision called Observation Point.

This report focuses on retaining, providing and improving habitat for the flora and fauna species that are known to occur at the site. These species have been identified by flora and fauna surveys conducted by Nicholas Skelton and Quintin Smith from GIS Environmental Consultants. The findings of the surveys and assessment of the impacts are recorded in a November 2000 report titled, "Flora and Fauna Impact Assessment for the Proposed Development at 1148 – 1152 Barrenjoey Road, Palm Beach".

The framework of this report has been approved and is described in the "Bushland Management Concept Plan" for this site by GIS Environmental Consultants (Skelton 2001). The Bushland Management Concept Plan was approved by Pittwater Council as part of the DA approval process.

Maps of the areas that are planned to be disturbed or built upon were provided by Crone Nation Architects and are listed in section 3.4.

This detailed Bushland Management Plan describes practical measures that can be taken to maintain and restore the native plant and animal habitat at 1148 – 1152 Barrenjoey Road, Palm Beach.

Pittwater Council's Development Control Plan 25 (Conservation of Biodiversity in Pittwater (DCP 25) requires a Bushland Management Plan to accompany the development applications where the property contains fragmented or core bushland or that may contain other environmental values. This site is within an area mapped in DCP 25 as fragmented. In accordance with this DCP, this report contains a 5 - year program for the regeneration/revegetation/restoration and management of the site, and a strategy for monitoring the success of the works.

Conditions B15 and B15a of the conditions of consent for the subdivision of the land require that this BMP report be prepared by a qualified person and approved by Council rather than certified. The conditions of consent list additional items that this report must address.

Three copies of this plan should be submitted to Council prior to the release of the Construction Certificate.

This report does not address the health or potential hazard of the mature trees on the site, as they are addressed in a separate arborists report (PSB 2002).

Pittwater has particularly high environmental value due to the naturally occurring scenic vegetation and the occurrence of several threatened plant and animal species, and one Endangered Ecological Community. These threatened species and ecological communities are described and protected by the Threatened Species Conservation Act 1995. This site however is not important habitat for any Threatened Species and does not contain any Endangered Ecological Communities.

4.2 Definitions

Throughout this report "threatened" refers to those species, populations or ecological communities listed on Schedules 1 and 2 of the Threatened Species Conservation Act, 1995 as "endangered" or "vulnerable". A "Noxious" weed is a species of plant listed in the Schedules of the Noxious Weeds Act 1993. "Protected Fauna" refers to any native bird, mammal (except the dingo), reptile or frog in NSW. Protected plant refers to the species listed in Schedule 13 of the NPWS Act 1974.

4.3 Aims of this Bushland Management Plan

- To assist in making the development and occupation of the property ecologically sustainable,
- To identify potential threats to the long term survival of the ecosystem including all the native plants and animals that may occur on the land
- To provide and maintain suitable habitat for native plants and animals that may use the property, with an emphasis on threatened species,
- To reduce degradation of the adjacent and downstream natural environment that may be caused by the development and construction process,
- To inform and educate the land owners and residents of measures to reduce environmental impact and provide habitat for native animals and plants. With better appreciation of the natural environment of the land, there will be increased appreciation of its value.
- To recommend a clear plan of environmental management actions for the next 5 years to achieve these aims,
- To set up a monitoring strategy to assess the success, or otherwise, and inform Council of the environmental management of the site, and
- To provide guidelines for the ongoing maintenance of environmental assets after the life of this plan

These aims will be achieved by the following management strategies:

- Minimising the impacts of the development proposal by reviewing the construction methods.
- Detailing a 5 year program of ecological regeneration, revegetation, restoration and bushland management of the site. This will include: the amount of effort needed, the required ecological qualifications and experience of the works supervisor, appropriate plantings, appropriate weed control methods and habitat restoration goals.
- Installing fauna roosting and nesting hollows and connectivity between trees where appropriate.
- Recommending the control of feral cats, dogs, foxes, Common Mynas, House Sparrows and other introduced and feral fauna.
- A strategy, including recording sheets and photo points, for monitoring and reporting back to Council the work undertaken, new species seen and a photographic record of the site.
- Providing information to the people living on the property about the environment they will be living in and to let the owners know about the valuable natural assets that occur on their land.

4.4 What is a Bushland Management Plan?

Bushland Management Plans describe the details of the environment protection measures that will be taken on a property during construction, as well as the environmental management that will be carried out on the property for at least the next 5 years. Bushland Management Plans are required to demonstrate how the bushland values of the site will be managed during and after development of the site. A Bushland Management Plan is required prior to the issue of a Construction Certificate.

Pittwater Council's DCP 25 contains a description of what a Bushland Management Plan needs to contain. The description in the DCP is brief and broad. It is written this way so it is flexible enough to cover a wide range of circumstances, from small driveway DAs to large-scale subdivision DAs. The scope of the plan that is required will be different for each DA and will depend on the findings of the flora and fauna survey. In part the scope of the plan may involve discussions between the developers, environmental consultant and the assigned Council environmental officer.

The Conditions of Consent also contain additional matters that must be addressed in the Bushland Management Plan, which are further described in conditions B15, B15a.

According to the DCP the Bushland Management Plan should address:

(1) Protection of retained native vegetation, habitat or other elements of biodiversity;

(2) Conservation of native flora and fauna;

(3) Domestic and feral animal control;

(4) Noxious and bushland weed control, follow up weeding and maintenance of the bushland on the site;

(5) The recommended fire regime for the ecology of the site;

(6) Soil management and drainage issues that impact on bushland;

(7) Planting of 80% locally indigenous plants; and

(8) Site management.

The Bushland Management Plan should also meet the recommendations of Planning New South Wales Guidelines for Preparing Management Plans for Urban Bushland. The Bushland Management Plan must be prepared by an appropriately qualified and practising bushland management consultant. This Bushland Management Plan meets all of the necessary requirements and has been written by an appropriately qualified and experienced consultant.

4.5 Legal Perspective

In addition to DCP 25, there are numerous federal, state and local legislative and planning instruments that describe how plants and animals must be managed on all land tenures (including private land).

Relevant laws include:

- Environmental Planning and Assessment Act 1979,
- Threatened Species Conservation Act 1995,
- Environment Protection and Biodiversity Conservation Act 1999,
- Noxious Weed Act 1993,
- Rural Fires Act 1997,
- National Parks and Wildlife Act 1974 and

- Native Vegetation Conservation Act 1997

Other relevant government controls, orders and policies include the; Protection of the Environment Operations Act 1997, NSW Biodiversity Strategy 1997, State Environment Planning Policies (in particular SEPP 44: Koala Habitat Protection Policy, SEPP 14: Wetlands Policy and SEPP 19: Bushland in Urban Areas Policy), Local Environment Plans and DCPs.

These legislative and planning instruments control clearing of land, eradication of weeds, regulation of bush fire fuel loads and harming native animals and plants or their habitat. Fines up to 2 million dollars and 5 years in jail can result from breaches.

Responsibility for the conservation of native plants and animals not only rests with Federal, State and Local government but also with private landholders. Private landholders are collectively the largest landholders and land managers of Sydney, NSW and Australia. Private landholders are required to actively carry out management of their land.

In general, Local Council is the initial enforcement agency with State and Federal agencies overseeing Councils actions especially for large-scale projects. Council's requirement for a Bushland Management Plan helps Council cover their own legal liability, and it also assists landholders meet their legal responsibilities in managing their land. With the implementation of an approved Management Plan the landholder is likely to be seen as a responsible land manager. There are also many practical advantages of having a management plan, outlined below.

4.6 Other Benefits of a Bushland Management Plan

Besides the legal benefits of having a Bushland Management Plan there are also many practical benefits such as:

- The control of weeds that cause medical problems such as asthma, skin irritations and allergies, poisoning, lice, ticks and other health problems,
- Management of bush fire hazards,
- Control of pest, exotic animals including foxes, rabbits, feral dogs, feral cats, rats, mice, sparrows, Common Mynas,
- Control of erosion by planting woody plants that stabilize the soil and prevent land slip and siltation,
- Improvement of the aesthetics of the site by providing a bush land environment for living in,
- Encouragement of colourful and educational native birds, insects, animals and flowers,
- Reduction of landscaping costs, eg the cost of maintaining native bushland is less than 1/10 the cost of maintaining a lawn or gardens,
- The satisfaction of knowing you are not adversely contributing to the extinction of species or degradation of the local environment,
- Provision of shade,
- Privacy screening from neighbours,
- Reduction of the visual impact for other local residents
- Wind protection, and
- Increase in the properties monetary value.

4.7 Description of the Study Site

4.7.1 The Property

The property is known as 1148-1152 Barrenjoey Rd (Lots 16, DP. 6746 and 17, DP. 651978) and 56 Palm Beach Rd (Lot 181 DP. 534139), Palm Beach. Together these form a property that is 5914 m^2 in size. The property is an irregular shape with a road frontage along the western edge and an access drive along the south-western edge.

4.7.2 Location

The property is located at Observation Point in the suburb of Palm Beach approximately 100 m north of the Palm Beach public jetty. The property has road frontage on both Palm Beach Road and Barrenjoey Road. The land is within 100 m of Pittwater and includes the crest of the ridge. The land generally slopes west to Pittwater. The sea is 300 m away to the east at Palm Beach. The AMG co-ordinates of the site are Easting 344055 and Northing 6281318.

4.7.3 The Study Site

The study site consists of the three existing lots, the immediately surrounding land and the Council controlled road reserve. Map 1 shows the study site.

4.7.4 Adjacent Land

The adjacent land to the north, east and south is privately owned and contains long established houses. Most of the houses have gardens that are dominated by exotic plants. To the west is a narrow road reserve, then Barrenjoey Road. On the other side of Barrenjoey Road is an escarpment that is subdivided into a row of developed urban lots that have the high tide mark of Pittwater as their western boundary.

4.7.5 Physical Environment of the Site

The property has a steep slope to the west. There is an existing house in the top of the property and a driveway and garage at the higher western end of the property. Much of the property is an old garden with some remnant native species and a patchy tree canopy of native trees. See Map 1. There are some small sandstone cliffs and some exposed sandstone floaters on the site. A detailed description of the physical environment of the site is in the Flora and Fauna Impact Assessment by Skelton and Smith (2000).

4.7.6 Plants and Animals on the Site

The plants, animals, ecological communities and habitats that occur on the site are described in the Flora and Fauna Impact Assessment by GIS Environmental Consultants (Skelton 2000). The plant species that occur on the site are also listed in Appendix C.

4.7.7 Noxious Weeds

There are 38 species declared Noxious Weeds in the Pittwater local government area. The more disturbed areas of the site contain 11 noxious weeds, 3 of which occur frequently and 1 of which is common on the site. This indicates that the site has a significant infestation of noxious weeds. The less disturbed areas contained 8 noxious weeds, one of, which was frequent.

4.8 The Proposed Development

The proposal addressed by this Bushland Management Plan is the sub-division of the 3 lots into 4 new lots, building of the driveway, and digging of trenches for connection of utilities. At a later date there will be a new house built on each of the new lots. The likely building envelopes of the subdivision and the 4 new dwellings are shown on Map 1.

4.8.1 Driveway

The proposed driveway runs along the southern boundary of the property through the road reserve and a driveway easement, then curves through the centre of the property. The alignment of the driveway is shown on Map 1.

The area that is likely to be disturbed by the construction of the driveway within the property is approximately1249 m^2. Due to the steep gradient of the site, the whole of the driveway will need to be made of concrete. The building of this drive will involve disturbance on the site and the road reserve, the amount of disturbance has been estimated by Crone Nation Architects and is shown on an earthworks map.

4.8.2 Houses

After subdivision and construction of the infrastructure there will be the construction for three of the houses and garages to be built on the escarpment that extends across the centre of the site at approximately at the 30m contour. The fourth house will be partially on the ridge at the top of the property. The area that will be disturbed by the house construction will be 1144 m^2. Information supplied by Crone Nation Architects and is based on the DA's Approved.(23 November 2000.)

4.8.3 Landscaping

The area that will be filled to create a landscaped area will be 102m^2 or 1.7% of the site. Extensive areas of the site are shown on the landscape plan to be retained as bushland or to be bush regenerated or revegetated, Details of the areas and other landscaping are shown on the landscape plans by Pittendrigh Shrinkfield & Bruce Pty Ltd.

4.8.4 Stabilisation of the Boulder

The large boulder that occurs on the high side of the existing driveway has been identified by Shirley Consulting Engineers are requiring stabilisation using bolting and a reinforced concrete block. Sketches SK20020925 and SK20020802A.

4.8.5 Gabion Wall

To prevent erosion when accessing the boulder area and access to make the drain at the top of the soldier wall the engineers have designed a Gabion wall. The location of the Gabion wall is shown on Sketch SK20020802A by Shirley Consulting Engineers.

4.8.6 Stormwater and Sewage Trenches

The location of the stormwater and sewage lines are now known and shown on a plan by Tierney Consulting engineers dated 15.10.02 drawing number 7531 C9 revision 3 and shown on a plan project No. 13701WW, by Michael Bell and Partners and submitted to Sydney Water dated 19/6/02.

4.8.7 Access for Machinery to Build Solider Wall and Drain

There will need to be an access path for heavy machinery to enable the construction of the soldier wall at the top of the embankment at the entry near Palm Beach Road.

There is planned to be a drain running along the top of the retaining wall.

5. Methods

5.1 Meetings and Discussions with Council Officers

Meetings were held and there has been several phone conversations with Council officers, the landowner, Engineers, Landscape Architects and Drilling Contractors to determine the details and modifications relevant to the Bushland Management Plan for the site.

5.2 Contribution to the Landscaping Plan

Meetings have been held, and there have been several phone conversations with the landscape architects (Pittendrigh, Shinkfield & Bruce), and list of local native species that are suitable for the site was supplied to the landscape designers to assist in providing appropriate habitat.

5.3 The Development Plans Used

The plans used in the preparation of this report are based on the following plans:

Landscape Plans for Houses 1 – 4 L03, L04, L05, L06 dated 25.05.01, Sub-Division Site set out dated 5.10.00 20006/ADAS0002, Revision D, and the Pre-construction Tree/vegetation Report Pittendrigh Shrinkfield & Bruce Pty Ltd.

The alignment of the sewerage is shown on a plan project No. 13701WW, by Michael Bell and Partners and submitted to Sydney Water dated 19/6/02 dated 19/6/02.

Concept Stabilisation Works Lower Access Drive to Development 1148-1152 Barrenjoey Road, Palm Beach. Shirley Consulting Engineers Pty Ltd. 26/10/00.

5.4 Zones Within the Site

The site can be divided into zones that reflect different (long term) usages, and will therefore require different management prior to, during and post construction.

5.4.1 Hard Surfaces

The areas of the site that are planned to be houses or driveway have an area of approximately 1696 m^2 of the site and are shown on Map1.

5.4.2 Landscaped Zones

Areas that are to be landscaped are the outdoor living space, areas adjacent to access paths or areas where there will be extensive earthworks. These areas will be designed by Pittendrigh Shrinkfield & Bruce Pty Ltd in detailed plans. These areas are intended to be maintained by landscapers/gardeners or horticulturists. The species used in these area will include many local endemic and propagated from local stock. Landscaping covers the area shown on Map1.

5.4.3 Revegetation Zones

Revegetation Zones have been allocated to a) areas where there is a canopy of native trees but an extensive infestation of weeds in the understorey or b) areas that are likely to be disturbed by earthworks during construction. These areas have been determined to have a low ecological resilience and will not be able to be returned to self-sustaining native bushland with out considerable effort. The aim of the revegetation zones will be to make these areas low maintenance in the long term and to provide habitat for the native animals and plants that occur in the area. Revegetation zones are shown on Map1. There is a need to plant some advanced screen trees in some parts of the bush revegetation area. The species will be either *Eucalyptus maculata, Eucalyptus punctata, Eucalyptus botriodies* or *Angophora costata* and they must be propagated from local (within 5 km of the site) stock. These trees will need at least 12 – 24 months to grow and should be grown immediately. The planting of these trees must be supervised by a environmental consultant or Council.

5.4.4 Bush Regeneration Zones

Bush Regeneration has been assigned to the parts of the site that have a relatively intact native vegetation cover that has a high ecological value and is resilient so it can be easily regenerated. The primary aim of bush regeneration is to retain and enhance the existing ecosystem, to allow it to be naturally self-sustaining. The structure and floristics of these areas is characteristic of the original vegetation. These areas will be fenced off during construction and heavy machinery will be prohibited from these areas. The native vegetation and habitat in these areas will be retained and weeded. Bush Regeneration zones are shown on Map1. There is a need to plant some advanced screen trees in some parts of the bush regeneration area. The species will be either *Eucalyptus maculata, Eucalyptus punctata, Eucalyptus botriodies* or *Angophora costata* and they must be propagated from local (within 5 km of the site) stock. These trees will need at least 12 – 24 months to grow and should be grown immediately. The planting of these trees must be supervised by a environmental consultant or Council.

Bushland Management Zones, Map 1.

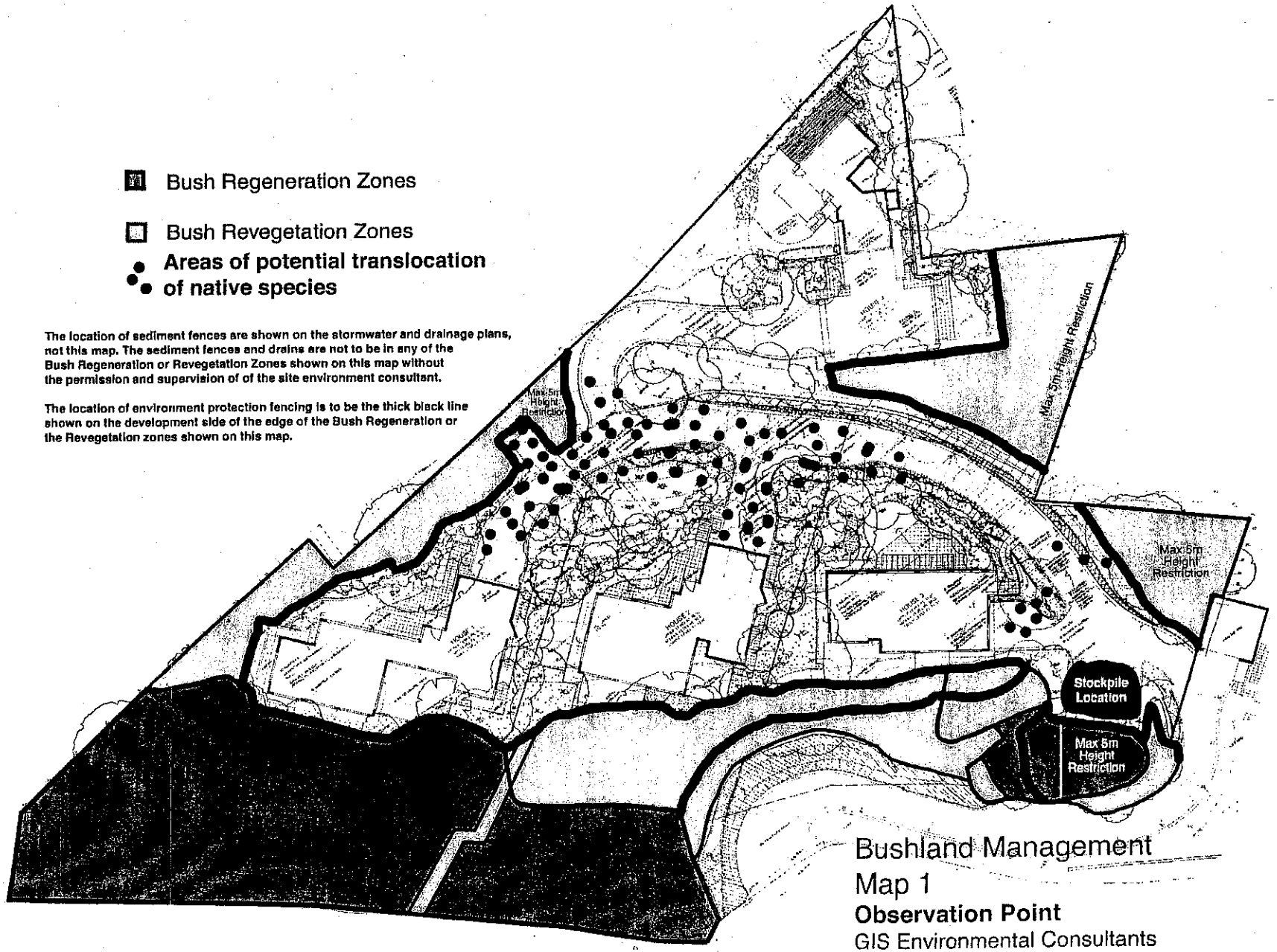
Bush Regeneration Zones

Bush Revegetation Zones

Areas of potential translocation of native species

The location of sediment fences are shown on the stormwater and drainage plans, not this map. The sediment fences and drains are not to be in any of the Bush Regeneration or Revegetation Zones shown on this map without the permission and supervision of of the site environment consultant.

The location of environment protection fencing is to be the thick black line shown on the development side of the edge of the Bush Regeneration or the Revegetation zones shown on this map.



Bushland Management Map 1

Observation Point

GIS Environmental Consultants
Ph: 041 943 8672
May 2003

This map is for the subdivision part of the proposal. To allow a similar map to be produced for the house DA's details such as specifications for stockpile and translocation locations and disturbance areas will need to be supplied by the engineers and these will not be known untill a later stage. At that time maps may be able to be made showing translocation and stockpile areas.

5.5 Staging

A works protection program that outlines the environmental protection works to be carried out includes the timing of the installation of protection fencing, erosion fencing, tree protection, the spraying of weeds, collection of seed and cuttings, the recovery and storage of boulders and logs, drainage works, tree removal and landscaping (see Appendix B). The following sections detail these activities.

6. Environment Works Prior to Construction

6.1 Temporary Environment Protection Fences

Protective fences and guards will have to be installed prior to the commencement of the subdivision works on the site and be retained for the duration of the construction works (see Map 1. for location of fences). A further map will be provided prior to the commencement of works for each of the new homes. Warning signs should be placed along the protective fencing informing contractors and visitors to the site the purpose for the fencing and tree protection. The warning signs would state " Environmental Protection Keep Out".

6.1.1 Protection of Vegetation and Habitat Areas

Environmental protection fencing will need to be installed around the disturbance zones in relation to the subdivision works that are to be regenerated. In relation to the regeneration areas for the homes the regeneration areas will also be fenced off and a map detailing the location of the fence will be provided prior to the commencement of works. The protective fencing will consist of a 2.1m high star pickets with a continuous connecting wire, with orange safety netting and signage. This type of fencing is lower impact to install and more flexible for the terrain. It is recommended that the protective fences are inspected by the site environmental consultant weekly during earthworks and the construction stages of the development. For locations of temporary fences. See Map 1.

6.1.2 Protection of Individual Trees

The requirements for the protection of individual trees are outlined in the Pre Construction Tree/Vegetation Report prepared by Pittendrigh Shinkfield & Bruce Pty Limited (2002). These areas will need to fenced unless they are already fenced by the vegetation and habitat protection fencing.

6.1.3 Protection of Soil and Rock Features

The site is steep and the surface soil is sandy and easily eroded. Sedimentation of creeks and drainage lines will remove or reduce the breeding habitat for a number of fauna species. Prior to the commencement of clearing the site for subdivision works, sediment fences must be installed to contain sediment within the site and minimise surface runoff. The sediment control devices must be consistent with the standards required, and be properly maintained for the duration of the construction. Sediment control devices must also be installed around stock-piles. These measures will also be undertaken for each of the dwellings.

Rocks and boulders are important reptile invertebrate and small mammal habitat. These features that are to be retained as habitat but are outside the fenced areas are to be covered with protective material such as hessian, weed mat or old carpet for the duration of construction. This is reduce damage, erosion and to protect from cement, paint, acid, waste and other material.

6.2 Propagation of Plant Material

Prior to the commencement of works for the subdivision and for each of the dwellings a native bush regeneration nursery will be engaged to propagate appropriate material for use in the bush regeneration and revegetation of the site. Only plants propagated from within 5 km of the site should be used. This type of material is available from nurseries that specialise in this type of stock.

The planting is to include the planting of at least 32 *Diospyros australis* (Black Plum) trees to compensate for those being removed. These will need to be propagated from plants growing on the site. Map 1 shows the locations where these trees are to be planted.

The plant material that will be used in the revegetation and regeneration zones will consist of tube stock and cells, except for semi-mature tree stock in selected areas to provide faster screening of built forms. Appendix A contains a list of suitable plants that are to be propagated.

Prior to the commencement of works of the subdivision and for each of the dwellings a pre-order (or evidence of supply) will be submitted to Council's Natural Resource unit. The pre-order will contain the species that will be used and the number of plant species that will be planted out for the subdivision and for the individual house dwellings.

In the Revegetation areas (Map 1) appropriate trees will be planted at 3 m centres, appropriate ferns and shrubs at 1 m centres and appropriate herbs, vines or grasses that are to be planted at 0.5 m centres. In the regeneration areas where planting is necessary the plantings will be to half these densities

6.3 Translocation of Native Plants

The site contains many native plants such as ground covers, shrubs and trees that are to be transplanted prior to the commencement of works of the subdivision and for the new dwellings. Plants located within the disturbance areas will be assessed for suitability for transplanting by a qualified practising ecologist/bush regenerator. The plants that are identified as suitable for transplanting will be tagged with yellow tape, and the species and number of juvenile plants identified will be submitted to Council prior to the commencement of work. The relocation of the juveniles must be undertaken by a qualified practising ecologist/bush regenerator who has proven experience in this type of work. A minimum of 100 plants are to be translocated this is to include a minimum of 50 Maidenhair Ferns (*Adiantum aethiopicum*). Tree Ferns must be translocated as soon as possible. The location of where the plants are to come from within the disturbance area is shown on Map 1.

6.4 Weed Control

Generally before construction begins a weed removal program is undertaken to reduce the spread of weeds by machinery throughout the site. Due to the extensive long-term weed infestation that occurs on this site, and the high erosion potential of the site, weed control is not recommended prior to driveway and construction. Weed control on this site is recommended to occur as part of the post drive construction environment protection works. To assist in the long-term control of weeds however, it is recommended that all flowering and seeding parts off noxious and environmental weeds are to be removed and bagged prior to commencement of works within the disturbance zone.

7. Environment Works During Construction

During planning and construction as much of the existing native vegetation should be retained as possible and the amount of disturbance should be minimised particularly in the Revegetation and Regeneration zones.

For the Timetable of Works see Appendix B

7.1 Environment Protection and Tree Protection Fencing

The environmental protection fences must remain in good repair and in the position approved by the site environmental consultant, the approximate locations are shown on Map 1 of this report. The fences are to be inspected weekly by the site environmental consultant during the earthworks and construction phases of the works for the subdivision and for the individual dwellings.

7.2 Retention of Logs

Some logs of the felled trees should be retained - especially sections that have hollows or knots. These logs can be incorporated in to the bush regeneration that is to occur on the site. The retained logs must be securely pegged to ensure the do not roll down the slope. Prior to the commencement of work logs that are to be retained for later use must be moved to an stockpile or have a protective fence erected around logs to protect them from damage.

7.3 Retention of Sandstone Boulders

Sandstone features that are not impacted by works should not be damaged or disturbed. Sandstone boulders and large pieces of sandstone must be retained for landscaping and bush regeneration purposes. Before works commence protective fencing must be installed around the sandstone features or stored in a pile protected in the fenced off bush regeneration area..

7.4 Water Quality

All point sources of water pollution are to be contained at the source. Die back is a major cause of death to mature trees in Pittwater. Trees particularly effected are *Eucalyptus, Angophora and Corymbia* and these are essential food and habitat trees for threatened and regionally/locally important species. Contaminated water produced during construction should be not be allowed to flow into the native vegetation.

It is essential that measures are taken to minimise soil erosion during construction. The sedimentation fencing is to be installed 1 week prior to the commencement of works for the subdivision (see accompanying sediment control Map). Prior to the construction of dwellings a further soil erosion control map will be provided.

7.5 Topsoil Recovery

Due to the high number of weeds on this site it is not recommended that the topsoil be collected for re use on this site.

7.6 Stockpiling

Materials, stockpiles and vehicle areas are to be located on already cleared and disturbed land well away from trees, vegetation, habitat, bush rock or other natural features. The designated areas for stockpiling of materials for each of the proposed dwellings will be provided prior to the commencement of the dwellings works. See attached plan for subdivision woks, a further plan will be provided prior to the construction certificate for the dwellings being granted. Designated areas for stockpiling of materials for the subdivision are shown on Map 1. Size of area and the geotechnical suitability of the location of stockpiles may need to be confirmed by with engineers and hydrologists.

7.6.1 Stabilisation of the Boulder

The large boulder that occurs on the high side of the existing driveway has been identified by Shirley Consulting Engineers are requiring stabilisation using bolting and a reinforced concrete block. Sketches SK20020925 and SK20020802A. This area will be extensively disturbed during construction and as a consequence has been removed from the bush regeneration zone and made part of the revegetation zone. Before these works commence there will need to be environment protection fences erected to minimise damage to native bushland to be retained and the native plants in this area that can be transplanted will need to be included in the transplanting plans. Photos are to be taken before and after the works. The fences and the photos are to be taken by the site environmental consultant or Council.

7.6.2 Gabion Wall

To prevent erosion when accessing the boulder area and access to make the drain at the top of the soldier wall the engineers have designed a Gabion wall. The location of the Gabion wall is shown on Sketch SK20020802A by Shirley Consulting Engineers. This area will be extensively disturbed during construction and as a consequence has been removed from the bush regeneration zone and made part of the revegetation zone, See Map 1. Before these works commence there will need to be environment protection fences erected to minimise damage to native bushland to be retained and the native plants in this area that can be transplanted will need to be included in the transplanting plans. Photos are to be taken before and after the works. The fences and the photos are to be taken by the site environmental consultant or Council.

7.6.3 Stormwater and Sewage Trenches

The location of the stormwater and sewage lines are now known and shown on a plan by Tierney Consulting engineers dated 15.10.02 drawing number 7531 C9 revision 3 and shown on a plan project No. 13701WW, by Sydney Water dated 19/6/02. Map 1 has been amended accordingly.

The areas of bush regeneration that would have affected by these works have now been changed to revegetation zones and changes have been made to Map1. The depth of these trenches is not known. It is recommended that the digging and refilling of these trenches be supervised by the site environmental consultant. Photos are to be taken before and after trenching. The trenches should be open for a short a time as possible Where possible the trenches should be shared by s many utilities as possible to reduce the number of trenches and the disturbance to the site. The soil profile is to be retained and the spoil is to be placed on canvas or geotech fabric while the trench is open.

7.6.4 Access for Machinery to Build Solider Wall and Drain

There will need to be an access path for heavy machinery to enable the construction of the soldier wall at the top of the embankment at the entry near Palm Beach Road. There is planned to be a drain running along the top of the retaining wall. This area has been excluded from the Bush regeneration areas on Map 1. This work will require erosion control and revegetation. This area will need to be fenced off by the protective fencing during works.

8. Environmental Works Post Construction

8.1 Bushland Revegetation

The native vegetation and habitat in the revegetation areas will be retained, weeded and planted with local native species propagated from local stock. The initial work and continued maintenance of the revegetation zones must be undertaken by suitably qualified and experienced Certificate 2 Bush Regenerators. The initial work and continued maintenance should also be conducted under the supervision of a suitably experienced and qualified person with Bush Regeneration Certificate 4. Logs, dead trees and surface rocks should be retained in these areas. Plants should not be planted in formal patterns and there should be deep mulching. These areas will contain some soil stabilisation works (such as retaining structures), placed rocks and footpaths and steps may be installed. The techniques of the appropriate weed removal techniques for the more common weed species that are found on the site are listed in table 1.

8.2 Bushland Regeneration

The native vegetation and habitat in these areas will be retained and weeded. There will be planting of local native species that have been propagated from local stock. The initial work and continued maintenance of the regeneration zones must be undertaken by suitably qualified and experienced Certificate 2 Bush Regenerators. The initial work and continued maintenance will also be conducted under the supervision of a suitably experienced and qualified person with Bush Regeneration Certificate 4. Plants should not be planted in formal patterns. The aim of the bush regeneration will be to make these areas self-sustaining and requiring little maintenance while also providing habitat for the native animals and plants. In these areas the soil surface will not be disturbed, except for weeding and planting of some advanced screening native trees. It is recommended that weed control and bush regeneration is to commence at least two months prior to the commencement of works. The techniques that are to be used are those described in "Bush Regeneration" by Robin Buchanan, "Bush Regeneration Handbook" By The National Trust of Australia and "Bush Invaders" by Adam Muyt. Table 1 describes the techniques for those weed species that are the more common on the site.

8.3 Weed Control

Prior to the commencement of construction weed control in the bush regeneration areas is to begin at a minimum of two weeks prior to the commencement of work.

Weeds remaining after construction in all areas are to be removed by qualified bush regenerators. Weed material including all seeds are to be removed from the site and disposed of at Kimbrikil Tip.

It is recommended that weed removal occur in the bush regeneration and revegetation zones after driveway construction but before occupancy. The weed removal in the building envelope areas is to occur 6 months after the construction of the drive if no house has been built in the envelope.

8.3.1 Table 1. Techniques to eradicate weeds and exotic species

*Herbicide concentrations follow NSW Agriculture recommendations in Noxious Weed Control Handbook: Herbicide Control (1998).

Genus species	Common name	Control Method
WOODY PLANTS		
Ligustrum lucidum *Ligustrum sinense*	Privet - Broad Leaved & Narrow Leaved	On the primary visit small plants are to be removed manually, ensuring all roots are removed. Large plants are to be treated by the cut and paint method using glyphosate. The success of this treatment can be increased by applying herbicide to sapwood in the stump after stripping some of the bark. All fruiting branches must be bagged and not carried loose through the site. Masses of seedlings may establish by seed in place of the mature plant and can be removed manually or by the cut and paint method. Broad spraying of seedlings will also impact on native regenerating plants therefore it must be avoided. All plant material is to be removed and disposed of off-site. The follow up visits are to include spot spray of regrowth and seedlings with Metsulfuron (e.g. Brushoff®) 10g/100L.
Lantana camara	Lantana	On the primary visit small plants are to be removed manually, ensuring all roots are removed. Large plants are to be treated by the cut and paint method using glyphosate. Dense, layered thickets must be removed in stages. All fruiting branches must be bagged and not carried loose through the site. All plant material is to be removed and disposed of off-site. The follow up visits are to include spot spraying of regrowth and seedlings with a systemic herbicide such as glyphosate.
Senna pendula	Cassia	On the primary visit small plants are to be removed manually, ensuring all roots are removed. Large plants are to be treated by the cut and paint method using glyphosate. All fruiting branches must be bagged and not carried loose through the site. Seeds persist in the soil for some years and must be contained. All plant material is to be removed and disposed of off-site. The follow up visits are to include spot spray of regrowth and seedlings with a systemic herbicide such as glyphosate.

Genus species	Common name	Control Method
Cinnamomum camphora	Camphor Laurel	On the primary visit small plants are to be removed manually, ensuring all roots are removed. Large plants are to be treated by the cut and paint method using glyphosate. The cut and paint method involves the plant being cut off at ground level and the cut surface is then painted with a glyphosate. This allows the chemical to move through the plant down into the roots thereby killing the plant effectively. All fruiting branches must be bagged and not carried loose through the site. Seeds persist in the soil for some years and must be contained. All plant material is to be removed and disposed of off-site. The follow up visits are to include spot spraying of regrowth and seedlings with a systemic herbicide such as glyphosate.
Ochna serrulata	Ochna or Mickey Mouse Bush	Ochna is difficult to eradicate due to it's tap root system. The best method for eradication is the scrape method. This involves scouring the bark down each side of the stem of the plant and then immediately applying undiluted glyphosate to the scour. Seedlings can be removed manually.
Sida rhombifolia	Paddys Lucerne	On the primary visit small plants are to be removed manually, ensuring all roots are removed. Large plants are to be treated by the cut and paint method using glyphosate. The cut and paint method involves the plant being cut off at ground level and the cut surface is then painted with a glyphosate. This allows the chemical to move through the plant down into the roots thereby killing the plant effectively. The follow up visits are to include spot spraying of regrowth and seedlings with a systemic herbicide such as glyphosate or they can be manually removed.
HERBS		
Ageratina adenophera & *Ageratina riparia*	Crofton Weed & Mist Flower	The primary visit is to manually remove small plants. This is most effective when the soil is wet. All weed material is to be removed and disposed of off-site. The follow up visits are to include manual removal of additional plants and herbicide spot spray of any regrowth using Glyphosate 360, 1:200*.

Genus species	Common name	Control Method
Protasparagus aethiopicus & *Asparagus plumosus*	Asparagus Fern & Climbing Asparagus	The primary visit is to manually remove the growing crown of all large plants and to bag any fruiting stems. All weed material is to be removed and disposed of off-site. This species does not regrow from water tubers which can be left in the soil. This will minimise surface soil disturbance. No fruiting plant material can be carried through the site. The follow up visits are to include the removal of any additional mature crowns and fruiting material.
Watsonia meriana var. bulbillifera	Wild Watsonia, Bugle Lily	The primary visit is to manually remove the plant with tubers and treat all plants by painting a single leaf surface with a systemic herbicide such as glyphosate. This will ensure treatment of the main and secondary tubers that are otherwise difficult to effectively remove. The follow up visits are to include additional leaf painted of surviving plants and manual removal.
Nephrolepis cordifolia	Fishbone Fern	The primary visit is to manually remove all large plants, including the tubers attached to lateral roots. All weed material must be bagged to prevent spore release and removed and disposed of off-site. This species re-sprouts from tubers left in the soil. The follow up visits are to include the removal of any additional mature plants and regrowth from remaining tubers. Mulch and competition from desirable plants can discourage regrowth.
Tradescantia fluminensis	Wandering Jew	Large infestations are raked or rolled into long rolls, the bundled plant matter can be lifted and taken offsite. Small infestations can be hand pulled and also taken off site. The follow up visits involve hand pulling any pieces that were missed in the initial visit.
CLIMBERS/ SCAMBLERS		

Genus species	Common name	Control Method
Ipomea indica	Morning Glory	The primary visit is to remove the bulk of the infestation by pulling/raking vines down from trees and tracing and pulling up ground runners and attached roots. Blanket growth over the ground and other plants is to be manually rolled up. All weed material is to be removed and disposed of off-site. The follow up visits are to include manual removal of regrowth and spot-spraying of seedlings with Glyphosate 360, 1:100*.
Lonicera japonica	Japanese Honeysuckle	The primary visit involves treating large climbing stems using the Drill and Fill method and the Stem Cut and Scrape method. Smaller plants can be treated using the Cut-paint method. Remove the vine by cutting back stems leaving a metre to cut and scrape. Apply the herbicide to the cut and scrape. Seedlings can be hand pulled ensuring that all of the roots and stems are removed from the soil. All material must be taken off site. The follow up visits are to include manual removal of regrowth and spot-spraying of seedlings with Glyphosate 360, 1:100*.

8.4 Planting

The plant material that will be used in the revegetation and regeneration zones will consist of tube stock and cells. The planting must be done by qualified bush regenerators who have the minimum qualifications of Bush Regeneration Certificate 2 and the project must be under the constant supervision of a experienced and qualified person with Bush Regeneration Certificate 4. The specific program and method of planting will be determined by the people carrying out the work. It is likely that seedlings will be supported by stakes and protected by tree guards. If fertiliser is to be used it must be specific to Australian native plants and low in phosphorus and nitrogen.

The goals of the planting will be to use appropriate species and densities sourced from local genetic stock to produce a self-sustaining ecosystem that is representative of the plants, animals and structure of the original vegetation.

Suitable tree species include: *Corymbia maculata* (Spotted Gum), *Eucalyptus punctata* (Grey Gum), *Eucalyptus paniculata* (Grey Ironbark), *Corymbia maculata* (spotted Gum), *Syzygium paniculatum*, *Allocasuaria torulosa* (Forest Oak), *Eucalyptus umbra* (Bastard Mahogany), *Banksia integrifolia* (Coastal Banksia) and *Livistinia australis* (Cabbage Palms) and *Syncarpia glomulifera* (Turpentines). There should be at least 30 *Allocasuarina torulosa* trees in 150 mm pots planted to replace the Endangered Glossy Black Cockatoo habitat. An extensive planting list for trees, shrubs and ground covers is given in Appendix A.

At least 32 Black Plums (*Diospyros australis*) are to be planted on the site - a minimum of 6 trees in each proposed planting area, see Map 1.

8.5 Height Restrictions for Plantings

There is to be a maximum of 5 m height limit on species selected to be growing in the 3 labelled area shown on Map 1. The species must be selected from the plant species list in Appendix A.

8.6 Soil Remediation and Preparation

Due to the extent of weed infestation that is on the site the topsoil will contain many weed seeds and propagules. It is recommended that the topsoil not be stockpiled for reuse. No levelling, ripping or scarifying of the soil surface is recommended. Spoil will not be used outside disturbance areas that are designated for the subdivision and the construction of the individual dwellings.

8.7 Erosion Control

Where there is to be extensive weed removal the work must be carried out in stages. The work is to be undertaken in this manner to reduce the chance of soil erosion and sudden habitat loss. It is recommended that weed removal occur in the bush regeneration and revegetation zones after construction finishes but before occupancy. This later than usual timing of weed removal is to reduce the change of erosion on this very steep and weedy site. The weed removal in the building envelopes is to occur 6 months after the construction of the drive if no house has been made in the envelope.

Where erosion is likely to occur erosion control such as fencing and weed matting must be utlised.

8.8 Domestic and Feral Animal Control

Studies of the impacts of urban development on native populations of animals indicate that habitat fragmentation and increased predation by carnivores (cats, dogs and foxes) are major factors in the decline of small mammal populations (Dickman and Doncaster 1989, Dickman 1996). For the protection of the threatened species and other animals on the site it is recommended that cats are excluded from the site and dogs are restrained from entering areas of wildlife habitat. The keeping of outdoor dogs and cats will lead to devastation of the wildlife on the property, increases in the amount of phosphorous entering the soil, which will subsequently kill off many native plants.

It is recommended that the keeping of cats be discouraged. However if residents want to have cats they must be restricted to being kept indoors or within a confined area that they cannot escape. Dogs should also be fenced in and kept indoors at night. No feral dogs cats or foxes should be fed.

Preferably all domestic vegetable waste from this site should be removed off site and not composted. Any compost bins that may contain food scraps, faeces or other household waste should be clearly labelled "Not to be used on native gardens" and should be covered to prevent access by feral animals such as European rats, feral cats, foxes etc.

Pest bird species such as Common Mynas, Sparrows and the native Currawong should not be encouraged or fed.

8.9 Cleaning of Earthmoving Equipment

All earthmoving equipment must be thoroughly cleaned before entering the site to prevent the introduction of new weed species and pathogens onto the site.

8.10 Use of Fertilisers and Insecticides

No fertiliser, insecticide, herbicides or detergents are to be used during the construction or maintenance of the property where they may drain to the proposed stormwater system. Fertiliser would be especially destructive to the local ecology - added nutrients will kill phosphorus intolerant natives. No poison type snail bait should be used in the maintenance of the gardens, as these will kill native animals such as Blue Tongue Lizards. Glyphosate herbicide can be used for the cut and paint method and scrape used in bush regeneration, however it is not recommended that it be used for spraying.

8.11 Staking of Plants

Stakes should only be used to mark the position of plants. Plants will grow quicker and stronger if they are not tied to stakes. The stakes only need to be sticks that are found on the site and not formal stakes.

8.12 Long-term Weed Control

There is a large amount of exotic plant material to be removed from the site, including trees, shrubs and herbs. Without careful and quick management the weed problem will become permanent, and the costs of maintaining the site will rapidly increase. Large amounts of weeds can be associated with health problems - in particular asthma, hay fever, ticks and allergies for humans and pets. Dense thickets of weeds can be a bush fire hazard.

Long-term weed control will be essential, as described in the 5-year maintenance timetable and monitoring program. The timetable includes checking and removal of weeds, checking that the mulch layer is intact, and checking for erosion twice a year. There may be a need for further recovery and propagation of seed and plant propagules for use during further bush regeneration works. The first year after construction will include extensive restoration works to remove existing weeds from the revegetation and regeneration areas. Where thickets of weeds are to be removed, the removal is to be gradual and staged to prevent a sudden loss of habitat. The timetable also includes the maintenance effort required to carry out weed control.

8.13 Landscape Edging

There must be edging installed along the boundary between areas that are to be landscaped and areas that are to be bush regenerated or revegetated if there is not planned to be a path along these boundaries. The edging must be at least 100 mm into the soil and 200 mm above the ground surface.

8.14 Ecological Fire Prescription

The lower part of this site contains a high number of species that are typical of moist vegetation. This lower part of the site should not be burnt as it will kill these species and favour fire tolerant species. The upper part of the site contains sclerophyll forest and should have a fire regime of one fire every 15 years in order to maintain species diversity. This can be achieved by pile burning with the supervision of the Rural Fire Service.

8.15 Mulching and Leaf Litter

Areas of dense vegetation and thick leaf-litter provide suitable areas for Long-nosed Bandicoots, reptiles, invertebrates and Lyre Birds to live and forage. Where native vegetation is to be removed, the removed vegetation including shrubs should be chipped on site and the chips used for landscaping and bush regeneration within the site. Only mulch certified to be from native trees should be used, otherwise there may be large infestations of willows, camphor laurel, privet and other noxious species introduced onto the site, the bush regenerator will need to liase with the site manager to ensure that the mulch that is to be used is weed free. The native trees that will be chipped for mulching must be identified and marked by the contracted bush regenerator with the site manager prior to the commencement of works. The mulch is to be placed to a minimum depth of 75 mm and the minimum depth of 150 mm. The mulch must be monitored for erosion, thinning and weeds this can be undertaken as part of the maintenance of the bush regeneration and revegetation areas and the landscaped areas.

8.16 Weed Matting

Due to the steepness and weediness of the site the use of weed matting is highly recommended where there is no existing native shrub or herb species that are to be retained. Depending on the slope, disturbance and weediness of each patch the use of mulch, sterile cover crops and binding sprays may also be used.

The decision of the method and location that is most appropriate for each patch must be made by a level 4 Bush Regenerator on the site at the time. Site assessment for the installation of weed matting is to occur one week prior to the commencement of bush regeneration and revegetation works.

Where weed mats are used they will be laid across the slope of the site with the uphill strip overlaying the downhill strips by 100 mm. The weed matt will be a biodegradable jute fibre which does not contain polymer reinforcement. The mat will be pegged into position using pegs that are galvanised steel, u-shaped, 10 mm diameter and a minimum of 450 mm long. The pegs will be placed at 300 x 300 mm anchor trenches at top and bottom, at 1000 x 1000 mm intervals with 250 mm overlaps. Eucalypt mulch would then be placed on top of the matting.

8.17 Provision of Habitat for Fauna

The areas designated for bush regeneration and bush revegetation will be designed to also provide fauna habitat. There will also be some modified fauna habitat in the landscaped areas of the site.

8.17.1 Bat, Possum and Glider Nesting Boxes

It is recommended that nesting boxes suitable for gliders and insectivorous bats be placed in trees on the property. This may compensate for the loss of tree hollows that are removed or the trees that can no longer grow due to the development. Correctly installed boxes should not require any maintenance. Nesting boxes can be placed in view or out of view depending on the wishes of the owner. If placed in view residents can watch little Feather-tailed and Sugar Gliders, insectivorous bats etc leaving the boxes every evening. The presence of the small insectivorous bats will greatly reduce if not eliminate any nocturnal insect problems such as mosquitoes and moths. The boxes must be placed at least 3 metres up trees to reduce predation by cats. Other roosting boxes should be installed on poles or to existing rough barked trees. The lack of sufficient nesting or roosting sites is likely to be one of the main factors leading to the decline of many animal species.

8.17.2 Bandicoot and Antechinus Habitat Improvement

Survival of the bandicoot and *Antechinus* populations relies upon adequate dense areas of low vegetation and thick leaf litter in which to make their day burrows. This type of habitat should be made and maintained.

8.17.3 Enhancing Possum Pathways

Possums, koalas and tree snakes require a means of travelling through the canopy. When travelling along the ground where they can be attacked by dogs, cats and foxes, or can be run over by cars. Enhancement of aerial pathways can be achieved by planting rough and smooth barked trees so that their canopies touch. Possum access paths could also be created by using discreet ropes to connect important tree canopies. Installing connectivity between trees where appropriate is recommended.

8.17.4 Improving Bat, Owl, Glider and Possum Foraging Habitat

Suitable habitat for bats owls possums and gliders will be improved by providing the appropriate vegetative structure on the site including a mixture of rough and smooth-barked trees, interconnecting canopies and food trees.

8.17.5 Food Plants

It is recommended that tube stock trees of appropriate species, grown from local genetic stock, be planted in vicinity to improve the habitat and feeding value of the site. Suitable species include:

- Spotted Gum—flowering nectar, sap and pollen for arboreal mammals, birds, bats and insects. Spotted Gums, *Corymbia maculata*, flower during winter and as such are important food sources for animals that rely on year round nectar/pollen. *Corymbia maculata* is a potential food plant for the Endangered Population of Squirrel gliders and is occasionally eaten by Koalas (Smith and Smith 1998). A Spotted gum on the neighbouring bushland has a 'feeding cut' most probably from a glider. Claw marks in the tree trunk occur around this slice.
- Autumn flowering Red Bloodwoods (*Corymbia gummifera*) occur site. A few wattle trees and shrubs (*Acacia* spp. see flora section), occur on site none are listed as being fed upon by Squirrel gliders but may be used by this species and/or other arboreal mammals such as locally significant Sugar gliders, Feathertail gliders and Pygmy possums (no feeding marks were evident on these plants).
- Wattles (*Acacia* spp. see flora Section)—few— none are listed as being typical food for Squirrel gliders. Acacias may be used by this species and/or other arboreal mammals such as locally significant Sugar gliders, Feathertail gliders and Pygmy possums.
- *Banksia* species provide nectar for many small birds: *Banksia ericifolia and B. integrefolia* are winter flowering, *B. serrata* and *B. spinulosa* are summer flowering. All of these species occur in areas that are linked to the site by trees.
- Iron barks—usually winter flowering—nectar, sap and pollen.
- Casuarinas—potential Koala food
- Xanthorrhoea—when flowering provides food source for arboreal mammals.
- 'Rainforest plants' (see flora list)—a few species of plants were observed to have fruits/flowers, including *Pittosporum undulatum*, fruits are a food source for animals particularly birds.

8.17.6 Tree Roughness

The site has a mixture of smooth barked and rough barked trees that would increase the access ability of the canopy to possums and study by Rowston (1998) found Squirrel Gliders utilised rough-bark trees and dead trees to a greater extent than any other trees. Released gliders were noted to "slip off" smooth barked Eucalypts, preferring to move along the ground until the nest tree or a rough-bark tree was reached (Rowston, 1998). This result highlight the importance of maintaining a contiguous tree canopy and having a floristically diverse community where smooth-bark trees (such as spotted-gums, winter flowering food trees are intermixed with rough-barked trees such as bloodwoods). Both smooth and rough-barked trees occur on the site.

9. Monitoring

9.1 During Construction Monitoring

The construction process is likely to take many months. During this time the soil in many areas will be exposed and the canopy will be disturbed which is perfect conditions for weeds to spread and become established. The weeds need to be fully suppressed during the construction process. Monthly weed inspections will be required.

During earthworks large machines will be used in difficult conditions, it is likely that the environment protection fencing will be damaged or dislodged. During the earthworks and trench digging phase of the construction weekly inspections and repair of the fences will be necessary and trench digging will need to be supervised when it is within or adjacent to the revegetation or regeneration areas. It is recommended that whenever work is planned to be carried out in or adjacent to these areas the site environmental consultant be called to determine if supervision or advice is needed.

9.2 Annual Monitoring

It is recommended that the success (or otherwise) of the regeneration and revegetation works be evaluated using photographs and data sheets.

In the Timetable of Works (Appendix B) there are 8 occasions over the 5 years of this plan when the data sheets are to be filled in, photos taken and both sent into the Environment Unit of Council for monitoring. The Timetable of Works outlines when the works are to be carried out and the estimated amount of effort required.

The annual monitoring of the management of the site must be carried out by an appropriate person (Bush Regenerator, TAFE certificate IV or a Environmental Scientist, B. Sc. (Hons)) with at least 5 years experience in the ecology of this area.

9.2.1 Filling in the Data Sheet

The data sheet (Appendix D) must be filled out and photocopied every year in September after the bush regeneration work has been carried out. All boxes must be filled in with a response. The map must be marked with the relevant information and the completed data sheet and photos must be sent to the Environment Section of Council before the end of the month (i.e. before the end of either September or March). The data sheet requires information on:

- the date
- the condition of the site (erosion, paths, disturbance fire litter etc.)
- the weeds removed
- the bush regeneration personnel
- the effort spent
- the work carried out
- the materials used
- the presence of feral animals
- other information

9.2.2 Tree Death

All occurrences of tree death or substantial die back of canopy must be recorded on the map in the data sheets.

9.2.3 Photos

Photos are to be taken in September every year from the permanent survey points (PP1, PP2, PP3, PP4, PP5, PP6) shown on Map 1. The colour photos are to be taken using a 35 mm camera (preferably digital) in the directions shown on Map 1. The photos must be taken from a standing position and not using any zoom or wide angle lenses. These photos are to be forwarded to the Environmental Section of Pittwater Council in either digital form (>3.1 Mega pixel i.e. an approximately 1.4 Mb, compressed JPEG file, delivered on a CD labelled with the dates and the text "Bushland Monitoring photographs for 1148 – 1152 Barrenjoey Road") or as 2 copies of standard (6' X 4') sized prints with negatives. The photos should have a date stamp on the image or alternatively the date written on the back.

10. References

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11. Appendix A, Propagation List for Revegetation and Regeneration Areas

Prior to construction a native bush regeneration nursery will be engaged to propagate appropriate material for use in the bush regeneration of the site. Only plants propagated from within 5 km of the site should be used. This type of material is available from nurseries that specialise in this type of stock. Such nurseries include; Tharwa Nursery (9450 1967), Wirreanda (9450 1400), Harvest Seeds and Native Plants (9450 2750), Toolijooa Nursery (9970 8709).

The exact quantities of each species and pot sizes will need to be determined by discussions with Councils environment unit or the site environmental consultant.

The exact quantities of each species and pot sizes will need to be determined by discussions with Councils environment unit or the site environmental consultant.

List of suitable native plant species for planting at Observation Point

By Nicholas Skelton, GIS Environmental Consultants Ph: 041 943 8672

Genus and Species	Habit	Common Name
Species mixture for planting on the upper parts of the site		
Macrozamia communis	Cycad	Burrawong
Calochlaena dubia	Fern	False Bracken Fern
Doodia caudata var caudata	Fern	
Entolasia stricta	Grass	Right Angled Grass
Imperata cylindrica var. major	Grass	Blady Grass
Oplismenus aemulus	Grass	Basket Grass
Themeda australis	Grass	Kangaroo Grass
Xanthorrhoea macronema	Grass tree	Grass Tree
Dianella caerulea	Herb	Blue Flax Lily
Geranium homeanum	Herb	
Lomandra longifolia	Herb	Mat Rush
Livistona australis	Palm	Cabbage Tree Palm
Acacia implexa	Shrub	Hickory
Acacia longifolia	Shrub	Sydney Golden Wattle
Acacia ulicifolia	Shrub	Prickly Moses
Acrotriche divaricata	Shrub	
Dodonaea triquetra	Shrub	Hop Bush
Oxylobium ilicifolium	Shrub	Native Holly
Persoonia linearis	Shrub	Narrow-leaved Geebung
Platylobium formosum	Shrub	Handsome Flat-pea
Pultenaea flexilis	Shrub	Graceful Bush Pea
Acacia floribunda	Tree	White Sallow Wattle
Acacia parramattensis	Tree	Parramatta Green Wattle
Acmena smithii	Tree	Lily Pilly
Allocasuarina littoralis	Tree	Black She-oak
Allocasuarina torulosa	Tree	Forest She-oak
Angophora costata	Tree	Smooth-barked Apple
Angophora floribunda	Tree	Rough-barked Apple
Banksia integrifolia ssp. integrifolia	Tree	Coastal Banksia
Cassine australis var. australis	Tree	

Diospyros australis	Tree	Black Plum
Elaeocarpus reticulatus	Tree	Blueberry Ash
Eucalyptus botryoides	Tree	Bangalay
Eucalyptus paniculata ssp. paniculata	Tree	Grey Ironbark
Eucalyptus piperita	Tree	Sydney Peppermint
Eucalyptus punctata	Tree	Grey Gum
Eucalyptus umbra	Tree	Bastard Mahogany
Ficus rubiginosa	Tree	Port Jackson Fig
Glochidion ferdinandi var. ferdinandi	Tree	Cheese Tree
Rapanea variablis	Tree	Brush Muttonwood
Syncarpia glomulifera	Tree	Turpentine
Synoum glandulosum	Tree	Scentless Rosewood
Syzygium paniculatum	Tree	Magenta Lillypilly
Billardiera scandens	Vine	Apple Berry Dumplings
Cissus antarctica	Vine	Kangaroo Vine
Cissus hypoglauca	Vine	Native Grape
Eustrephus latifolius	Vine	Wombat Berry
Geitonoplesium cymosum	Vine	Scrambling Lily
Glycine clandestina/microphylla	Vine	Love Creeper
Kennedia rubicunda	Vine	Dusky Coral Pea
Smilax glyciphylla	Vine	Native Sarsaparilla
Adiantum aethiopicum	Fern	Maidenhair Fern
Blechnum ambiguum	Fern	Gristle fern
Calochlaena dubia	Fern	False Bracken Fern
Cyathea cooperi	Fern	Straw Tree Fern
Doodia caudata var caudata	Fern	
Gleichenia dicarpa	Fern	Coral Fern
Histiopteris incisa	Fern	Bats Wing Fern
Todea barbara	Fern	King Fern
Entolasia stricta	Grass	Right Angled Grass
Imperata cylindrica var. major	Grass	Blady Grass
Oplismenus aemulus	Grass	Basket Grass
Commelina cyanea	Herb	Creeping Christian
Dianella caerulea	Herb	Blue Flax Lily
Dichondra repens	Herb	Kidney Weed
Geranium homeanum	Herb	
Gymnostachys anceps	Herb	Settlers Flax
Lomandra longifolia	Herb	Mat Rush
Pseuderanthemum variable	Herb	Pastel Flower
Viola hederacea	Herb	Native Violet
Livistona australis	Palm	Cabbage Tree Palm
Acacia implexa	Shrub	Hickory
Breynia oblongifolia	Shrub	Breynia
Dodonaea triquetra	Shrub	Hop Bush
Notelaea longifolia	Shrub	Mock Olive
Notelaea venosa	Shrub	Native Olive
Oxylobium ilicifolium	Shrub	Native Holly
Pultenaea flexilis	Shrub	Graceful Bush Pea
Acacia floribunda	Tree	White Sallow Wattle
Acacia parramattensis	Tree	Parramatta Green Wattle

Acmena smithii	Tree	Lily Pilly
Allocasuarina littoralis	Tree	Black She-oak
Allocasuarina torulosa	Tree	Forest She-oak
Angophora costata	Tree	Smooth-barked Apple
Angophora floribunda	Tree	Rough-barked Apple
Banksia integrifolia ssp. integrifolia	Tree	Coastal Banksia
Cassine australis var. australis	Tree	
Corymbia maculata	Tree	Spotted Gum
Diospyros australis	Tree	Black Plum
Elaeocarpus reticulatus	Tree	Blueberry Ash
Eucalyptus botryoides	Tree	Bangalay
Eucalyptus paniculata ssp. paniculata	Tree	Grey Ironbark
Eucalyptus piperita	Tree	Sydney Peppermint
Eucalyptus punctata	Tree	Grey Gum
Ficus rubiginosa	Tree	Port Jackson Fig
Glochidion ferdinandi var. ferdinandi	Tree	Cheese Tree
Rapanea variablis	Tree	Brush Muttonwood
Syncarpia glomulifera	Tree	Turpentine
Synoum glandulosum	Tree	Scentless Rosewood
Syzygium oleosum	Tree	Blue Lillypilly
Syzygium paniculatum	Tree	Magenta Lillypilly
Cissus antarctica	Vine	Kangaroo Vine
Cissus hypoglauca	Vine	Native Grape
Glycine clandestina/microphylla	Vine	Love Creeper
Kennedia rubicunda	Vine	Dusky Coral Pea
Pandorea pandorana	Vine	Wonga Wonga Vine

12. Appendix B, Timetable of Works

Appendix B

Schedule of work for Observation Point

Work Program for the Subdivision/Driveway

Schedule	Task	Monitoring	Effort and Personnel Required
Before Drive Construction	Engage Bush Regeneration Nursery to propagate plant material		Builder
	Engage Bush Regeneration Contractor		Builder
	Take photos of site	Monitoring	Environmental Consultant
	Soil and rock features to be covered		2 Bush Regenerators 1/2 day
	Environment Protection Fencing erected		2 Environmental Consultants 1 day
	Tree, log and rock fence protection installed		2 Aborists /Bush Regenerators 1 day
	Install Erosion control devices 1 week prior to work		2 Environmental Consultants 1 day
	Translocation of natives		2 Bush Regenerators 1/2 day
	Rocks, logs, logs with hollows relocated to stock piles for later use		2 Bush Regenerators 1/2 day
	Take photos of all work done at this point	Monitoring	Environmental Consultant
	Commence weed removal in regeneration areas		4 Bush Regenerators 2 days
During Construction of Driveway	Install nesting boxes, ropes on trees and poles		2 Bush Regenerators 1 day
	Clean earthmoving equipment before entering site		Earth moving contractors
	Continued removal of weeds in regeneration zone		4 Bush Regenerators 1 day
	Inspection of Environment Protection and Sediment devices, take photos	Monitoring	Environmental Consultant
	Install edging and retaining walls		Landscaper/builder
	Weed building envelope if they haven't been built on		2 Bush Regenerators 1 day
Immediately after drive construction	Commence weed removal in revegetation areas		2 Bush Regenerators 1 day
	Continue weed removal in regeneration areas, placement of rocks. Logs and logs with hollows in regen and reveg areas		4 Bush Regenerators 1 day
	Removal of Environment Protection and Sediment control devices		4 Bush Regenerators 1 day
	Take photos of work done	Monitoring	Environmental Consultant
	Commence plantings and mulching in regen, reveg areas and in landscaped areas		4 Bush Regenerators for the reveg and regen areas landscapers for landscaped areas
2 months after construction	Follow up weed removal in all areas. Additional planting as needed.		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant

4 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch.		2 Bush Regenerators 1 day
6 months after construction	Follow up weed removal in all areas. Additional planting as needed.		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
8 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
10 months after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
12 months after construction	Follow up weed removal in all areas. Additional planting as needed, check mulch and weed matting		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
14 months after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
16 months after construction	Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1/2 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
18 months after construction	Follow up weed removal in all areas. Additional planting as needed.		2 Bush Regenerators 1 day
20 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
22 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
2 years after construction	Follow up weed removal in all areas Additional planting as needed		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
2 years and 3 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
2 years and 6 months after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
2 years and 9 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day

3 years after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
3 years and 3 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
3 years and 6 months after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
3 years and 9 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
4 years after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
4 years and 3 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
4 years and 6 months after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
4 years and 9 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
5 years after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
5 years and 3 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
5 years and 6 months after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
5 Years and 9 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
End of 5 years after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant

Work Program for each of the new properties

Schedule	Task	Monitoring	Effort and Personnel Required
Before Dwelling Construction	Engage Bush Regeneration Nursery to propagate plant material		Builder
	Engage Bush Regeneration Contractor		Builder
	Take photos of site	Monitoring	Environmental Consultant
	Soil and rock features to be covered		2 Bush Regenerators 1/2 day
	Environment Protection Fencing erected		2 Environmental Consultants 1 day
	Tree, log and rock fence protection installed		2 Aborists /Bush Regenerators 1 day
	Install Erosion control devices 1 week prior to work		2 Environmental Consultants 1 day
	Translocation of natives		2 Bush Regenerators 1/2 day
	Rocks, logs, logs with hollows relocated to stock piles for later use		2 Bush Regenerators 1/2 day
	Take photos of all work done at this point	Monitoring	Environmental Consultant
	Commence weed removal in regeneration areas		4 Bush regenerators 1 day
During Construction of Dwelling	Install nesting boxes, ropes on trees and poles		2 Bush Regenerators 1 day
	Clean earthmoving equipment before entering site		Earth moving contractors
	Continued removal of weeds in regeneration zone		4 Bush Regenerators 1 day
	inspection of Environment Protection and Sediment devices, take photos	Monitoring	Environmental Consultant
	Install edging and retaining walls		Landscaper/builder
	Weed building envelope if they haven't been built on		2 Bush Regenerators 1 day
Immediately after Dwelling construction	Commence weed removal in revegetation areas		2 Bush Regenerators 1 day
	Continue weed removal in regeneration areas, placement of rocks. Logs and logs with hollows in regen and reveg areas		4 Bush Regenerators 1 day
	Removal of Environment Protection and Sediment control devices		4 Bush Regenerators 1 day
	Take photos of work done	Monitoring	Environmental Consultant
	Commence plantings and mulching in regen, reveg areas and in landscaped areas		4 Bush Regenerators for the reveg and regen areas landscapers for landscaped areas
2 months after construction	Follow up weed removal in all areas. Additional planting as needed.		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant

4 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch.		2 Bush Regenerators 1 day
6 months after construction	Follow up weed removal in all areas. Additional planting as needed.		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
8 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
10 months after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
12 months after construction	Follow up weed removal in all areas. Additional planting as needed, check mulch and weed matting		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
14 months after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
16 months after construction	Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1/2 day
18 months after construction	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
	Follow up weed removal in all areas. Additional planting as needed.		2 Bush Regenerators 1 day
20 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
22 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
2 years after construction	Follow up weed removal in all areas Additional planting as needed		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
2 years and 3 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
2 years and 6 months after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
2 years and 9 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day

3 years after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
3 years and 3 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
3 years and 6 months after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
3 years and 9 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
4 years after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
4 years and 3 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
4 years and 6 months after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
4 years and 9 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
5 years after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
5 years and 3 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
5 years and 6 months after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant
5 Years and 9 months after construction	Follow up weed removal in all areas. Additional planting as needed, check weed matting and mulch		2 Bush Regenerators 1 day
End of 5 years after construction	Follow up weed removal in all areas. Additional planting as needed		2 Bush Regenerators 1 day
	Take photos fill in data sheet, send to council	Monitoring	Environmental Consultant

13. Appendix C, Plant Species List

Flora Species List for Observation Point, Palm Beach

By Nicholas Skelton, GIS Environmental Consultants, 45 Austin Ave North Curl Curl, Ph: 041 943 8672

Species list is complied for the whole site not just a quadrat or a sub sample. This list may not be copied or reproduced without the permission of the author Nicholas Skelton.

October 2000

Location **AMG Easting 344055 and Northing 6281318**
Vegetation Type **9h ii**
Survey Area **0.5843 ha**

Summary Table

Total Records	137
Unique Species	109

Abundance

Relative Abundance	Less Disturbed Areas	More Disturbed Areas
Common	2	1
Frequent	9	13
Scattered	25	23
Uncommon	18	19
Uncommon & Widespread	13	14
Grand Total	68	70

Status

	Less Disturbed Areas	More Disturbed Areas
Noxious	8	11
Planted	2	8
Significant	2	2
Weed	8	24
Native	46	25
Grand Total	68	70

Continued over

Common Families

Most Common Families	Less Disturbed Areas	More Disturbed Areas
SOLANACEAE	5	11
MYRTACEAE	7	2
ASTERACEAE	2	7
FABACEAE	6	2
CONVOLVULACEAE	2	3
ROSACEAE	2	2
PROTEACEAE	2	2
OLEACEAE	2	2

Habit

	Less Disturbed Areas	More Disturbed Areas
Ferns	8	3
Grasses	5	7
Herbs	13	26
Palms	1	2
Scramblers	1	1
Shrubs	12	16
Trees	19	8
Vines	8	7

Key to Abundance

Abundance	Cover
Abundant	76 to 100%
Dominant	51 to 75%
Common	26 to 50%
Frequent	6 to 25%
Widespread	0 to 5%
Scattered	Isolated Few Individuals < 5%
Uncommon	Rare but widespread < 5%

Fauna Habitat Value

	Less Disturbed Areas	More Disturbed Areas
Glider and koala food	3	0
Koala and Glossy Black food	2	2
Fauna nectar, potential Glider	1	1
Food for many animals	1	1
Possible sap source	3	1
RCT and bandicoot habitat	1	0
TSC Act Listed	0, but one just outside the site	0

Flora Species List for Observation Point, Palm Beach

By Nicholas Skelton, GIS Environmental Consultants, 45 Austin Ave North Curl Curl, Ph: 041 943 8672

Species list for the site not just a quadrat or a sub sample. The list is ordered by abundance then genus then species.

October 2000

Location **AMG Easting 344055 and Northing 6281318**

Vegetation Type **9h li**

Survey Area **0.5843 ha**

Plants in the More Disturbed Areas

	Abundance On Site	Genus and Species	Family	Habit	Common Name	Status
1	Common	Asparagus plumosus	ASPARAGACEAE	Herb	Climbing asparagus	Nox W4c
2	Frequent	Adiantum aethiopicum	ADIANTACEAE	Fern	Maidenhair Fern	Protected
3	Frequent	Ageratina riparia	ASTERACEAE	Herb	Crofton Weed	Weed
4	Frequent	Banksia integrifolia ssp. integrifolia	PROTEACEAE	Tree	Coastal Banksia	
5	Frequent	Diospyros australis	EBENACEAE	Tree		Significant
6	Frequent	Ficus rubiginosa	MORACEAE	Tree	Port Jackson Fig	
7	Frequent	Glochidion ferdinandi var. ferdinandi	EUPHORBIACEAE	Tree	Cheese Tree	
8	Frequent	Imperata cylindrica var. major	POACEAE	Grass	Blady Grass	
9	Frequent	Ipomea indica	CONVOLVULACEAE	Vine	Morning glory	Nox W4c
10	Frequent	Lantana camara	VERBENACEAE	Shrub	Lantana	Nox W2
11	Frequent	Ligustrum lucidum	OLEACEAE	Shrub	Privet - broad leaved	Nox W4b
12	Frequent	Pittosporum undulatum	PITTOSPORACEAE	Tree	Sweet Pittosporum	
13	Frequent	Pteridium esculentum	DENNSTAEDTIACEAE	Fern	Bracken	
14	Frequent	Tradescantia albiflora	COMMELINACEAE	Herb	Wandering Jew	Weed
15	Widespread	Cissus antarctica	VITACEAE	Vine	Kangaroo Vine	
16	Widespread	Commelina cyanea	COMMELINACEAE	Herb	Creeping Christian	

17	Widespread	Dichondra repens	CONVOLVULACEAE	Herb	Kidney Weed	
18	Widespread	Kennedia rubicunda	FABACEAE	Vine		
19	Widespread	Ligustrum sinense	OLEACEAE	Shrub	Privet - narrow leaved	Nox W4b
20	Widespread	Lonicera japonica	CAPRIFOLIACEAE	Vine	Japanese Honeysuckle	Weed
21	Widespread	Pandorea pandorana	BIGNONIACEAE	Vine	Wonga Wonga Vine	
22	Widespread	Pennisetum clandestinum	POACEAE	Grass	Kikuyu	Planted
23	Widespread	Senna floribunda	CAESALPINIOIDEAE	Shrub	Cassia	Weed
24	Widespread	Sida rhombifolia	MALVACEAE	Shrub	Paddy's Lucerne	Weed
25	Widespread	Strelitzia sp.	MUSACEAE	Shrub	Bird of Paradise	Planted
26	Widespread	Verbena officinalis	VERBENACEAE	Herb	Common Verbena	Weed
27	Widespread	Viola hederacea	VIOLACEAE	Herb	Native Violet	
28	Widespread	Allocasuarina torulosa	CASUARINACEAE	Tree	Forest She-oak	
29	Scattered	Acacia longifolia	FABACEAE	Shrub	Sydney Golden Wattle	
30	Scattered	Acetosa sagittata	POLYGONACEAE	Vine	Turkey Rhubarb	Nox W4b
31	Scattered	Ageratina riparia	ASTERACEAE	Herb	Mistflower	Weed
32	Scattered	Angophora floribunda	MYRTACEAE	Tree	Rough-barked Apple	
33	Scattered	Bidens pilosa	ASTERACEAE	Herb	Cobbler's Pegs, Pitchforks	Weed
34	Scattered	Briza maxima	POACEAE	Grass	Quaking Grass	Weed
35	Scattered	Briza minor	POACEAE	Grass	Shivery Grass	Weed
36	Scattered	Canna indica	CANNACEAE	Herb	Canna Lily	Weed
37	Scattered	Conyza albida	ASTERACEAE	Shrub	Fleabane	Weed
38	Scattered	Dendrobium linguiforme	ORCHIDACEAE	Herb	Tongue Orchid	
39	Scattered	Gnaphalium sp.	ASTERACEAE	Herb	Cud weed	weed
40	Scattered	Hibiscus sp.	MALVACEAE	Shrub	Hibiscus	Planted
41	Scattered	Hypochaeris glabra	ASTERACEAE	Herb	Smooth Cats Ear	Weed
42	Scattered	Ipomea calrica	CONVOLVULACEAE	Vine	Morning Glory	Nox W4c
43	Scattered	Livistona australis	ARECACEAE	Palm	Cabbage Tree Palm	Significant
44	Scattered	Nephrolepis cordifolia	DAVALLIACEAE	Fern	Fishbone Fern	Weed

45	Scattered	Ochna serrulata	OCHNACEAE	Shrub	Ochna, Mickey Mouse Plant	Nox W4b
46	Scattered	Oplismenus aemulus	POACEAE	Grass	Basket Grass	
47	Scattered	Paspalum dilatatum	POACEAE	Grass	Paspalum	Weed
48	Scattered	Rubus hillii	ROSACEAE	Scrambler	Broad-leaved Bramble	
49	Scattered	Solanum mauritianum	SOLANACEAE	Shrub	Wild Tabacco Tree	Weed
50	Scattered	Tropaeolum majus	TROPAEOLACEAE	Herb	Nasturtium	Weed
51	Scattered	Watsonia meriana cv.Bulbillifera	IRIDACEAE	Herb	Wild Watsonia, Bugle Lily	Weed
52	Uncommon	Arundo donax	POACEAE	Grass	Giant Reed / Elephant Grass	Nox W4a
53	Uncommon	Bougainvillea sp.	NYCTAGINACEAE	Shrub	Bougainvillea	Weed
54	Uncommon	Bryophyllum delagoense	CRASSULACEAE	Herb	Mother-of-millions	Weed
55	Uncommon	Cestrum parqui	SOLANACEAE	Shrub	Green Cestrum	Nox W2
56	Uncommon	Clivea miniata	AMARYLLIDACEAE	Herb	Kaffir Lily	Planted
57	Uncommon	Cotoneaster pannosus	ROSACEAE	Shrub	Cotoneaster	Weed
58	Uncommon	Dimorphotheca ecklonis	ASTERACEAE	Herb	Sailor Boy Daisy	Weed
59	Uncommon	Grevillea Hybrid	PROTEACEAE	Shrub	Grevillea	Planted
60	Uncommon	Monstera deliciosa	ARACEAE	Herb	Swiss Cheese Plant	Weed
61	Uncommon	Musa sp.	MUSACEAE	Herb	Banana	Planted
62	Uncommon	Nerium oleander	APOCYNACEAE	Shrub	Oleander	Planted
63	Uncommon	Phoenix canariensis	ARECACEAE	Palm	Canary Island Palm	Planted
64	Uncommon	Physalis peruviana	SOLANACEAE	Herb	Cape Gooseberry	Weed
65	Uncommon	Plantago lanceolata	PLANTAGINACEAE	Herb	Lamb's Tongues, Plantain	Weed
66	Uncommon	Plectranthus parviflorus	LAMIACEAE	Herb	Cockspur Flowers	
67	Uncommon	Protoasparagus aethiopicus	ASPARAGACEAE	Herb	Asparagus Fern	Nox W4c
68	Uncommon	Solanum nigrum	SOLANACEAE	Herb	Black-berry Nightshade	Weed
69	Uncommon	Syzygium oleosum	MYRTACEAE	Tree	Blue Lillypilly	Significant
70	Uncommon	Tetragonia tetragonoides	AIZOACEAE	Herb	Warrigal Greens, Native Spinach	

Plants in the Less Disturbed Areas

	Abundance On site	Genus and Species	Family	Habit	Common Name	Status
71	Common	Allocasuarina torulosa	CASUARINACEAE	Tree	Forest She-oak	
72	Common	Pittosporum undulatum	PITTOSPORACEAE	Tree	Sweet Pittosporum	
73	Frequent	Acmena smithii	MYRTACEAE	Tree	Lily Pilly	
74	Frequent	Adiantum aethiopicum	ADIANTACEAE	Fern	Maidenhair Fern	Protected
75	Frequent	Banksia integrifolia ssp. integrifolia	PROTEACEAE	Tree	Coastal Banksia	
76	Frequent	Backhousia myrtifolia	MYRTACEAE	Tree	Grey Myrtle	
77	Frequent	Diospyros australis	EBENACEAE	Tree		
78	Frequent	Eucalyptus piperita	MYRTACEAE	Tree	Sydney Peppermint	
79	Frequent	Ficus rubiginosa	MORACEAE	Tree	Port Jackson Fig	
80	Frequent	Glochidion ferdinandi var. ferdinandi	EUPHORBIACEAE	Tree	Cheese Tree	
81	Frequent	Ligustrum lucidum	OLEACEAE	Shrub	Privet - broad leaved	Nox W4b
82	Widespread	Acacia longifolia	FABACEAE	Shrub	Sydney Golden Wattle	
83	Widespread	Briza minor	POACEAE	Grass	Shivery Grass	Weed
84	Widespread	Cissus antarctica	VITACEAE	Vine	Kangaroo Vine	
85	Widespread	Commelina cyanea	COMMELINACEAE	Herb	Creeping Christian	
86	Widespread	Elaeocarpus reticulatus	ELAEOCARPACEAE	Tree	Blueberry Ash	
87	Widespread	Imperata cylindrica var. major	POACEAE	Grass	Blady Grass	
88	Widespread	Ipomea indica	CONVOLVULACEAE	Vine	Morning glory	Nox W4c
89	Widespread	Lantana camara	VERBENACEAE	Shrub	Lantana	Nox W2
90	Widespread	Notelaea venosa	OLEACEAE	Shrub	Native Olive	
91	Widespread	Pandorea pandorana	BIGNONIACEAE	Vine	Wonga Wonga Vine	
92	Widespread	Pteridium esculentum	DENNSTAEDTIACEAE	Fern	Bracken	
93	Widespread	Rapanea variabilis	MYRSINACEAE	Tree	Brush Muttonwood	
94	Widespread	Strelitzia sp.	MUSACEAE	Shrub	Bird of Paradise	Planted
95	Widespread	Tradescantia albiflora	COMMELINACEAE	Herb	Wandering Jew	Weed
96	Scattered	Acacia implexa	FABACEAE	Shrub	Hickory	

97	Scattered	Acacia parramattensis	FABACEAE	Tree	Parramatta Green Wattle	
98	Scattered	Ageratina riparia	ASTERACEAE	Herb	Crofton Weed	Weed
99	Scattered	Angophora floribunda	MYRTACEAE	Tree	Rough-barked Apple	
100	Scattered	Calochlaena dubia	DICKSONIACEAE	Fern	False Bracken Fern	
101	Scattered	Cassine australis var. australis	CELASTRACEAE	Tree		Sig Pltt
102	Scattered	Cissus hypoglauca	VITACEAE	Vine	Native Grape	
103	Scattered	Cortaderia sp.	POACEAE	Grass	Pampas Grass	Nox W2
104	Scattered	Corymbia maculata	MYRTACEAE	Tree	Spotted Gum	
105	Scattered	Dianella caerulea	PHORMIACEAE	Herb	Blue Flax Lily	
106	Scattered	Dichondra repens	CONVOLVULACEAE	Herb	Kidney Weed	
107	Scattered	Entolasia stricta	POACEAE	Grass		
108	Scattered	Eucalyptus botryoides	MYRTACEAE	Tree	Bangalay	
109	Scattered	Eustrephus latifollus	LUZURIAGACEAE	Vine	Wombat Berry	
110	Scattered	Geitonoplesium cymosum	LUZURIAGACEAE	Vine	Scrambling Lily	
111	Scattered	Geranium homeanum	GERANIACEAE	Herb		
112	Scattered	Gleichenia dicarpa	GLEICHENIACEAE	Fern		
113	Scattered	Glycine clandestina/microphylla	FABACEAE	Vine	Love Creeper	
114	Scattered	Hypochaeris glabra	ASTERACEAE	Herb	Smooth Cats Ear	Weed
115	Scattered	Livistona australis	ARECACEAE	Palm	Cabbage Tree Palm	Significant
116	Scattered	Oplismenus aemulus	POACEAE	Grass	Basket Grass	
117	Scattered	Senna floribunda	CAESALPINIOIDEAE	Shrub	Cassia	Weed
118	Scattered	Smilax glyciphylla	SMILACACEAE	Vine	Native Sarsaparilla	
119	Scattered	Trifolium repens	FABACEAE	Herb	White Clover	Weed
120	Scattered	Viola hederacea	VIOLACEAE	Herb	Native Violet	
121	Uncommon	Acacia ulicifolia	FABACEAE	Shrub	Prickly Moses	
122	Uncommon	Angophora costata	MYRTACEAE	Tree	Smooth-barked Apple	
123	Uncommon	Asparagus densiflorus	ASPARAGACEAE	Herb	Asparagus Fern	Nox W4c
124	Uncommon	Asparagus plumosus	ASPARAGACEAE	Herb	Climbing asparagus	Nox W4c
125	Uncommon	Blechnum ambiguum	BLECHNACEAE	Fern		
126	Uncommon	Brachychiton acerifolius	STERCULIACEAE	Tree	Flame Tree	
127	Uncommon	Breynia oblongifolia	EUPHORBIACEAE	Shrub	Breynia	

128	Uncommon	Cyathea cooperi	CYATHEACEAE	Fern	Straw Tree Fern	
129	Uncommon	Eriobotrya japonica	ROSACEAE	Shrub	Loquat	Planted
130	Uncommon	Histiopteris incisa	DENNSTAEDTIACEAE	Fern	Batswing Fern	
131	Uncommon	Lilium formosum	LILIACEAE	Herb	Roadside Lilly	Weed
132	Uncommon	Ochna serrulata	OCHNACEAE	Shrub	Ochna, Mickey Mouse Plant	Nox W4b
133	Uncommon	Persoonia linearis	PROTEACEAE	Shrub	Narrow-leaved Geebung	
134	Uncommon	Petroselinum crispum	PLATYSTACEAE	Herb	Parsley	Weed
135	Uncommon	Pittosporum revolutum	PITTOSPORACEAE	Tree	Rough-fruit Pittosporum	
136	Uncommon	Rubus fruticosus (agg. sp.)	ROSACEAE	Scrambler	Blackberry	Nox W2 or Nox W3
137	Uncommon	Todea barbara	OSMUNDACEAE	Fern		

Noxious weed classifications	
W1	The presence of the weed on land must be notified to the local control authority and the weed must be fully and continuously suppressed and destroyed.
W2	The weed must be fully and continuously suppressed and destroyed.
W3	The weed must be prevented from spreading and its numbers and distribution reduced.
W4a	The weed must not be sold, propagated or knowingly distributed and any part of the weed must be prevented from growing within 3 metres of the boundary of a property.
W4b	The weed must not be sold, propagated or knowingly distributed and any existing weed must be prevented from flowering and fruiting.
W4c	The weed must not be sold, propagated or knowingly distributed and the weed must be prevented from spreading to an adjoining property.
W4d	The weed must not be sold, propagated or knowingly distributed and the weed must be removed if it is: 3 metres in height or less, or within half a kilometre of remnant urban bushland, as defined by SEPP 19, and is not deemed by Council as having historic
W4e	The weed must be fully and continuously suppressed and destroyed. All reasonable precautions must be taken to ensure produce, soil, livestock, equipment and vehicles are free of the weed before sale or movement from an infested area of the property.
W4f	The weed must not be sold, propagated or knowingly distributed. Any biological control or other control program directed by a local control authority must be implemented.
W4g	The weed must not be sold, propagated or knowingly distributed.

14. Appendix D, Monitoring Sheets

Monitoring Sheet for 5 Year Bushland Management Plan

For 1148 - 1152 Barrenjoey Road, Palm Beach

By Nicholas Skelton, GIS Environmental Consultants Ph: 041 943 8672

See text of Management Plan for details

General

Date	/ /
Recorders initials	

Site Personnel

		Qualifications & Experience	Signature
Field Leader			
Name of any other field person			
Contact Mobile phone number			

Effort

Total Hours spent on site	
Hours spent weeding	
Hours spent planting	
Hours spent other activities (specify)	

Work Completed

Include weed control methods used and show on map where planted and weeded

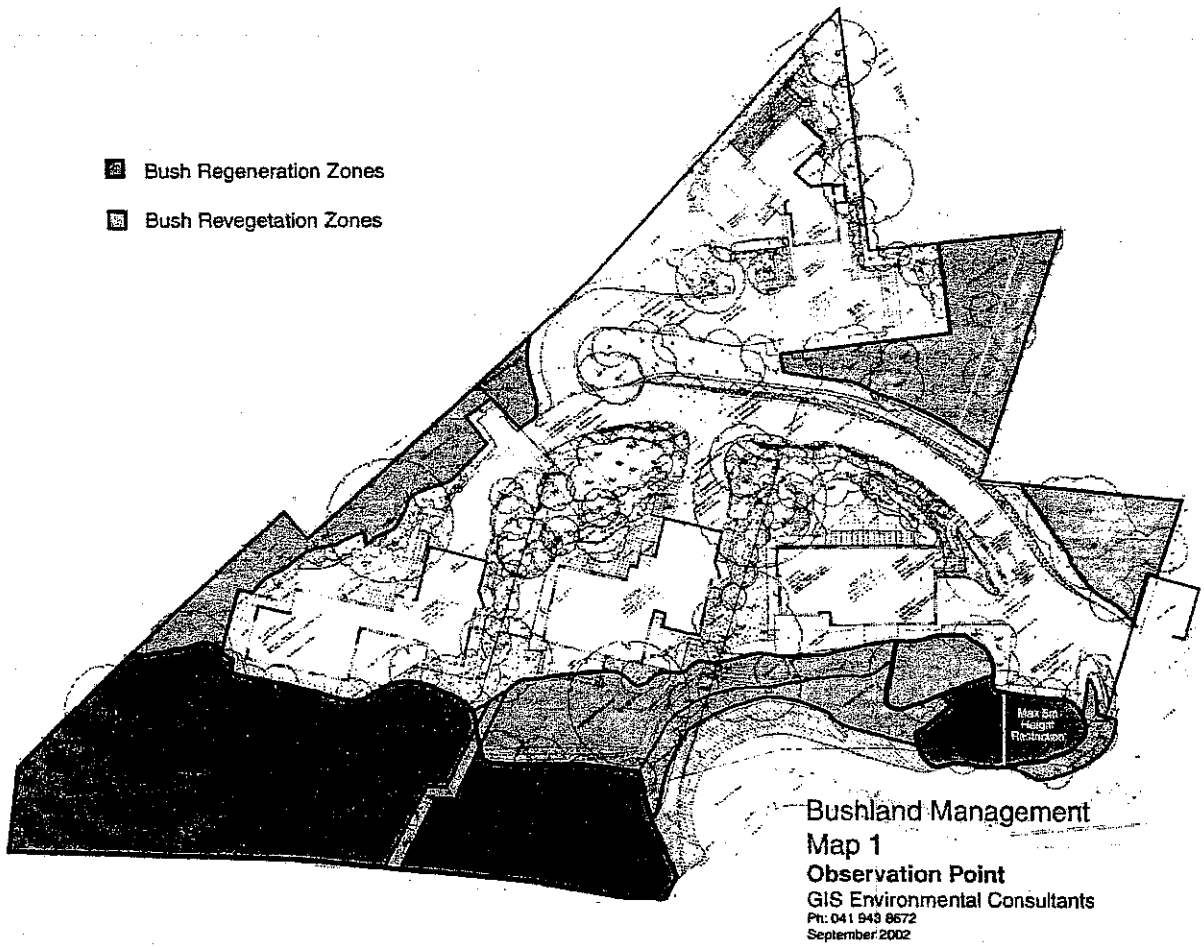
Materials Used

Plants planted	Species	Quantity	Pot Size

Source (nursery) of plants

Source and type of mulch/chip and other materials used (or "none")

Site Map



Plants and animals seen

Plants seen during field work			
Fauna seen during work			

Pest birds seen on site: Circle; Sparrows, Indian Mynors, other

Evidence of cats or dogs using the site:

Nesting boxes

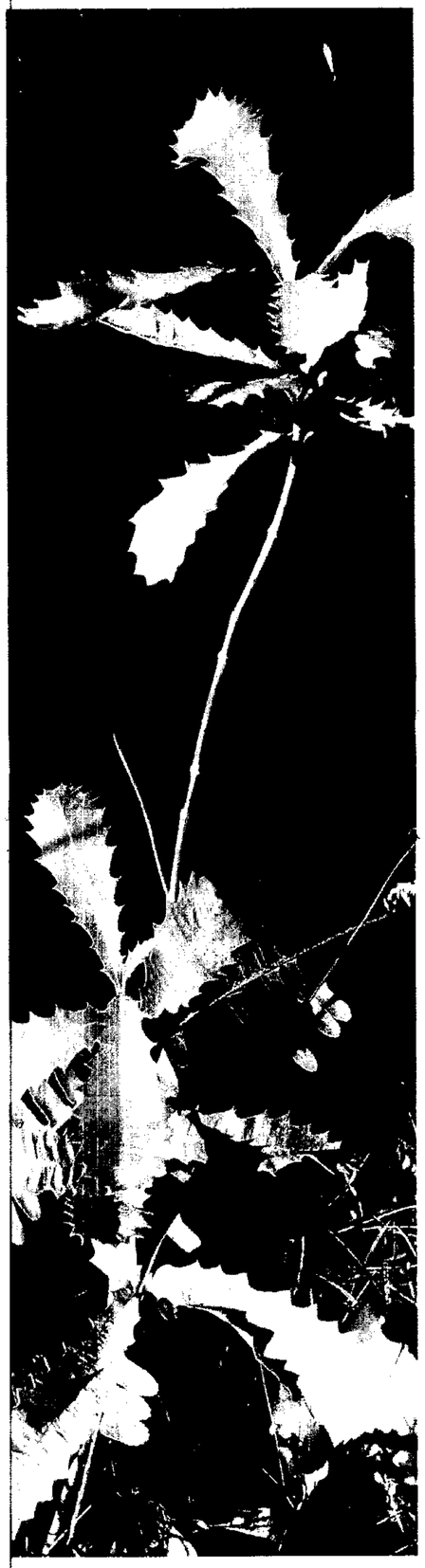
Is there evidence of pest birds using the mammal boxes	Yes / No	If so were the pests removed	Yes / No
Is there evidence of Gliders, possums or bats using the boxes	Yes / No	If so what evidence	

Monitoring/Photos

Photos taken at 4 photo points: Yes / No

Signs of disturbance eg. Exotic plants planted, soil imported, herbicide or insecticide use, vegetation (including trees) damaged or dead, nutrient spill, changed drainage etc.

Send completed form and photos with dates on back to; Environment Unit Pittwater Council.



bushland management plan - house 3, observation point ,1148 - 1152 barrenjoey road, palm beach

Footprint Green Pty Ltd
Botanical, Environmental & Horticultural Consultants
5 Watkins Road, Avalon Beach, NSW 2107
Email: mail@footprintgreen.com.au
Ph: (02) 99188877
Fax: (02) 99188576
ABN 34 097 138 817

prepared by
Mark Couston CPESC - Ass Dip Env. Ctrl. (CSU), Grad. Dip. Env. Mgmt. (CSU), CoA Soil & Water Mgmt. (UWS), MESA, MECA

7 september 2004

1. Introduction

1.1 background
This bushland management plan has been prepared in conjunction with a proposed development at Lot 3 at 1148-1152 Barrenjoey Road, Palm Beach and has been developed to meet the requirements of Pittwater Council's conditions of development consent. The report has been commissioned by Raypond Pty Ltd and site instructions and plans have been provided by Raypond Pty Ltd and Selena Hannan Landscape Design.

Subsequent site inspections were conducted between the 25th & 28th August 2004 and for the purposes of this plan the area within allotment 3 at 1148-1152 Barrenjoey Road, Palm Beach will be referred to as the site

Development consent was given by Pittwater Council for construction of a dwelling on Lot 3 subject to a number of conditions. Included in these were the following:

- B15, Three copies of a detailed Bushland Management Plan covering the regeneration/ revegetation/ restoration of the site are to be submitted prior to the release of the Construction Certificate. The Bushland Management Plan is to be accompanied by a certification by an appropriately qualified and experienced Bushland Management Consultant stating that the Bushland Management Plan is consistent with Department of Urban Affairs and Planning's Urban Bushland Management Guidelines, the Conservation of Biodiversity DCP, the management for Threatened Flora & Fauna in Pittwater and any relevant requirements.
- B15a, In particular, the following matters are to be addressed:
  1. define each project task to be undertaken during regeneration / revegetation / restoration; how each tasks will be done; the duration of each task; the priority order for each task; and who will be responsible for undertaking each task
  2. Prepare a time frame for all tasks involved
  3. Local native to be used - identify local native plant stock
  4. Prepare maps /diagrams and plant species lists including existing vegetation, site constraints and trees, vegetation, habitat, bush rock and other natural features to be retained.
  5. Prepare maps/ diagrams including proposed vegetation (species/ communities), density of planting, size of plants (viroculls, longsleeve, tubestock etc.), sediment and erosion control to protect the vegetation etc.
  7. Specify techniques to be used for domestic and feral animal control.
  9. Detail site preparation including
     a. Protection of trees, vegetation, habitat, bush rock or other natural feature to be retained;
     b. Installation of sediment and erosion control devices
     c. Completion of any site works.
     d. Weed control prior to disturbance (techniques and sequences of removal)
     e. Weed control immediately following completion of site works (techniques and sequence of removal)
     f. Application of herbicides (if any) prior to site disturbance.
     g. Application of herbicides (if any) immediately following completion of site works.
     h. Top soil / litter layer
     i. Soil remediation
     j. Surface preparation (including levelling, deep ripping, scarifying, mulching).
     k. Surface stabilisation (must be suitable for the site vegetation) - matters including erosion matting, mulch brush-matting, sterile cover crops, binding sprays, and
     l. Site drainage
  10. Planting program and method including installation of weed matting, mulch, stakes and tree guards, use of fertilizer and type (including justification of the use of fertilizer), use of water retaining crystals.
  11. Site and vegetation maintenance including sediment and erosion control, watering, replacement of plant loss, disease and insect control, mulch, maintenance for a period of 18 months commencing at date of issue of Occupation Certificate.
  12. Site management to prevent the placement of soil or storage of any materials in the drip line of trees or native vegetation or habitat to be retained on the site.
  13. Monitoring and review (develop method for performance evaluation, replacement of plant losses and other relevant matters).
  14. Other issues including public safety, signage, relevant legislation, planning instruments / guidelines, OH&S, community involvement, liaison with Department of Land & Water Conservation and other government departments, how other areas of the property and adjacent areas can be managed to complement the vegetation strategy (weed control, drainage, planting of indigenous canopy)
  15. Detail the enhancement and regeneration of retained remnants. Where thickets of noxious or environmental weeds are to be removed, such removal is to be gradual and staged to prevent sudden complete loss of habitat.
  16. Identification of protection of trees, vegetation, habitat, bush rock or other natural features, prior to works commencing on the site to prevent damage or injury during development.
  17. Materials, stockpiles and vehicle stockpile areas are to be located on already cleared are disturbed land well away from creek line, trees, vegetation, habitat, bushrock or other natural features.

Note: This bushland management plan consists of 4 sheets and as part of the plan Sheet 2 has included detail required to satisfy Condition B24 and Sheet 4 identified information required by Condition 26 of the consent.

Whilst there are a number of certifications required as part of the development consent the following certifications are directly relevant to this plan

Prior to issue of Construction Certificate
- B15, The Bushland Management Plan is consistent with the Department of Urban Affairs and Planning's Urban Bushland Management Guidelines, the Conservation of Biodiversity DCP, the management for Threatened Flora & Fauna in Pittwater and any relevant requirements (date & signature) ..... M.B. Couston 8/9/04

Prior to Commencement of Work
- C1. Prior to commencement of site works, a qualified experienced bushland management consultant is to certify that they have been engaged to conduct a program of Bushland Management covering the regeneration / revegetation / restoration of the site. All details of the Bushland Management Program are to be in accordance with the Bushland Management Plan approved and / or nominated on the Construction Certificate. (date & signature) .....
- C2, see C1
- C2a1, Preorder or evidence of supply of plant material to be used identifying local native plant stock source is to be submitted to Council or the accredited certifier. Failure to submit will involve breach of this consent / approval. (date & signature) .....
- C2a3, A qualified ecologist is to certify that protective fencing has been installed around the trees, vegetation, habitat, bushrock or other natural features to be retained. (date & signature) .....
- C2a4, The Site Manager is to certify that sediment and erosion control devices have been installed. (date & signature) .....
- C2a5, A qualified ecologist is to certify that site works have been completed. (date & signature) .....
- C2a6, A qualified experienced bushland management consultant is to certify that the weed control required prior to disturbance of the site has been completed in accordance with the techniques and sequences of removal weed control. (date & signature) .....
- C2a7, A qualified experienced bushland management consultant is to certify that application of herbicides required prior to disturbance of the site has been completed (date & signature) .....
- C2a8, The Site Manager is to certify that top soil / litter storage has been completed (date & signature) .....
- C2a9, The Site Manager is to certify that soil remediation has been completed (date & signature) .....
- C2a10, The Site Manager is to certify that surface preparation has been completed. (date & signature) .....
- C2a11, A qualified experienced bushland management consultant is to certify that surface stabilization suitable for site vegetation has been completed. (date & signature) .....
- C2a12, A qualified bushland management consultant is to certify that site drainage has been completed. (date & signature) .....
- C2a13, The site Manager is to certify that no soil or storage has been placed in the dripline of trees or native vegetation or habitat to be retained on the site. (date & signature) .....
- C2a14, The Project Manager is to certify that other issues including public safety, signage, relevant legislation, planning instruments / guidelines, OH&S, community involvement, liaison with Department of Land & Water Conservation and other government departments, how other areas of the property and adjacent areas can be managed to complement the vegetation strategy (Weed control, drainage, planting of indigenous canopy) have been addressed.
- C4, Prior to commencement of works a qualified bushland management consultant is to certify that adequate tree protection / exclusion fencing has been adequately installed as detailed in the approved plans prior to issue of the construction certificate. (date & signature) .....
  A site inspection is to be carried out by a Natural Resources Officer and Landscape Officer

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Construction Cert. No: 24582 Approved Date: 22 OCT 2004
Certifying Authority: Brendan Bennett
Accreditation No: PIA3004

nts 07/09/04 cpbmp3 0.2 1 4

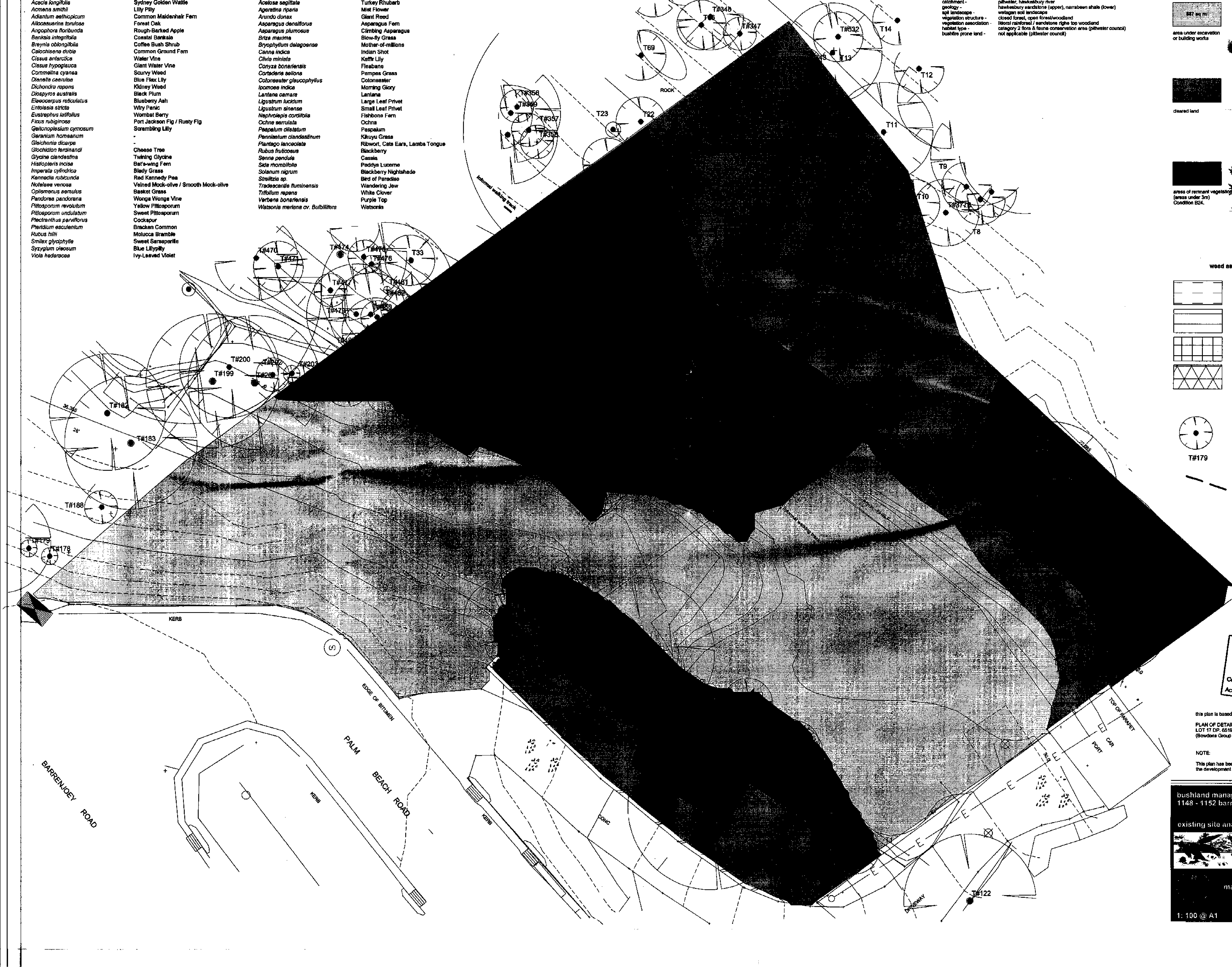
site floristics

characteristic endemic species

Genus/species	Common Name
Acacia longifolia	Sydney Golden Wattle
Acmena smithii	Lilly Pilly
Adiantum aethiopicum	Common Maidenhair Fern
Allocasuarina torulosa	Forest Oak
Angophora floribunda	Rough-Barked Apple
Banksia integrifolia	Coastal Banksia
Breynia oblongifolia	Coffee Bush Shrub
Calochlaena dubia	Common Ground Fern
Cissus antarctica	Water Vine
Cissus hypoglauca	Giant Water Vine
Commelina cyanea	Scurvy Weed
Dianella caerulea	Blue Flax Lily
Dichondra repens	Kidney Weed
Diospyros australis	Black Plum
Elaeocarpus reticulatus	Blueberry Ash
Entolasia stricta	Wiry Panic
Eustrephus latifolius	Wombat Berry
Ficus rubiginosa	Port Jackson Fig / Rusty Fig
Geitonoplesium cymosum	Scrambling Lilly
Geranium homeanum	-
Gleichenia dicarpa	-
Glochidion ferdinandi	Cheese Tree
Glycine clandestina	Twining Glycine
Histiopteris incisa	Bat's-wing Fern
Imperata cylindrica	Blady Grass
Kennedia rubicunda	Red Kennedy Pea
Notelaea venosa	Veined Mock-olive / Smooth Mock-olive
Oplismenus aemulus	Basket Grass
Pandorea pandorana	Wonga Wonga Vine
Pittosporum revolutum	Yellow Pittosporum
Pittosporum undulatum	Sweet Pittosporum
Plectranthus parviflorus	Cockspur
Pteridium esculentum	Bracken Common
Rubus hillii	Molucca Bramble
Smilax glyciphylla	Sweet Sarsaparilla
Syzygium oleosum	Blue Lillypilly
Viola hederacea	Ivy-Leaved Violet

characteristic exotic species

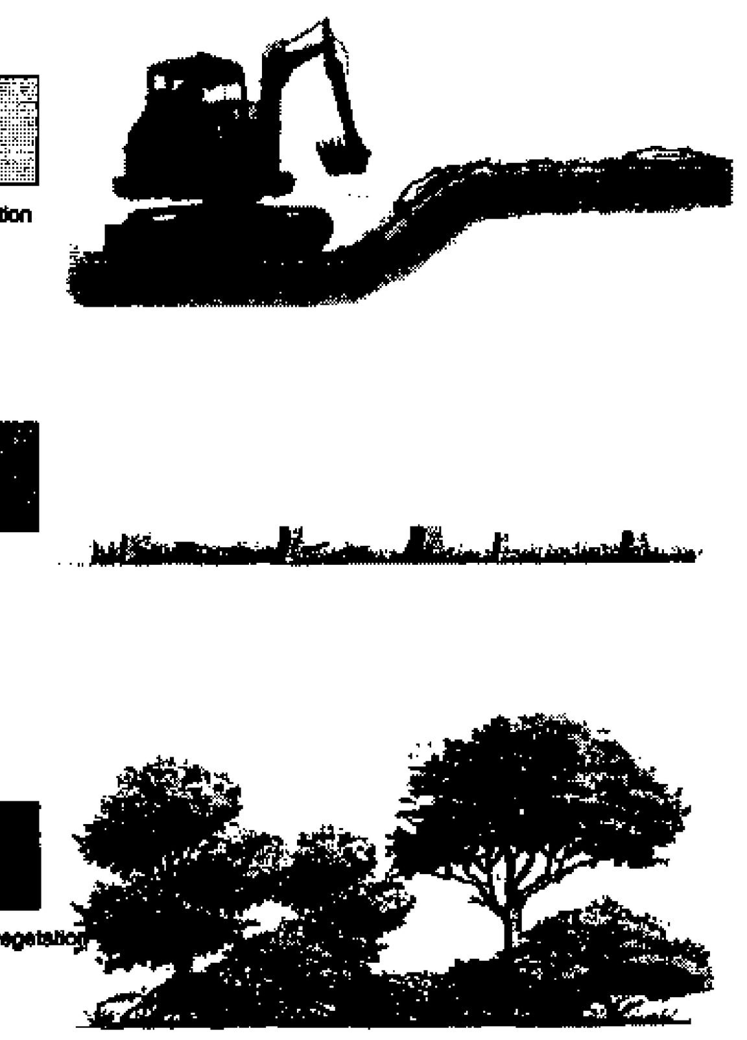
Genus/species	Common Name
Acetosa sagittata	Turkey Rhubarb
Ageratina riparia	Mist Flower
Arundo donax	Giant Reed
Asparagus densiflorus	Asparagus Fern
Asparagus plumosus	Climbing Asparagus
Briza maxima	Blow-fly Grass
Bryophyllum delagoense	Mother-of-millions
Canna indica	Indian Shot
Clivia miniata	Kaffir Lily
Conyza bonariensis	Fleabane
Cortaderia selloana	Pampas Grass
Cotoneaster glaucophyllus	Cotoneaster
Ipomoea indica	Morning Glory
Lantana camara	Lantana
Ligustrum lucidum	Large Leaf Privet
Ligustrum sinense	Small Leaf Privet
Nephrolepis cordifolia	Fishbone Fern
Ochna serrulata	Ochna
Paspalum dilatatum	Paspalum
Pennisetum clandestinum	Kikuyu Grass
Plantago lanceolata	Ribwort, Cats Ears, Lambs Tongue
Rubus fruticosus	Blackberry
Senna pendula	Cassia
Sida rhombifolia	Paddys Lucerne
Solanum nigrum	Blackberry Nightshade
Strelitzia sp.	Bird of Paradise
Tradescantia fluminensis	Wandering Jew
Trifolium repens	White Clover
Verbena bonariensis	Purple Top
Watsonia meriana cv. Bulbillifera	Watsonia



general site information

aspect -	west
general slope -	26 deg, 49%
catchment -	pittwater, hawkesbury river
geology -	hawkesbury sandstone (upper), narrabeen shale (lower)
soil landscape -	watagan soil landscape
vegetation structure -	closed forest, open forest/woodland
vegetation association -	littoral rainforest / sandstone ridge top woodland
habitat type -	category 2 flora & fauna conservation area (pittwater council)
bushfire prone land -	not applicable (pittwater council)

site vegetation structure



587 sq m

area under excavation or building works

cleared land

areas of remnant vegetation (areas under 3m) Condition B24.

weed assessment

weed density	area
weed class 1 - little or no exotic biomass	303 sq m
weed class 2 - low % exotic biomass	393 sq m
weed class 3 - moderate % exotic biomass	35 sq m
weed class 4 - high % of exotic biomass	347 sq m

existing trees as per survey

T#179 — tree reference numbers as per survey

informal walking track

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Accreditation No: PIA3004

this plan is based upon:

PLAN OF DETAIL AND CONTOURS OVER LOTS 1817 182 DP.534139
LOT 17 DP. 651978 & LOT 16 DP. 6746, Revision N, 10.03.03, Dwg No. 31784/02)
(Bowdens Group Development Consultants, Parramatta)

NOTE:

This plan has been preparrd to satisfy Condition B24. of the conditions of the development consent.

bushland management plan - house 3. observation point
1148 - 1152 barrenjoey road, palm beach

existing site analysis as of 27/08/04

Footprint Green Pty Ltd
6 Watkins Road, Avalon Beach, NSW 2107

mark couston

1: 100 @ A1 07/09/04 sabmp3 0.2 2 4

performance criteria for site works & protection areas

area subject to earthworks & construction

performance criteria
- protective fencing restricting access or damage beyond this area.
- sediment controls in place to minimise sediment movement beyond this area.
- surface stabalised where there are no activities to minimise erosion.
- the area is maintained so as to achieve less that 5% noxious or environmental weed biomass at all times (with the exception of temporary soil retention cover crops).

areas of remnant vegetation to be retained

performance criteria
- no physical disturbance to soil profiles, existing vegetation and habitats.
- conditions retained that encourage the natural regeneration of endemic flora species.
- the area maintained periodically so as to achieve less that 5% exotic weed biomass.

tree 23 root zone protection

- no physical disturbance to soil profiles, existing vegetation and habitats.
- the area maintained periodically so as to achieve less that 5% exotic weed biomass.

specifications

temporary protective fencing

the purpose of the fencing is to identify and protect natural features or habitats and endemic vegetation

fencing is to be 1.5m high securely fixed with steel supporting posts or star pickets with continuous wire strands and 1.5m high continous chain mesh with signage.

where up slope works are intended, the protective fencing shall incorporate sediment control fencing installed to manufacturers instructions

signage is to be fixed at visible locations with the wording "Environmental Protection" "No Access, Storage or Disturbance Permitted"

weed control

weed control is to be undertaken using standard bush regeneration techniques (hand remove, cut & paint, spot spray, stem scrape etc.) with the use of glyphosate based herbicides wher necessary.

weed material containing seed or weed material capable of spreading vegetatively shall be removed from site and disposed of at an appropriate location where it will not cause further environmental damage.

temporary cover crop

Depending upon the season, temporary cover crops are to be sown with either:
- Autumn/Winter seed mix - Oats @ 40kg/ha and Japanese Millet @ 10kg/ha
- Spring/Summer seed mix - Japanese Millet @ 20kg/ha and Oats @ 20kg/ha

legend

- protective fencing
- existing trees to be retained (refer arborists report for specific tree protection)
- existing trees to be removed
- T#999 tree reference numbers as per survey

plan implementation

prior to construction commencing

- a qualified and experienced bushland management contractor shall be engaged to undertake to conduct the weed control, regeneration / revegetation works associated with this plan
- all endemic plants capable of being transplanted within the area to be disturbed are to be tagged for relocation using blue flagging tape
- all tagged plants are to be relocated to within the identified regeneration areas on site.
- where high numbers of seeds/fruit are evident on trees identified for removal, branches containing seeds/fruit shall be cut and used as brush-matting in the regeneration areas.
- the removal of identified trees should be undertaken ensuring no damage occurs to branches and foliage of trees being retained.
- protective fencing and sediment controls are to be erected as shown on this plan or as shown on sediment & erosion control plans.
- all exotic plants, noxious and environmental weeds within the protective fencing and outside the protective fencing shall be eradicated (primary weeding) using bush regeneration weed control methods.
- the top soil in the area to be disturbed where there are low levels of weed can to be stored on site and reused as part of the rehabilitation process.
- a nursery that specialises in the propagation of native plants will be engaged to supply plants for the rehabilitation process.
- environmental awareness and identification of environmental protection zones is to be incorporated as part of the site induction program for contractors along with OH&S practices.
- relevent works required as identified in the conditions of development consent are to carried out.
- certifications relating to matters identified in section C of the development consent are required.
- an environmental monitoring / compliance auditing program is to be developed to ensure compliance with site controls and conditions of development consent.

during the excavation & construction process

- secondary weeding is to be undertaken across the entire site with particular effort to remove seed from regenerating weed species.
- the allotment is to be maintained free from noxious & environmental weeds at all times during the construction process.
- depending upon the season, ongoing weeding is to be undertaken at minimum of 2 monthly intervals with additional weed control as deemed necessary to control the establishment of noxious and environmental weeds and meet the performance criteria for each area.
- the vegetation and habitats within the areas identified as remnant vegetation to be retained shall be remain undisturbed and managed to meet the performance measures on this plan.
- areas that have been disturbed and are vulnerable to soil erosion will be treated with a cover crop to minimise the risk of erosion and sediment deposition off site.
- protective fencing and sediment controls shall be maintained in a functional condition through out the construction process.
- environmental awareness and identification of environmental protection zones is conducted as part of the site induction program for contractors along with OH&S practices.
- an environmental monitoring / compliance auditing program is to be undertaken to ensure compliance with site controls and conditions of development consent.

retention of tree 317 subject to arborist's report

HOUSE 3
DEVELOPMENT APPLICATION ASSESSMENT PLAN ONLY
CONSTRUCTION CERTIFICATE NOT TO BE ISSUED

ROCK

KERB

EDGE OF BITUMEN

PALM BEACH ROAD

BARRENJOEY ROAD

ACCESS DRIVEWAY

CONC

MSB1

CAR PORT

CITY PLAN SERVICES
Construction Cert. No: 24582 Approved Date: 22 OCT 2004
Certifying Authority: Brendan Bennett
Accreditation No: PIA3004

this plan is based upon:

PLAN OF DETAIL AND CONTOURS OVER LOTS 1617 182 DP.534139 LOT 17 DP. 651978 & LOT 16 DP. 8746, Revision N, 10.03.03, Dwg No. 31764/02 (Bowdens Group Development Consultants, Parramatta, NSW)

Subdivision plan dated 11.11.02 (Crone Nation Architects, Sydney, NSW)

bushland management plan - house 3, observation point
1148 - 1152 barrenjoey road, palm beach

works prior to & during excavation & construction

Footprint Green PTY LTD
mark couston

1: 100 @ A1 07/09/04 pwbmp3 0.2 3 4

performance criteria for revegetation & bush regeneration areas

bushland revegetation area

performance criteria
- planting carried out in accordance with the planting densities and species options.
- plantings are to be maintained in a healthy state showing signs of good vigour.
- the area is to be maintained periodically so as to achieve less than 5% exotic weed biomass at all times.
- there should be no signs of active erosion or sediment deposition.

planting densities
- trees - 1 tree per 25 sq m with specific Black Plums identified on this plan and additional specific trees identified on Landscape Plan (Hannan, Dwg. No. LP10A),
- understorey shrubs - 1 plant per 2 sq m (average),
- grasses / ground covers - 4 plants per 1 sq m (average).

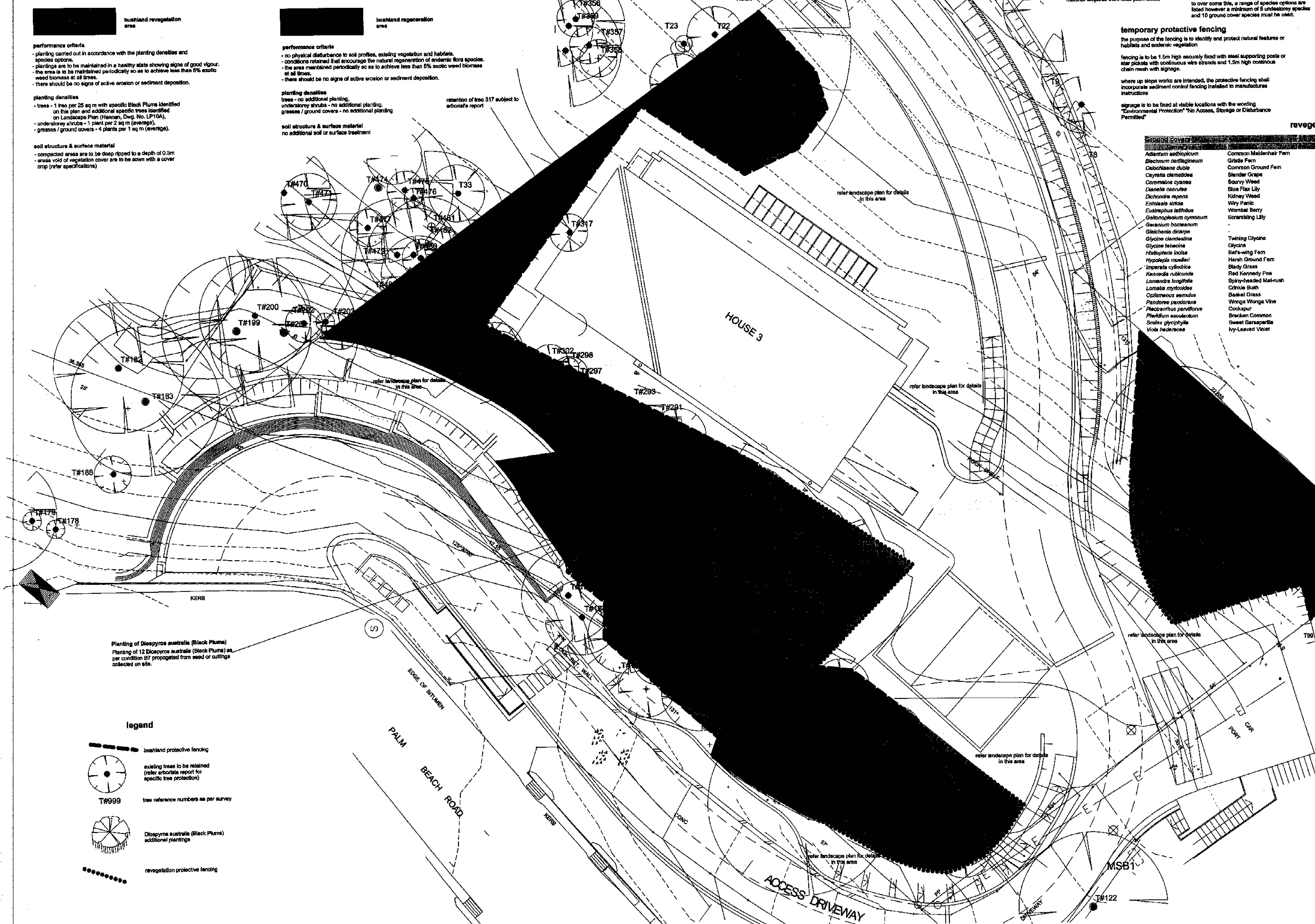
soil structure & surface material
- compacted areas are to be deep ripped to a depth of 0.3m
- areas void of vegetation cover are to be sown with a cover crop (refer specifications)

bushland regeneration area

performance criteria
- no physical disturbance to soil profiles, existing vegetation and habitats.
- conditions retained that encourage the natural regeneration of endemic flora species.
- the area maintained periodically so as to achieve less than 5% exotic weed biomass at all times.
- there should be no signs of active erosion or sediment deposition.

planting densities
trees - no additional planting,
understorey shrubs - no additional planting,
grasses / ground covers - no additional planting

soil structure & surface material
no additional soil or surface treatment



Planting of Diospyros australis (Black Plums)
Planting of 12 Diospyros australis (Black Plums) as per condition B7 propogated from seed or cuttings collected on site.

legend

bushland protective fencing
existing trees to be retained (refer arborists report for specific tree protection)
T#999 tree reference numbers as per survey
Diospyros australis (Black Plums) additional plantings
revegetation protective fencing

specifications

weed control
weed control is to be undertaken using standard bush regeneration techniques (hand remove, cut & paint, spot spray, stem scrape etc.) with the use of glyphosate based herbicides where necessary.

weed material containing seed or weed material capable of spreading vegetatively shall be removed from site and disposed of at an appropriate location where it will not cause further environmental damage.

sourcing endemic plants
all plants used as part of the rehabilitation / revegetation works are to sourced from suppliers who specialise in propagating material acquired from local plant stock.

temporary cover crop
Depending upon the season, temporary cover crops are to be sown with either:
- Autumn/Winter seed mix - Oats @ 40kg/ha and Japanese Millet @ 10kg/ha;
- Spring/Summer seed mix - Japanese Millet @ 20kg/ha and Oats @ 20kg/ha

species options & diversity
planting will be undertaken in accordance with the densities indicated for the respective areas.

all planting will be tubestock however viro-cells may be used for native grasses

it is recognised that specialist native plant nurseries may not be able to supply some of the species identified.

to over come this, a range of species options are listed however a minimum of 5 undestorey species and 10 ground cover species must be used.

temporary protective fencing
the purpose of the fencing is to identify and protect natural features or habitats and endemic vegetation

fencing is to be 1.5m high securely fixed with steel supporting posts or star pickets with continuous wire strands and 1.5m high continous chain mesh with signage.

where up slope works are intended, the protective fencing shall incorporate sediment control fencing installed to manufactures instructions

signage is to be fixed at visible locations with the wording "Environmental Protection" "No Access, Storage or Disturbance Permitted"

plan implementation

at completion of the construction works
- all noxious & environmental weed species are to be eradicated from the regeneration and revegetation areas and other parts of the site.
- final soil levels are to be graded within the revegetation areas with particular attention given to maintaining original soil levels adjacent trees.
- areas that have been compacted by machinery are to be ripped with particular attention given to avoid disturbance to root systems of adjacent trees.
- where revegetation areas exceed 10 deg (18%) a cover crop is to be sown.
- after the cover crop is sown the revegetation protective fencing shall be installed to prevent further disturbance and allow the cover crop to establish.
- when the cover crop establishes and shows signs of curing planting can occur.
- revegetation of the disturbed areas is to be undertaken in accordance with the species and planting densities referred to on this plan.
- protective fencing and sediment controls shall be maintained in a functional condition through out the construction process and can be removed at the completion of revegetation, landscape and construction works.
- the environmental monitoring / compliance auditing program is to be undertaken to ensure compliance with site controls and conditions of development consent.
- to obtain certification the performance criteria listed for each area is to be achieved.

on going maintenance & further considerations
- all plantings shall be maintained so as to display good health & vigour
- apart from typical seasonal variations, plantings showing poor vigour, stress or disease will be replaced
- in order to maintain the integrity of the site, on-going weed maintenance will be necessary particularly the removal of those species spread by birds.
- responsible pet ownership is also required primarily at night to allow small mammals to forage on the site.
- the feeding of native fauna is to be discouraged as it typically provides an artificial foraging and often poor dietary requirements, particularly for birds.
- the site has few species of obligate seeders which germinate readily from seed after fires. Conversely the populations of species that are sensitive to regular fire events increase between prolonged fire events. Given the physical disturbance that has occurred on the site and the high number of mesic species, it is recommended that fire be excluded from the site for 25 years for ecological purposes.

revegetation species options

Ground covers	
Genus species	Common Name
Adiantum aethiopicum	Common Maidenhair Fern
Blechnum cartilagineum	Gristle Fern
Calochlaena dubia	Common Ground Fern
Cayratia clematidea	Slender Grape
Commelina cyanea	Scurvy Weed
Dianella caerulea	Blue Flax Lily
Dichondra repens	Kidney Weed
Entolasia stricta	Wiry Panic
Eustrephus latifolius	Wombat Berry
Geitonoplesium cymosum	Scrambling Lily
Geranium homeanum	-
Gleichenia dicarpa	-
Glycine clandestina	Twining Glycine
Glycine tabacina	Glycine
Histiopteris incisa	Bat's-wing Fern
Hypolepis muelleri	Harsh Ground Fern
Imperata cylindrica	Blady Grass
Kennedia rubicunda	Red Kennedy Pea
Lomandra longifolia	Spiny-headed Mat-rush
Lomatia myricoides	Crinkle Bush
Oplismenus aemulus	Basket Grass
Pandorea pandorana	Wonga Wonga Vine
Plectranthus parviflorus	Cockspur
Pteridium esculentum	Bracken Common
Smilax glyciphylla	Sweet Sarsaparilla
Viola hederacea	Ivy-Leaved Violet

Trees	
Genus species	Common Name
Acmena smithii	Lilly Pilly
Allocasuarina torulosa	Forest Oak
Angophora floribunda	Rough-Barked Apple
Backhousia myrtifolia	Ironwood/Grey Myrtle Tree
Banksia integrifolia	Coastal Banksia
Cassine australis	Red Olive Plum
Corymbia maculata	Spotted Gum
Diospyros australis	Black Plum
Elaeocarpus reticulatus	Blueberry Ash
Eucalyptus botryoides	Swamp Mahogany
Glochidion ferdinandi	Cheese Tree
Guioa semiglauca	Guioa
Notelaea longifolia	Large Mock-olive
Notelaea venosa	Veined Mock-olive / Smooth Mock-olive
Rapanea variabilis	Muttonwood
Syzygium oleosum	Blue Lillypilly

Understorey	
Genus species	Common Name
Acacia falcata	Sickle Wattle
Acacia longifolia	Sydney Golden Wattle
Acronychia oblongifolia	Common Acronychia
Billardiera scandens	Appleberry
Breynia oblongifolia	Coffee Bush Shrub
Clerodendrum tomentosum	Hairy Clerodendrum
Cyathea australis	Rough Treefern
Eupomatia laurina	Bolwarra Shrub
Gahnia sieberiana	Sawsedge
Kunzea ambigua	Tick Bush
Macrozamia communis	Burrawang
Omalanthus populifolius	Bleeding Heart / Native Poplar
Persoonia linearis	Narrow-Leaved Geebung
Pittosporum revolutum	Yellow Pittosporum
Pittosporum undulatum	Sweet Pittosporum
Synoum glandulosum	Scentless Rosewood
Wilkiea huegeliana	Veiny Wilkiea

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PLAN OF DETAIL AND CONTOURS OVER LOTS 1817 182 DP.534139 LOT 17 DP. 651978 & LOT 16 DP. 6746, Revision N, 10.03.03, Dwg No. 31784/02 (Bowdens Group Development Consultants, Parramatta, NSW)

HOUSE 3 FLOOR PLANS, 20006 / ADA3 1003. 1148 - 1152 BARRENJOEY ROAD PALM BEACH. (Crone Associates, architects, Sydney, NSW)

Subdivision plan dated 11.11.02 (Crone Nation Architects, Sydney, NSW)

NOTE:

This plan has been prepared to satisfy Condition B26. of the conditions of the development consent.

bushland management plan - house 3, observation point
1148 - 1152 barrenjoey road, palm beach

bushland revegetation & regeneration

Footprint Green Pty Ltd
Arboricultural, Environmental & Horticultural Consultants
5 Watkins Road, Avalon Beach, NSW 2107
Email: mail@footprintgreen.com.au

mark couston

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HOUSE 3 CC TREE SUMMARY

All previously numbered and surveyed trees within Lot 3 boundaries are listed below, with the exception of some weed species. List compiled with reference to:

- Pittwater Council DA Conditions B22 & C7,
- PSB Tree Protection Plan TP10B dated 15/11/2002,
- PSB Landscape Planting Plan 00137/L03A, dated 25/06/2001,
- Stamped, approved Tree Survey TP05B, dated 06/01/2002,
- PSB Pre-Construction Tree/Vegetation Report, Subdivision Works, dated 10 April 2003.
- Urban Forestry Arboricultural Assessment dated September 2004.

1. Trees that have been approved for removal for the subdivision works due to their location within, or proximity to, the road or Construction Access Easement. These trees are not shown on Landscape Plan LP10A. Previous Issues of Tree Plans/Surveys, may be referred to if required.
T1, T3, T10, T19, T20, T21, T55, T121, T126, T160, T161, T162, T163, T165, T166, T169, T171, T198, T198, T205, T207, T208, T209, T210, T216, T217, T220, T221, T222, T224, T228, T229, T230, T231, T232, T233, T234, T235, T236, T237, T238, T239, T247, T248, T252, T253, T254, T255, T256, T257, T258, T259, T260, T261, T263, T269, T325, T333, T334, T338, T340, T343, T346.

2. Trees to be retained, protected and bonded as part of the subdivision, as per DA Condition C7:
T123, T143, T144, T146, T147, T149, T153, T154, T156, T167, T204, T225, T226.
Shown on Landscape Plan LP10A.

3. Trees to be retained and bonded which are located within 5 metres of dwelling, as per DA Condition C7:
To be shown on Landscape Plan.
T31, (T286), (T286), T287, T290, T292, T293, T297, T298, T299, T302, T310, T317.
Note: T286 and T286 have been removed.
T317 in poor condition. Refer Urban Forestry Arboricultural Assessment.

4 Condition B22:
T25, T30.
Refer Urban Forestry Arboricultural Assessment.

5. Trees to be removed for House 3
Not shown on Landscape Plan LP10A.
T24, T26, T27, T28, T29, T110, T112(dead), T118(dead), T119(poor), T120(dead), T227, T266, T266, T269, T270, T271, T273, T274, T275, T276, T277, T278, T279, T280, T281, T282, T283, T288, T291, T303, T304, T306, T307, T314, T316(dead), T318, T318, T320, T322, T323, T370.

6. Trees to be retained, not bonded
Shown on Landscape Plan LP10A.
T2, T25, T30, T100, T101, T113, T114, T115, T116, T117, T130, T132, T148, T161, T162, T167, T250, T251, T269, T300, T301, T309, T311, T313, T374.
Note 1: T90 previously shown to be retained. T96 now to be removed. Refer Council TPO #P1705 for approval for removal, dated 5/5/04.
Note 2: T124 and T168 were previously shown to be retained. T124 and T168 appear to have been removed in civil works.
Note 3. T167 has been identified as being negatively impacted by civil works and will likely die.
Note 4: T148, T161, T162 retention is questionable. Located in slip zone. Refer to civil arborist report.

7. Tree to be retained, not bonded, as per amendments noted on TP10B.
'Arborist report to be provided re specific measures to retain tree'
T141
Information to be supplied by civil arborist contracted to subdivision works.

8. Trees to be removed for reconstruction of garage at 84 Palm Beach Road
T26, T249.
Refer to separate Development Application.

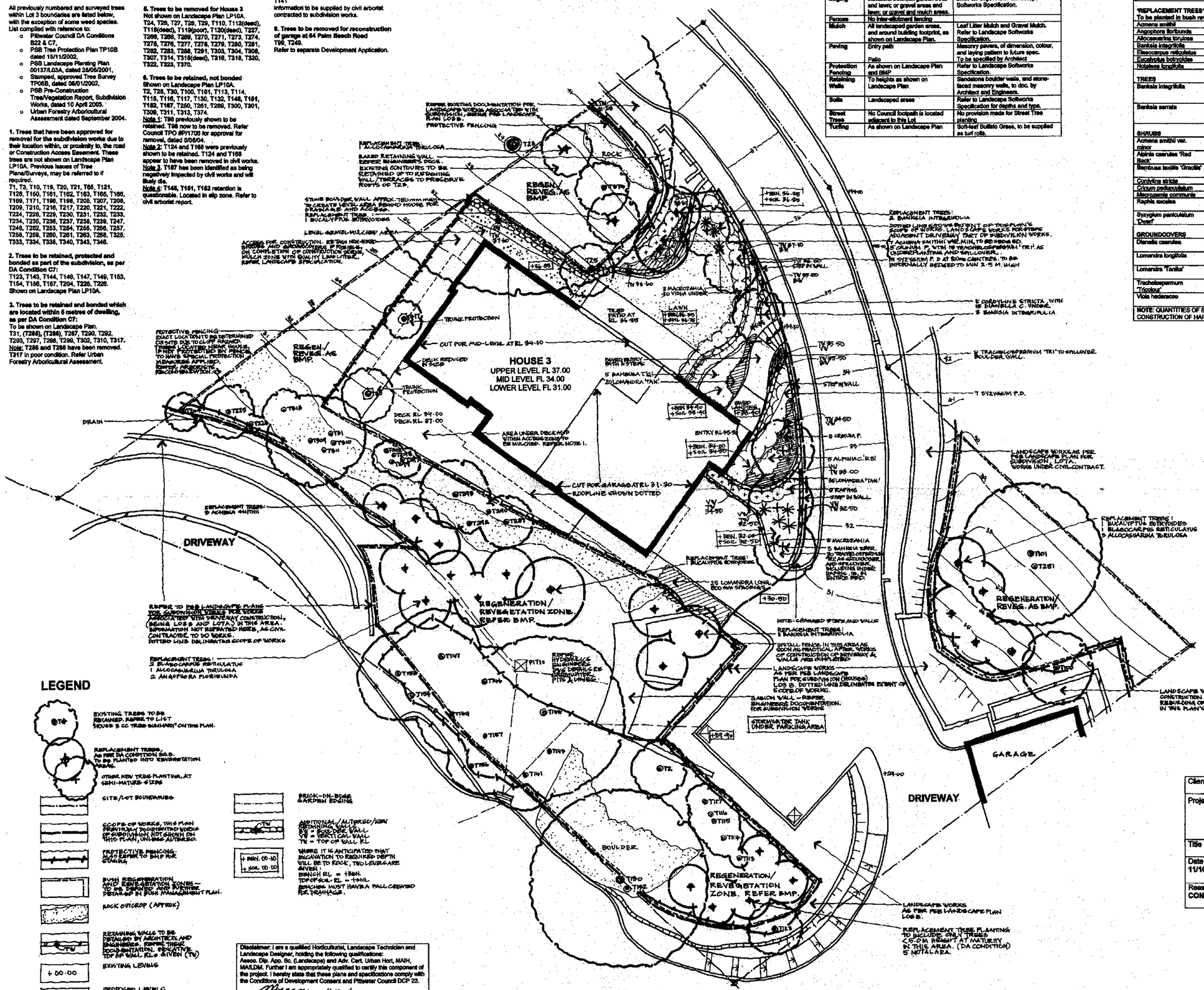
LANDSCAPE MATERIALS SCHEDULE

Material	Location	Colour/description
Edging	Junctions between garden beds and lawn; or gravel areas and lawn; or gravel and mulch areas.	Brick-on-edge. Refer Landscape Softworks Specification.
Fences	No inter-allotment fencing	
Mulch	All landscaped garden areas, and around building footprint, as shown on Landscape Plan.	Leaf Litter Mulch and Gravel Mulch. Refer to Landscape Softworks Specification.
Paving	Entry path Patio	Masonry pavers, of dimension, colour, and laying pattern to future spec. To be specified by Architect
Protection Penoing	As shown on Landscape Plan and BMP	Refer to Landscape Softworks Specification.
Retaining Walls	To heights as shown on Landscape Plan	Standstone boulder walls, and stone-faced masonry walls, to doc. by Architect and Engineers.
Soils	Landscaped areas	Refer to Landscape Softworks Specification for depths and type.
Street Trees	No Council footpath is located adjacent to this Lot	No provision made for Street Tree planting
Turfing	As shown on Landscape Plan	Soft-leaf Buffalo Grass, to be supplied as turf rolls.

PLANT SCHEDULE

Botanical Name	Common Name	Height x Spread at Maturity (mm)	Pot Size	Quantity/ Spacing
'REPLACEMENT TREES' AS PER CONDITION B22 To be planted in bush revegetation. areas as shown on this plan				
Acmena smithii	Lillypilly	8000 x 4000	Viro-tube	3
Angophora floribunda	Rough-barked Apple	10000 x 8000	Viro-tube	2
Allocasuarina torulosa	Forest Oak	8000 x 4000	Viro-tube	5
Banksia integrifolia	Coastal Banksia	8000 x 6000	Viro-tube	5
Elaeocarpus reticulatus	Blueberry Ash	8000 x 4000	Viro-tube	3
Eucalyptus botryoides	Bangalay	12000 x 10000	Viro-tube	3
Notelaea longifolia	Mock Olive	4000 x 2000	Viro-tube	5
TREES				
Banksia integrifolia	Coastal Banksia	8000 x 6000	300mm (larger if available)	3
Banksia serrata	Old Man Banksia	6000 x 6000	300mm (larger if available)	3
SHRUBS				
Acmena smithii var. minor	Small-leaved Lillypilly	3000 x 1500	200mm	7
Alpinia caerulea 'Red Back'	Native Ginger	2500 x 800	200mm	5
Bambusa textilis 'Gracilis'	Slender Weavers Bamboo – non-invasive	6000 x 1500	45L	5
Cordyline stricta	Slender Palm Lily	2500 x 600	200mm	5
Crinum pedunculatum	Swamp Lily	1000 x 1000	200mm	10
Macrozamia communis	Burrawang	1000 x 1000	200mm	8
Raphis excelsa	Lady Palm	2500 x 800	300mm (minimum)	9
Syzygium paniculatum 'Dwarf'	Dwarf Lillypilly	3000 x 1200	300mm (minimum)	22
GROUNDCOVERS				
Dianella caerulea	Flax Lily	800 x 400	150mm	15 400mm sp.
Lomandra longifolia	Mat Rush	1000 x 1000	150mm	25 500mm sp.
Lomandra 'Tanika'	Lomandra Tanika	400 x 400	150mm	56 400mm sp.
Trachelospermum 'Tricolour'	Variegated Star Jasmine	800 x 1000	150mm	62 800mm sp.
Viola hederacea	Native Violet	100 x 1000	150mm	30 1.0m sp.

NOTE: QUANTITIES OF SHRUBS AND GROUNDCOVERS TO BE CONFIRMED ON SITE AFTER CONSTRUCTION OF HARDWORKS IS COMPLETE.



LEGEND

- EXISTING TREES TO BE RETAINED. REFER TO LIST 'HOUSE 3 CC TREE SUMMARY' ON THIS PLAN.
- REPLACEMENT TREES, AS PER DA CONDITION B22. TO BE PLANTED INTO REVEGETATION AREAS.
- OTHER NEW TREE PLANTING, AT SEMI-MATURE SIZES
- SITE/LOT BOUNDARIES
- SCOPE OF WORKS, THIS PLAN PERTAINS TO PROPOSED WORKS OF SUBDIVISION, NOT SHOWN ON THIS PLAN, UNLESS NOTED.
- PROTECTIVE FENCING. ALSO REFER TO BMP FOR DETAILS
- BUSH REGENERATION AND REVEGETATION ZONES - TO BE MAINTAINED AS PER DETAILED IN BUSH MANAGEMENT PLAN.
- ROCK OUTCROP (APPROX)
- RETAINING WALLS TO BE DETAILED BY ARCHITECTS AND ENGINEERS. REFER THESE DOCUMENTATION. INDICATIVE TOP OF WALL RLs GIVEN (TW)
- EXISTING LEVELS
- PROPOSED LEVELS
- BRICK-ON-EDGE GARDEN EDGING
- ADDITIONAL/ALTERED/NEW RETAINING WALLS: BW = BOX-BEE WALL; VW = VERTICAL WALL; TW = TOP OF WALL RL
- WHERE IT IS ANTICIPATED THAT EXCAVATION TO REQUIRED DEPTH WILL BE TO ROCK, TWO LEVELS ARE GIVEN: BRANCH RL = +BRN. TOP OF SOIL RL = +SOIL. BENCHES MUST HAVE A FALL CREATED FOR DRAINAGE.

Disclaimer: I am a qualified Horticulturist, Landscape Technician and Landscape Designer, holding the following qualifications: Assoc. Dip. App. Sc. (Landscape) and Adv. Cert. Urban Hort, MAIH, MAILDM. Further I am appropriately qualified to certify this component of the project. I hereby state that these plans and specifications comply with the Conditions of Development Consent and Pittwater Council DCP 23.
Selena Hannan, 11 October 2004

REFERENCED DOCUMENTS

1. House 3 DA-issue documentation:
- Architectural plans for House 3, Crone Nation Architects, 20008/ADA3-1701, -2001, -3001, -0100, -1003, - 1002, -1001
- Tree Survey House 3, PSB00137, TP05B, dated10/01/02
- Pittwater Council stamped, approved, coloured, marked-up, A3-size Tree Survey PSB00137, TP05B, dated 10/01/02
- Landscape Plan House 3, PSB00137, L03A, dated 25/05/01
- Pittwater Council stamped, approved, marked-up Landscape Plan House 3, PSB00137, L03A, dated 25/05/01

2. Site Subdivision CC-issue documentation:
- Architectural plans by Crone Nation Architects, 20008/AWD-S007, -S006
- Landscape Plans for subdivision works, PSB00137B, L03B dated 19/11/02 and L07A dated 18/11/02
- Tree Protection Plan for subdivision works, PSB000137, TP10B, dated 15/11/02
- Landscape Specification for subdivision works, PSB 00137B, dated 18 November 2003.
- Pre-Construction Tree/Vegetation Report, PSB00137B, dated 10 April 2004
- Sydney Water Sewerage Plan, #13701WW
- Bushland Management Plan by GIS Environmental Consultants, dated May 2003

3. 84 Palm Beach Road DA-issue documentation
- Landscape Concept Plan PSB00137C, 84 Palm Beach Road, SK01A, dated 10/12/02

CC-ISSUE DOCUMENTATION

This plan to be read in conjunction with:
- Architectural plans for House 3, Crone Nation Architects, 20008/ADA3-1701, -2001, -3001, -0100, -1003, - 1002, -1001
- Landscape Softworks Specification, Selena Hannan Landscape Design, dated September 2004
- Arboricultural Assessment by Urban Forestry, dated September 2004
- Bushland Management Plan by Footprint Green, dated September 2004

CITY PLAN SERVICES
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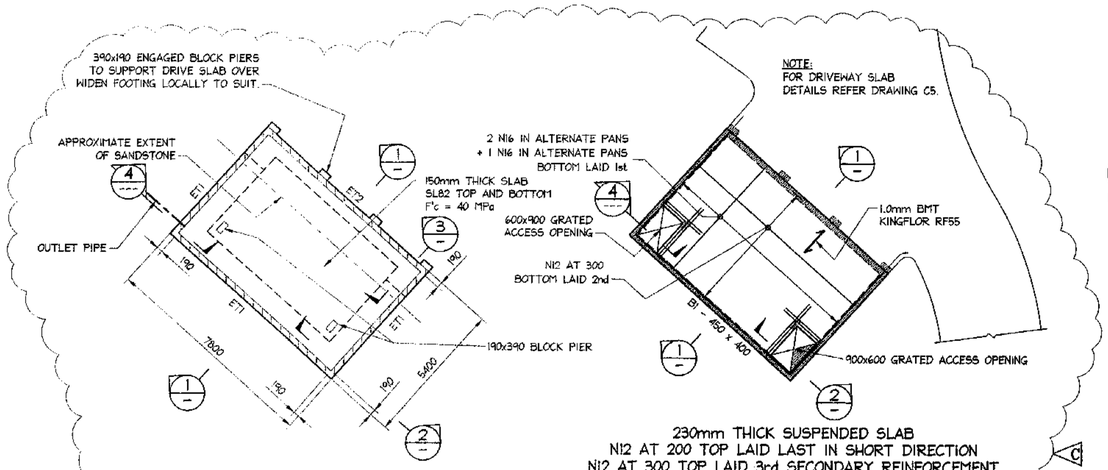
Accreditation No: PIA3004

Client	RAYPOND PTY LTD
Project	HOUSE 3, OBSERVATION POINT 1148 – 1152 BARRENJOEY ROAD AND 86 PALM BEACH ROAD, PALM BEACH, NSW
Title	LANDSCAPE PLAN
Date of Issue	11/10/2004
Scale	1:100 @A1
Drawing No	LP10 D
Reason for Issue	CONSTRUCTION CERTIFICATE

SELENA HANNAN LANDSCAPE DESIGN
Landscape Design and Horticultural Consultation
1/59 Central Road, Avalon, NSW, 2107
Phone 02 9973 3247 Fax 02 9973 3247 Mobile 0403 041 187



DETENTION TANK DT3 FLOOR PLAN

SCALE 1:100

230mm THICK SUSPENDED SLAB
N12 AT 200 TOP LAID LAST IN SHORT DIRECTION
N12 AT 300 TOP LAID 3rd SECONDARY REINFORCEMENT
COG BARS AT SLAB EDGES AND LAP AT MID SPAN
BOTTOM REO REFER PLAN
CONCRETE STRENGTH 40 MPa
45mm TOP COVER, 30mm BOTTOM COVER

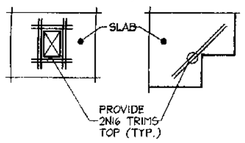
DETENTION TANK DT3 ROOF PLAN

SCALE 1:100

TANK BASE SLAB ON GROUND NOTES

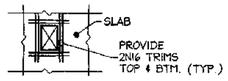
1. ALL DRIVEWAY SLABS ON GROUND TO 32 MPa CONCRETE
2. ALL DRIVEWAY SLABS ON GROUND TO BE 180 THICK REINFORCED WITH SL82, 65mm TOP COVER ON:-
   - 50 THICK SAND WHERE SUBGRADE IS ROCK.
   - 100 THICK GRANULAR SUBPAVEMENT WHERE SUBGRADE IS RESIDUAL SOIL.

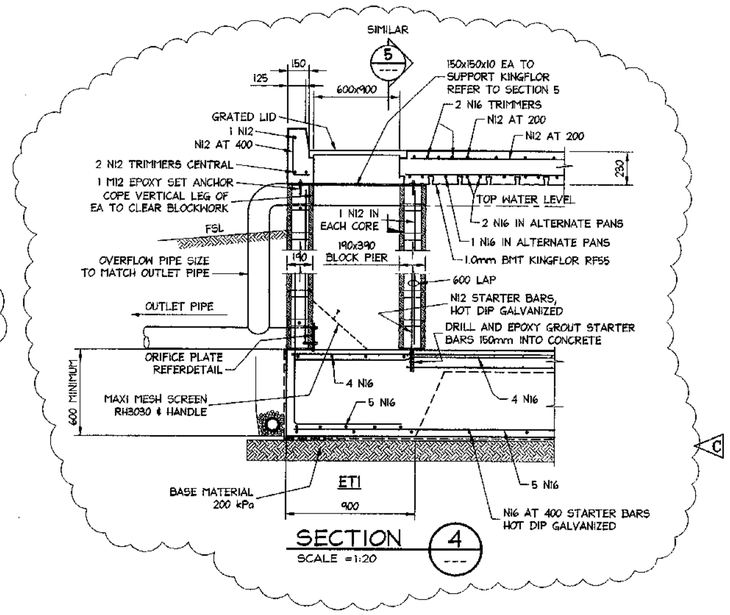
   ALL REINFORCEMENT TO BE POSITIONED ON BAR CHAIRS WITH CORRECT COVER AND NOT TO BE WALKED IN
3. TYPICAL FABRIC LAP ; 25 MIN
4. ALL SLABS TO BE POURED ON APPROVED VAPOUR BARRIER MEMBRANE (V.B.M.)
5. ALL EXISTING FILL TO BE PROOF ROLLED.
6. a) PENETRATIONS (I.E: STORMWATER PIT) b) RE-ENTRANT CORNER



SLAB NOTES

1. ALL SLABS TO BE 180 THICK U.N.O.
2. TYPICAL FABRIC LAP ; 25 MIN
3. DEPTH OF SETDOWN TO BE MEASURED FROM TOP OF STRUCTURAL SLAB LEVEL.
4. PROVIDE SL72 TOP WHERE NO OTHER REINFORCEMENT SHOWN.
5. a) PENETRATIONS





SECTION 4

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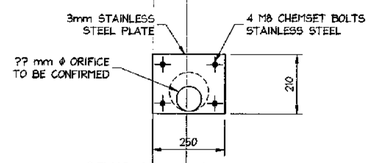
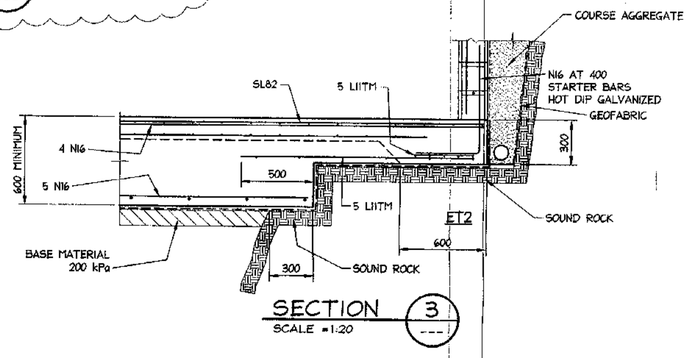
NOTES:

1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: 501.



ORIFICE PLATE DETAIL



SECTION 3

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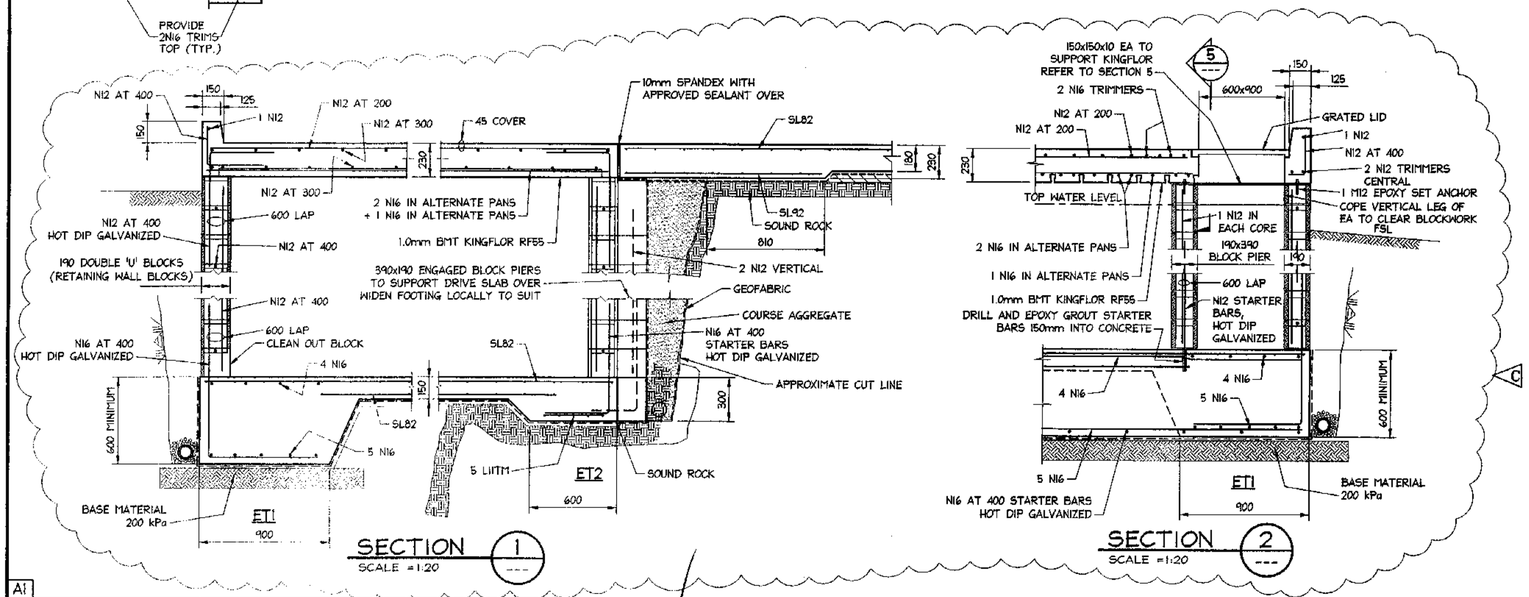

SECTION 1

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SECTION 2

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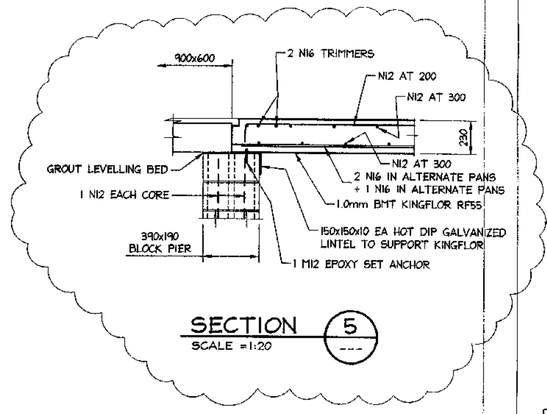

SECTION 5

SCALE =1:20

CITY PLAN SERVICES
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Accreditation No: PIA3004

It is considered that this drawing has been prepared in general accordance with geotechnical recommendations contained in: SCE Ref No: .....
Signed: .....
Date: 1/12/04
Douglas Partners Pty Ltd Geotechnics Environment Groundwater

A1

Date:	Rev:	Amendment:
23.08.2004	C	ALTERED DURING CONSTRUCTION
29.07.2004	B	ALTERED DURING CONSTRUCTION TO SUIT GROUND CONDITIONS
10.06.2004	A	NOTES ALTERED

DOCUMENT CERTIFICATION
Date: Sept 04
Rick G. Wray .....
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER.
Institute of Engineers Membership No. 803936
I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

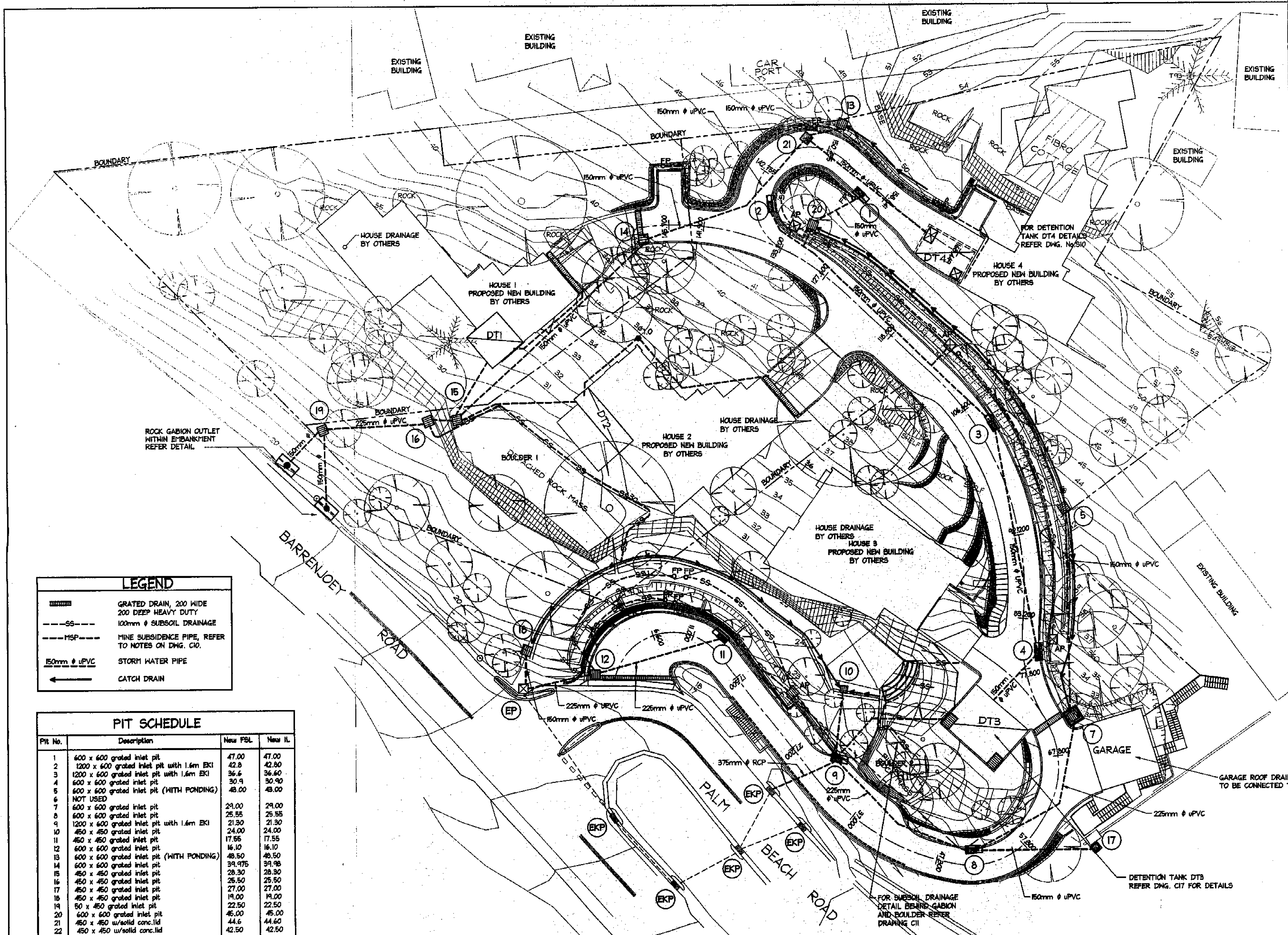
NORTHERN BEACHES Consulting Engineers P/L.
A.C.N. 076 121 616 A.B.N. 24 076 121 616
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail: nb@nbconsulting.com.au

Project: PROPOSED ACCESS ROAD at: 1148-1152 Barrenjoey Road and 56 Palm Beach Road Palm Beach for: Raypond Development

Drawing Title: ON-SITE DETENTION TANK DT3 PLAN AND DRAINAGE DETAILS

Date:	Design:	Drawn:	Checked:
Nov. 2003	R.G.W.	Paul R Bruce CTIEAust., MIDDAust.	

Job No:	Drawing No:	Rev:
030963	C17	C



NOTES:

1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

LEGEND

(hatched)	GRATED DRAIN, 200 WIDE 200 DEEP HEAVY DUTY
---SS---	100mm ϕ SUBSOIL DRAINAGE
---MSP---	MINE SUBSIDENCE PIPE, REFER TO NOTES ON DWG. C10.
150mm ϕ uPVC	STORM WATER PIPE
←	CATCH DRAIN

PIT SCHEDULE

Pit No.	Description	New FSL	New IL
1	600 x 600 grated inlet pit	47.00	47.00
2	1200 x 600 grated inlet pit with 1.6m EKI	42.8	42.80
3	1200 x 600 grated inlet pit with 1.6m EKI	36.6	36.60
4	600 x 600 grated inlet pit	30.9	30.90
5	600 x 600 grated inlet pit (WITH PONDING)	48.00	48.00
6	NOT USED		
7	600 x 600 grated inlet pit	29.00	29.00
8	600 x 600 grated inlet pit	25.55	25.55
9	1200 x 600 grated inlet pit with 1.6m EKI	21.30	21.30
10	450 x 450 grated inlet pit	24.00	24.00
11	450 x 450 grated inlet pit	17.55	17.55
12	600 x 600 grated inlet pit	16.10	16.10
13	600 x 600 grated inlet pit (WITH PONDING)	48.50	48.50
14	600 x 600 grated inlet pit	39.975	39.98
15	450 x 450 grated inlet pit	28.30	28.30
16	450 x 450 grated inlet pit	25.50	25.50
17	450 x 450 grated inlet pit	27.00	27.00
18	450 x 450 grated inlet pit	19.00	19.00
19	50 x 450 grated inlet pit	22.50	22.50
20	600 x 600 grated inlet pit	45.00	45.00
21	450 x 450 w/solid conc.lid	44.6	44.60
22	450 x 450 w/solid conc.lid	42.50	42.50

NOTE:
1. FINISHED SURFACE LEVELS OF PITS TO BE CONFIRMED ON SITE

ALL STORMWATER PIPES AND SUBSOIL LINES TO HAVE 1 % MINIMUM FALL

DRAINAGE PLAN

SCALE = 1 : 200

A1

Date:	Rev:	Amendment:
09.09.2004	B	CHANGES DURING CONSTRUCTION
24.08.2004	A	CHANGES DURING CONSTRUCTION

DOCUMENT CERTIFICATION

Date : Sept. 04'
Rick G. Wray ....
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil),CPEng,MIEAust.,NPER.
Institute of Engineers Membership No. 803436
I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

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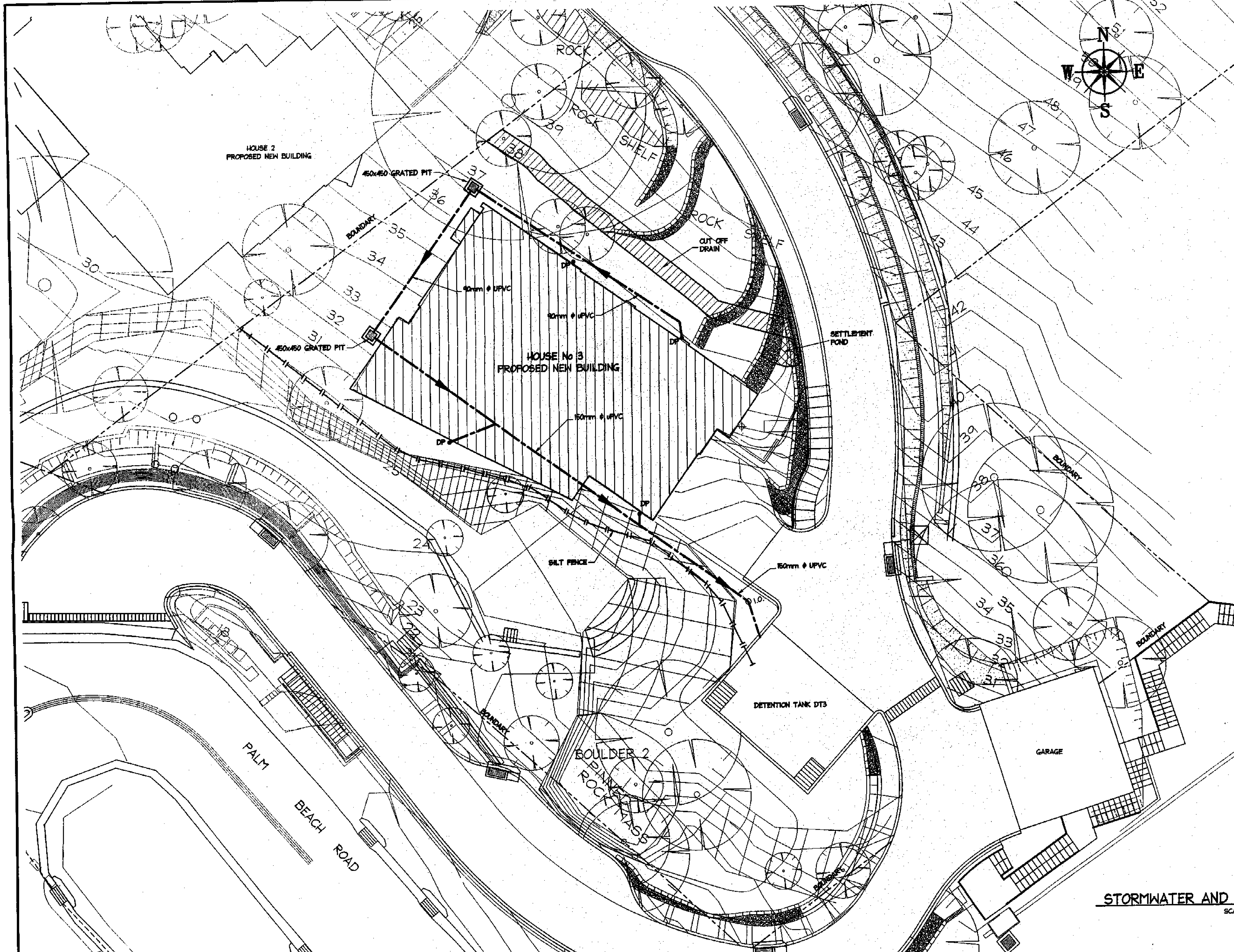
A.C.N. 076 121 616 A.B.N. 24 076 121 616
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail : nb@nbconsulting.com.au

Project: PROPOSED ACCESS ROAD at: 1148-1152 Barrenjoey Road and 56 Palm Beach Road Palm Beach for: Raypond Development

Drawing Title: DRAINAGE PLAN

Date:	Design:	Drawn:	Checked:
Nov. 2003	R.G.W.	Paul R Bruce MIEAust.,MIDDAust.	

Job No:	Drawing No:	Rev:
030963	C14	B



NOTES:

1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

NOTE:
FOR HGL'S, ILSAX RUNS AND FURTHER DRAINAGE DETAILS REFERENCE IS MADE TO OBSERVATION POINT CIVIL WORKS DRAWINGS

It is considered that this drawing has been prepared in general accordance with geotechnical recommendations contained in:
SCE
~~Douglas Partners Report No~~ ......
Signed ......
Date 20/9/04
Douglas Partners Pty Ltd
Geotechnics Environment Groundwater

ISSUED FOR CONSTRUCTION CERTIFICATE SUBMISSION ONLY

CITY PLAN SERVICES
Construction Cert. No: 24582 Approved Date: 22 OCT 2004
Certifying Authority: Brendan Bennett
Accreditation No: PIA3004

STORMWATER AND EROSION CONTROL PLAN
SCALE = 1 : 100

A1		
-	-	-
Date:	Rev:	Amendment:

DOCUMENT CERTIFICATION
Date: Sept. 04'
Rick G. Wray ......
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER.
Institute of Engineers Membership No. 809988
I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

NORTHERN BEACHES
Consulting Engineers P/L.
A.C.N. 078 121 616 A.B.N. 24 078 121 616
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail: nb@nbconsulting.com.au

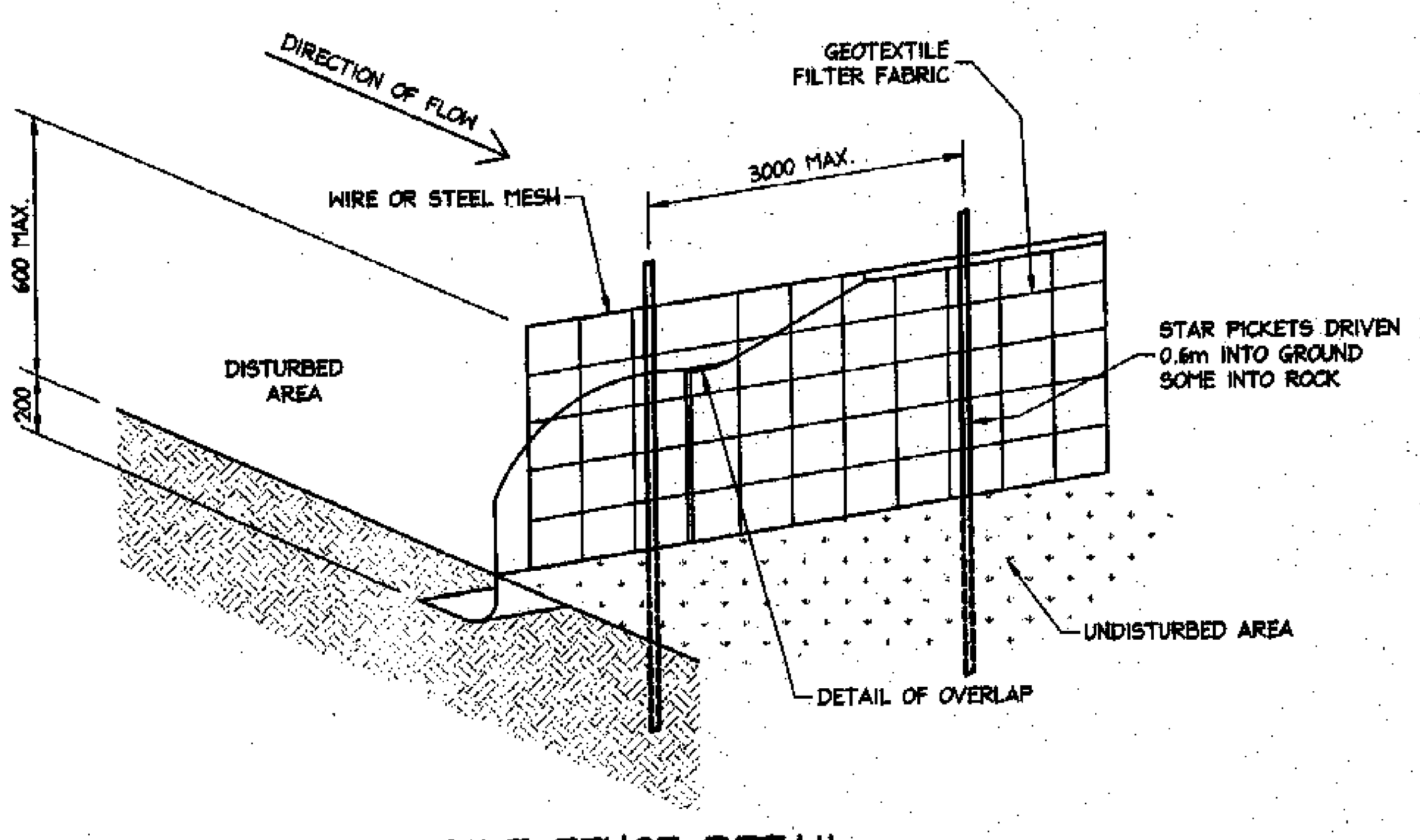
Project:
PROPOSED NEW DWELLING AT BARRENJOEY & PALM BEACH ROADS
PALM BEACH
for: RAYPOND DEVELOPMENT

Drawing Title:
HOUSE No.3
STORMWATER AND EROSION CONTROL PLAN

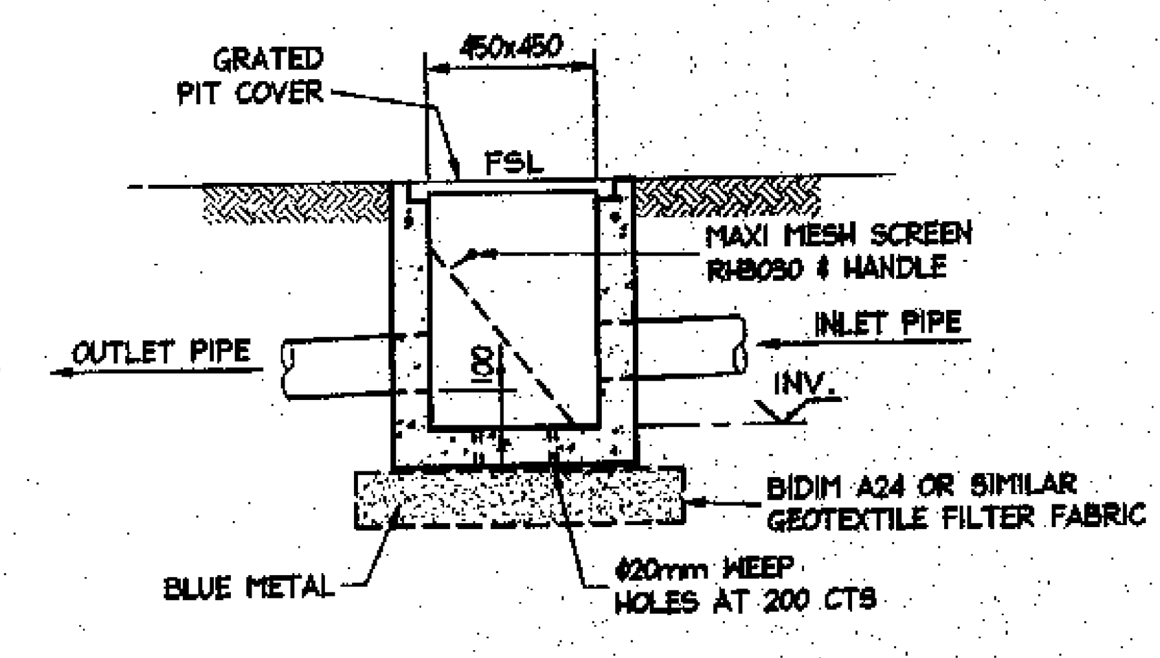
Date:	Design:	Drawn:	Checked:
SEPT 2004	RGW	MC	
Job No:		Drawing No:	Rev:
030704		D01	-

SEDIMENT CONTROL:

1. INSTALL SEDIMENT CONTROL STRUCTURES IN LOCATIONS INDICATED ON DRAWINGS AND AS OTHERWISE REQUIRED TO CONTROL SEDIMENT DURING ALL EXCAVATIONS AND WHILST AREAS OF THE SITE ARE EXPOSED TO EROSION.
2. CONTROL STRUCTURES TO BE AS DETAILED OR AS OTHERWISE REQUIRED BY CERTIFYING AUTHORITY.
3. REVIEW CONTROL MEASURES AND MAINTAIN STRUCTURES DURING CONSTRUCTION.
4. IF ADDITIONAL MEASURES ARE REQUIRED FOR EROSION CONTROL OR BY COUNCIL REQUIREMENTS REFER TO "URBAN EROSION AND SEDIMENT CONTROL" GUIDELINES PREPARED BY THE DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT.



SILT FENCE DETAIL
SCALE = N.T.S.



PRECAST OR CAST INSITU PIT
REFER STORMWATER NOTES

450x450 PIT DETAIL
SCALE = 1 : 20

NOTES:

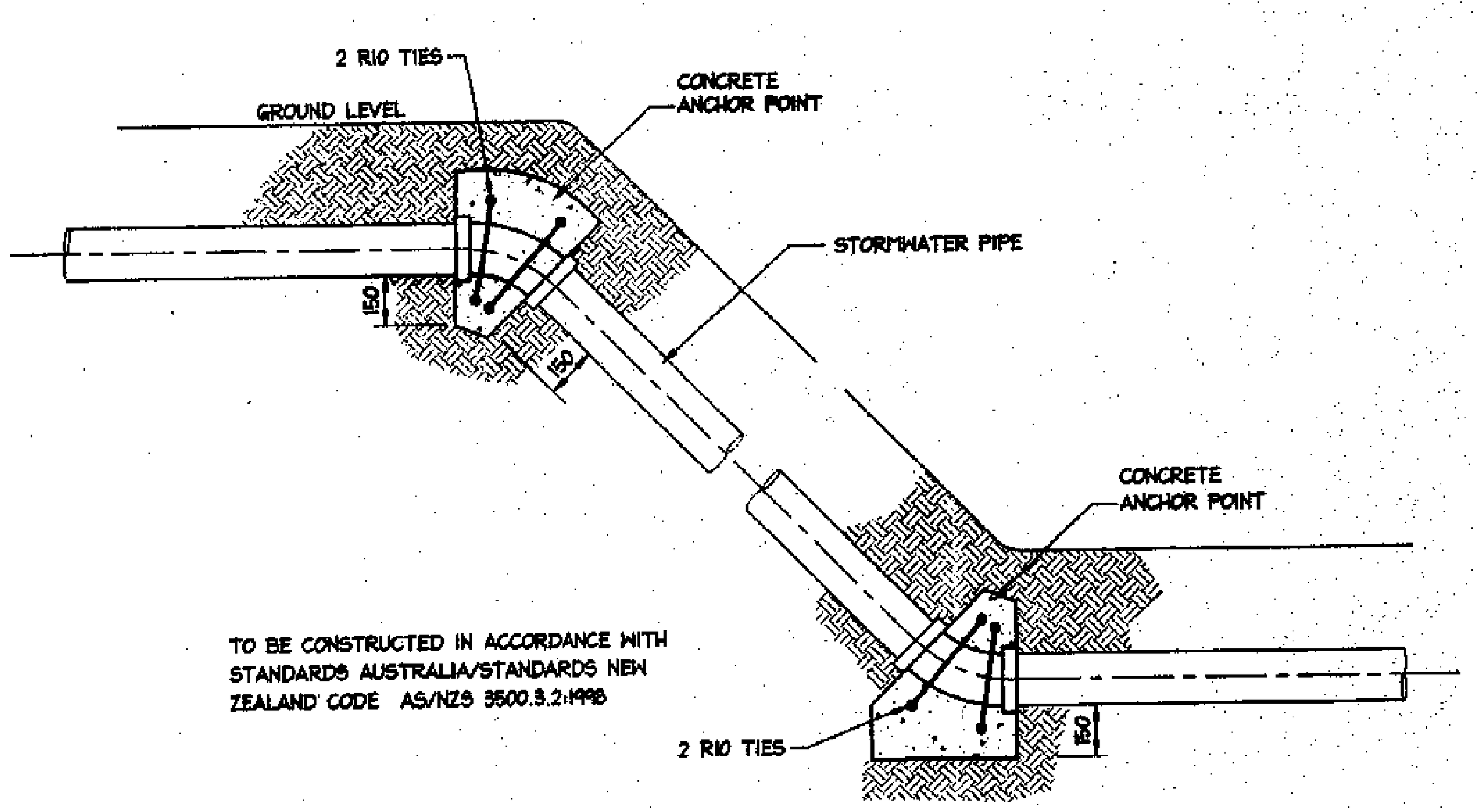
1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

STORMWATER NOTES:

1 - ALL PIPES TO BE 90mm Ø UNLESS NOTED OTHERWISE.
2 - ALL PIPES TO BE uPVC TO AS 1254-1978 UNLESS NOTED OTHERWISE.
3 - ALL PIPES TO BE LAYED AT 1 % MINIMUM GRADE UNLESS NOTED OTHERWISE.
4 - ALL PIPES SHALL BE LAID ON A 75mm SAND BED, COMPACTED TO 100% S.M.D.D. BELOW PAVEMENTS.
(NO COMPACTION REQUIRED BELOW LANDSCAPING)
COVER TO SURFACE FROM TOP OF PIPE TO BE 300mm MINIMUM.
BACKFILL TO BE ADEQUATELY CONSOLIDATED AROUND PIPES BY METHOD OF RAMMING AND WATERING IN. TRENCHES TO BE FILLED WITH GRANULAR MATERIAL AS SPECIFIED.
5 - ALL DOWN PIPES TO BE 90mm Ø UNLESS NOTED OTHERWISE.
6 - DOWN PIPE LOCATIONS ARE INDICATIVE ONLY. LOCATIONS TO BE CONFIRMED WITH ARCHITECT PRIOR TO COMMENCEMENT WITH WORK.
7 - PROVIDE CLEANING EYES AT ALL DOWNPIPES.
8 - ALL PITS TO BE CAST INSITU OR, IF PRECAST, APPROVED BY ENGINEER. CAST INSITU PITS TO HAVE 150mm THICK CONCRETE WALLS AND BASE. WALLS TO BE REINFORCED WITH 1 N12 TOP TIE UNLESS NOTED OTHERWISE. CAST INSITU PITS GREATER THAN 1000 DEEP TO BE MINIMUM 900x600 AND TO HAVE 150mm THICK CONCRETE WALLS AND BASE. WALLS TO BE REINFORCED WITH N12 AT 300 EACH WAY UNLESS NOTED OTHERWISE.
9 - ALL PITS GREATER THAN 1000mm DEEP SHALL HAVE STEP IRONS AS PER COUNCIL STANDARDS.
10 - ALL WORK TO BE IN ACCORDANCE WITH LOCAL COUNCIL STANDARDS AND SPECIFICATIONS.
11 - PRIOR TO COMMENCING ANY SITE WORKS THE CONTRACTOR SHALL IMPLEMENT EROSION CONTROL MEASURES TO EPA GUIDELINES AND COUNCIL SPECIFICATIONS. ALL MEASURES TO REMAIN IN PLACE UNTIL COMPLETION AND STABILIZATION OF THE SITE TO COUNCIL SATISFACTION.
12 - ALL LEVELS SHOWN ARE TO AHD
13 - ENSURE THAT ALL PITS AND STORMWATER PIPES ARE LOCATED CLEAR FROM TREE ROOT SYSTEMS.
14 - ALL EXISTING EARTHENWARE PIPES TO BE UPGRADED TO uPVC.
15 - ALL WORKS TO BE IN ACCORDANCE WITH AS 3500-1990 NATIONAL PLUMBING DRAINAGE CODE PART 3 - STORMWATER DRAINAGE.

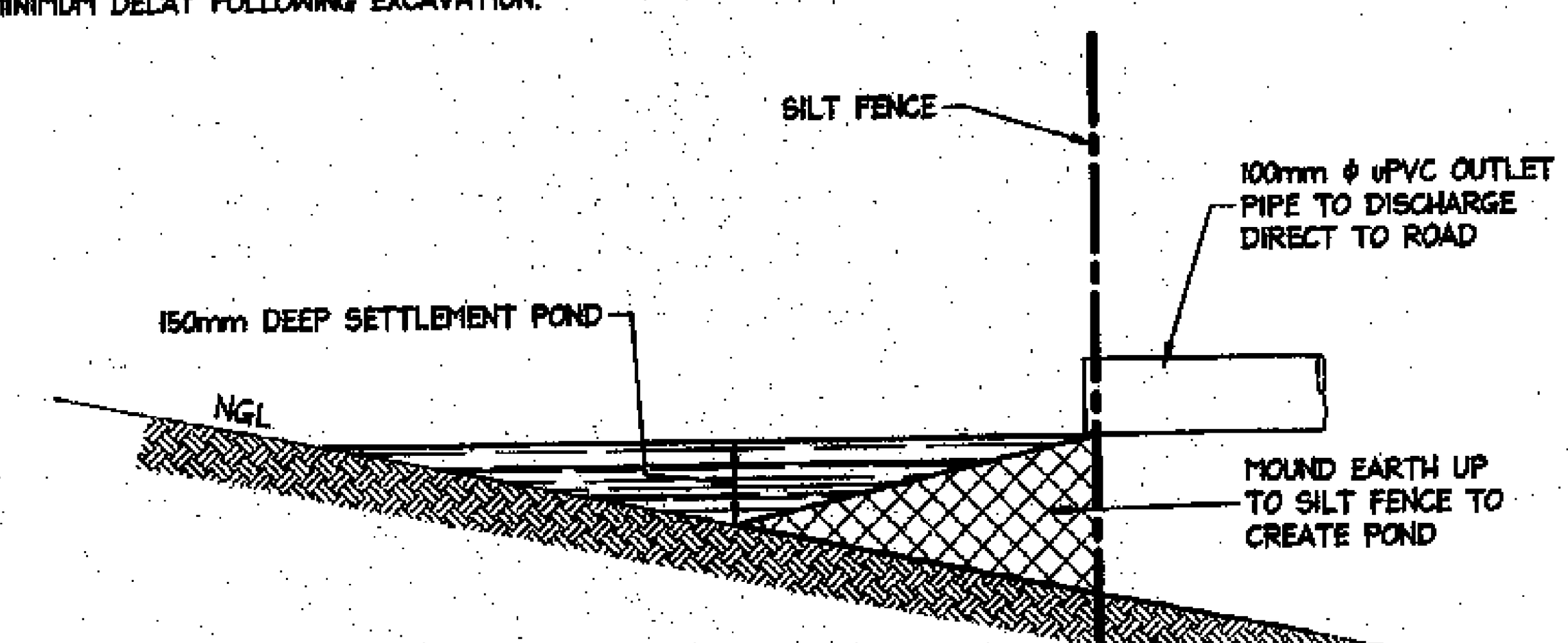
SCHEDULE OF WORKS:

1. SILT FENCE AND ASSOCIATED WORKS INCLUDING INTERCEPTOR DRAIN IS TO BE INSTALLED BEFORE THE COMMENCEMENT OF ANY EXCAVATION.
2. CUTS TO BE EXECUTED TO THE REQUIRED LEVEL USING CONVENTIONAL EXCAVATION MACHINERY. INITIALLY THE DEPTH OF FILL/CLAY IS TO BE ESTABLISHED TO ENSURE NEIGHBOURING PROPERTIES ARE NOT ADVERSELY AFFECTED. EARTH BATTERS TO BE A MAXIMUM SLOPE OF 1.0 m VERT. TO 1.7 m HORIZ. (AS PER GEOTECHNICAL REPORT). ANY BATTERS GREATER THAN 1.0 m VERT. TO 1.7 m HORIZ. ARE TO BE ADEQUATELY SHORED IN ACCORDANCE WITH THE ENGINEERS DETAILS AND INSTRUCTIONS.
3. ANY PERMANENT RETAINING STRUCTURE IS TO BE CONSTRUCTED IN ACCORDANCE WITH THE ENGINEERS DETAILS AND INSTRUCTIONS.
4. ALL PERMANENT RETAINING STRUCTURES ARE TO BE COMPLETED WITH MINIMUM DELAY FOLLOWING EXCAVATION.

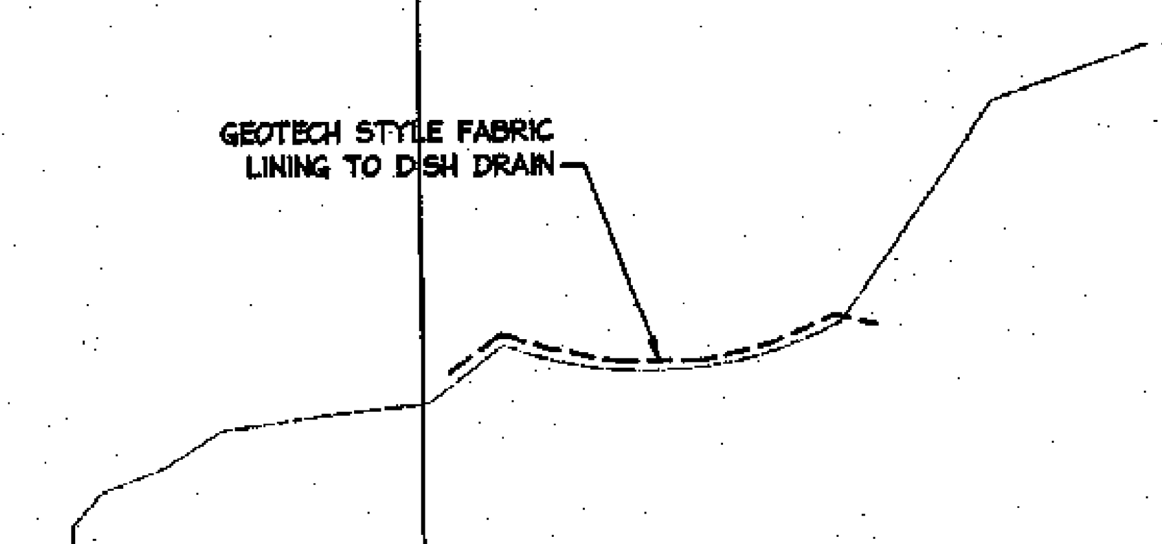


ANCHOR BLOCKS TO BE LOCATED AT THE BEND OR JUNCTION AT THE TOP AND BOTTOM OF THE INCLINED SITE STORMWATER DRAIN AND AT INTERVALS NOT EXCEEDING 3.0m

CONCRETE ANCHOR POINT DETAIL FOR EARTH SLOPE GREATER THAN 1 V. TO 3 H.
SCALE = 1 : 20



TYPICAL SECTION THROUGH SETTLEMENT POND
SCALE = N.T.S.



TYPICAL SECTION THROUGH CUT OFF DRAIN
SCALE = N.T.S.

CITY PLAN SERVICES
Construction Cert. No: 24382 Approved Date: 22 OCT 2004
Certifying Authority: Brendan Bennett
Accreditation No: PIA3004

It is considered that this drawing has been prepared in general accordance with geotechnical recommendations contained in:
Signed
Date 20/9/04

ISSUED FOR CONSTRUCTION CERTIFICATE SUBMISSION ONLY

A1		
-	-	-
Date	Rev.	Amendment

DOCUMENT CERTIFICATION
Date: Sept. 04
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil), CPEng, MIEAust., NPER. Institute of Engineers Membership No. 803486
I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

NORTHERN BEACHES Consulting Engineers P/L
A.C.N. 076 121 616 A.B.N. 24 076 121 616
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail: nb@nbconsulting.com.au

Project: PROPOSED NEW DWELLING AT BARRENJOEY & PALM BEACH ROADS PALM BEACH for: RAYPOND DEVELOPMENT

Drawing Title: HOUSE No.3 STORMWATER AND EROSION CONTROL DETAILS

Date:	Design:	Drawn:	Checked:
SEPT 2004	RGW	Paul R Bruce	
Job No: 030704		Drawing No: D02	Rev: -

GENERAL NOTES:

GENERAL

G1. The drawings are to be read together with all Architects drawings and specifications.

G2. Dimensions shall not be obtained by scaling from the drawings. All setting out dimensions shall be verified and discrepancies shall be referred to the Engineer prior to commencement of work.

G3. Care is required during construction so that structural elements are not over stressed and that the works and excavations required therefore are kept stable at all times.

G4. Design, materials and workmanship are to be in accordance with current S.A.A standards and statutory authority regulations except where varied by these documents.

G5. Design live loads are in accordance with AS 1170.1

FOOTINGS

F1. Foundation strata is assumed for design purposes in accordance with AS 2870. See Footnote. Classification to be verified by a Geotechnical Engineer commissioned by the client if certification of foundation is required.

F2. Footings to be constructed and back filled as soon as possible following excavation to avoid softening by rain or drying out by exposure.

F3. Footings must bear into undisturbed natural ground clear of organic material. Refer to details.

F4. If rock or variable bearing strata is encountered during excavation of the footings all footings/piers are to be excavated to similar material of greater bearing capacity.
The Engineer is to be contacted at that time for approval or review.

F5. Footings to be cast in approved material having an allowable capacity as follows:

Sand Foundations:

SA1. Required bearing capacity 100 kPa.
SA2. Trenches must be cleaned of all debris and hand compacted prior to placement of reinforcement.

Clay Foundations:

CL1. Required bearing capacity 150 kPa.
CL2. Trenches must be cleaned of all debris Soft spots must be cut out and filled as per compacted fill notes, prior to placement of reinforcement.

Shale Foundations:

SH1. Required bearing capacity 400 kPa.
SH2. Excavation for footings into shale must be cast or capped with plain concrete on the same day as excavation.

Sandstone Foundations:

SS1. Required bearing capacity 650 kPa.
SS2. Scrape weathered surface to remove cleaved sandstone under footings.

Refer adjacent for assumed Design bearing strata.

CONCRETE

C1. All workmanship and materials shall be in accordance with AS 3600.

C2. Concrete quality shall be as follows and shall be verified by tests.

C3. All concrete unless otherwise noted shall have a slump of 80mm at point of placement, a max. aggregate size of 20 mm, and a min. cement content of 280 kg/cubic metre. No water shall be added to the mix prior to or during placement of concrete.

C4. Clear concrete cover to reinforcement shall be as follows unless otherwise shown-

ELEMENT	INTERIOR	EXTERIOR	EXTERIOR CAST AGAINST GROUND
FOOTINGS	-	-	50
COLUMNS/PEDESTALS	30 UNO	REFER TO PLAN	-
SLABS/WALLS	25	REFER TO PLAN	40 ON MEMBRANE
BEAMS	25 UNO	REFER TO PLAN	50
BLOCKWORK	55 FROM APPROPRIATE FACE		

C5. Sizes of concrete elements do not include thickness of applied finishes.

C6. All Construction Joints locations shall be approved by the Structural Engineer.

C7. Beam depths are written first and include slab thickness, if any.

C8. No holes or chases other than those shown on the structural drawings shall be made in concrete elements without the prior approval of the engineer.

C9. Shrinkage reducing admixtures such as 'Eclipse' or approved equivalent, if specified, must be added to mix prior to pour.

C10. Water reducing agents, if specified, must be added to mix prior to pour. No extra water is to be added to increase slump.

C11. Where vertical slab/beam surfaces are formed against a masonry (or other) wall, provide 10 mm styrene separation material.

C12. Water must not be added to concrete mix prior to placement of concrete.

C13. Above covers may have to be adjusted if fire rating is a requirement.

REINFORCEMENT

R1. All reinforcement specified is Grade D500 unless noted otherwise.

R2. Reinforcement is represented diagrammatically it is not necessarily shown in true projection.

R3. Top reinforcement is to be continuous over supports.
Bottom reinforcement to be lapped at supports.

R4. Welding of reinforcement shall not be permitted unless shown on the structural drawings.

R5. Pipes or conduits shall not be placed within the zone of concrete cover to the reinforcement without the approval of the engineer.

R6. All reinforcing bars and fabric shall comply with AS 4671-2001.

R7. Reinforcement symbols:
N - Grade 500N deformed bar (D500) Normal Ductility
R - Grade 250N plain round bar (R250) Normal Ductility.
SL - Grade 500L welded deformed ribbed mesh (D500) Square Low Ductility.
RL - Grade 500L welded deformed ribbed mesh (D500) Rectangular Low Ductility.
The number immediately following these symbols is the number of millimeters in the bar diameter.

Example :
8 N12-250, denotes 8, Grade 500N deformed bars, 12 mm diameter at 250 cts.

R8. Fabric reinforcement to be lapped 1 complete square + 25 mm unless noted otherwise.

R9. All reinforcement shall be firmly supported on bar chairs spaced at a maximum of 750 centres both ways under rod and fabric reinforcement. Reinforcement shall be tied at alternate intersections.

FORMWORK

FW1. Formwork must be cleaned of all debris prior to casting of concrete.

FW2. Minimum stripping times for form work shall be as recommended in AS 1509 or as directed by the engineer.

FW3. The finished concrete shall be a dense homogeneous mass, completely filling the form work, thoroughly embedding the reinforcement and free of stone pockets. All concrete elements including slabs on ground and footings shall be compacted with mechanical vibrators.

FW4. Curing of all concrete is to be achieved by keeping surfaces continuously wet for a period of 3 days, followed by prevention of loss of moisture for seven days followed by a gradual drying out . Approved sprayed on curing compounds may be used where no floor finishes are proposed. Polythene sheeting or wet hessian may be used if protected from wind and traffic.

BRICKWORK

BR1. Brickwork is to be constructed to AS 3700.

BR2. Two layers of approved greased metal based slip material shall be used over all load bearing walls that support concrete slabs and placed on smooth brickwork or trowelled mortar finish. Non load-bearing walls shall have 10 mm compressible material and ties to the slab soffit.

BR3. No brickwork shall be constructed on suspended slabs until all propping has been removed from the underside of the slab and the concrete has the specified 28 day cylinder strength verified by tests.

BR4. Control joints to be placed at a maximum of 8m centres or in accordance with AS 3700.

BR5. Exposure grade bricks to be used below damp proof course.

BR6. Vertical control joint material where specified on plan between slabs and brick walls shall be: 10 mm Spandex External UNO.
Bituminastic fibreboard internal UNO.

BR7. Provide stainless steel wall ties below DPC to AS 3700. Provide galvanized wall ties above DPC to AS 3700 & Local Council Specifications.

BLOCKWORK

BL1. Concrete blocks shall have a minimum compressive strength of 15 MPa and conform to AS 1500.
Masonry to be constructed to AS 3700.

BL2. Where cores of hollow blocks are to be filled, properly compacted 20MPa concrete with 10 mm aggregate and 230 mm slump shall be used. Clean out openings must be utilized for all cores.

BL3. Location of actual starters is critical to suit block cores, allow 55 mm cover from the outside face of blockwork. All reinforcement lap lengths to conform to AS 3600.

BL4. Control joints to be placed at a maximum of 8 m centres or in accordance with AS 3700.

BL5. Vertical control joint material where specified on plan between slabs and brick walls shall be: 10 mm Spandex External UNO.
Bituminastic fibreboard internal UNO.

BL6. Retaining walls or any reinforced and concrete core filled block walls to be of Double 'U' Block Construction.

BL7. No blockwork shall be constructed on suspended slabs until all propping has been removed from the underside of the slab and the concrete has the specified 28 day cylinder strength verified by tests. unless approved by the Structural Engineer.

BL8. Max. pour height for unrestrained blockwork is 2000.

STEEL

S1. All Structural steelwork to be Grade 300 or greater.
Design, fabrication and erection to be in accordance with AS 4100.

S2. Materials and workmanship shall comply with AS 1250 - 1981, SAA Steel Structures Code and the specification for Structural Steel.

S3. Rolled steel sections including steel plates shall comply with AS 3678 - 1990.

S4. Cold formed steel sections shall be Grade 450 Zinc coated in accordance with AS 1538-1988.

S5. Welded and seamless steel hollow sections shall comply with AS 1163. Grade 350.

S6. Bolt Designation:
4.6S - Commercial bolts Grade 4.6, snug tightened.
8.8S - High Strength structural bolts Grade 8.8, snug tightened.
8.8TB - High Strength structural bolts Grade 8.8, fully tightened to AS 1511 and acting as a Bearing Joint.
8.8TF - High Strength structural bolts Grade 8.8, fully tensioned to AS 1511 and acting as a Bearing Joint.
Unless noted otherwise, all bolts will be 8.8S.

S7. Unless shown otherwise, minimum connection shall be 2M16 bolts, 10 thick gusset plates, 6mm continuous fillet welds.

S8. Load indicating washers shall be used in all fully tensioned joints. (8.8TF & 8.8TB).

S9. All welding shall be carried out in accordance with AS 1554 SAA Structural Steel Welding Code.

S10. Unless noted otherwise all welds shall be category SP using E41xx Electrodes. All butt welds shall be complete penetration butt welds category SP.

S11. Grouting of anchor bolt sleeves and base plates shall be completed by the contractor using High Strength, Non-Shrink grout.

S12. Fabrication and erection tolerances for Structural Steelwork shall be in accordance with AS 4100.

S13. Purlin bolts shall be M12 - 4.6S galvanised.

S14. Steel work shall have one of the following grades of corrosion protection:-

INTERNAL

a. Thoroughly cleaned wire brushing, followed by two coats of zinc phosphate primer equivalent to Dulux Luxaprime applied by hand using brushes to achieve a total dry film thickness of 70 microns.

EXTERNAL ELEMENTS, & ELEMENTS WITHIN EITHER SKIN OF EXTERNAL CAVITY WALLS

b. Preparation Blast clean to a minimum standard Class 2.5 in accordance with AS 1627 Part 4.
Primer 2-pack epoxy phosphate at dft 75 microns (Dulux Durepon P14).
Barrier Coat 2-pack epoxy micaceous iron oxide, dft 100 microns
Finish Coat 2-pack epoxy high gloss acrylic to dft 75 microns (e.g. Dulux Acrathane 1 F) in an approved colour.

c. Hot dipped galvanized to AS 4680.
Where galvanized coating is broken on site make good with two coats of zinc rich epoxy primer equivalent to Dulux Zinc anode 202 or Hot Metal Spray in accordance with AS 4680.

S15. Workshop drawings shall be prepared and two copies submitted to the engineer for review prior to fabrication commencement.

TIMBER

T1. All workmanship and materials to be in accordance with AS 1684 and AS 1720. All soft wood to be Grade F7 unless noted otherwise. All hardwood to be minimum Grade F14 unless otherwise noted. Exposed timber to be CCA treated (to AS 1604) redried after full impregnation, or durability class 1 or 2.

T2. All joists deeper than 150 to have blocking over support bearers and at a maximum 3000 centres.

T3. Roof trusses to be designed by the manufacturer to the relevant standards. Pre camber to be an amount equal to dead load deflection u.n.o.

T4. All holes for bolts to be exact size. Washers to be used under all heads and nuts and to be at least 2.5 times the bolt diameter. Bolts to be M16 grade 4.6 unless noted otherwise.

T5. Treat all exposed cut ends with Reseal by Protim to manufacturers specification to achieve required Hazard Level Exposure Classification.

T6. Battens for T & G to be Kiln Dried to 12 %.
38mm minimum deep treated pine or as recommended by supplier.
Flooring to be installed no sooner than 28 days after slab pour.

T7. Hot dip galvanized nails/clouts/screws to be used with all timber connections.

T8. Continuous nailing must not be used for any timber connections.

COMPACTED FILL

CF1. Only to be used with approval Engineer & to be certified by a geotechnical Engineer.

CF2. Clear organic material and topsoil under proposed slabs/footings.

CF3. Filling shall be granular material compacted in not more than 200 mm layers to a minimum dry density ratio (AS 1289/E4.2 1982) of 98 percent.

CF4. During clearing and excavation for slabs and footings cut out soft spots and fill as above.

INSPECTIONS BY ENGINEER

24 HOURS NOTICE IS REQUIRED BEFORE ANY SITE INSPECTION
1. Bearing strata of all footings prior to concrete pour.
2. Any reinforcement prior to concrete pour.
3. Timber and Steel framing prior to cladding or lining.
4. Steel lintels after installation.

DRAWING SCHEDULE:

It is considered that this drawing has been prepared in general accordance with geotechnical recommendations contained in:
Douglas Partners Report No .....
Signed .....
Date: 20/9/04
Douglas Partners Pty Ltd Geotechnics Environment Groundwater

CITY PLAN SERVICES
Construction Cert. No: 26582 Approved Date: 22 OCT 2004
Certifying Authority: Brendan Bennett
Accreditation No: PIA3004
ISSUED FOR CONSTRUCTION CERTIFICATE SUBMISSION ONLY

ASSUMED FOUNDATION CLASSIFICATION FOR DESIGN PURPOSES - 'A'
ASSUMED BEARING STRATA FOR DESIGN PURPOSES - ROCK, 1000kPa.

NOTES:

1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

A1

Date:	Rev:	Amendment:
14.09.2004	A	ISSUED FOR CONSTRUCTION CERTIFICATE APPROVAL

DOCUMENT CERTIFICATION
Date Sept. 04'
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER.
Institute of Engineers Membership No. 803998
I hereby state that this drawing is in compliance with the conditions of the development consent, the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

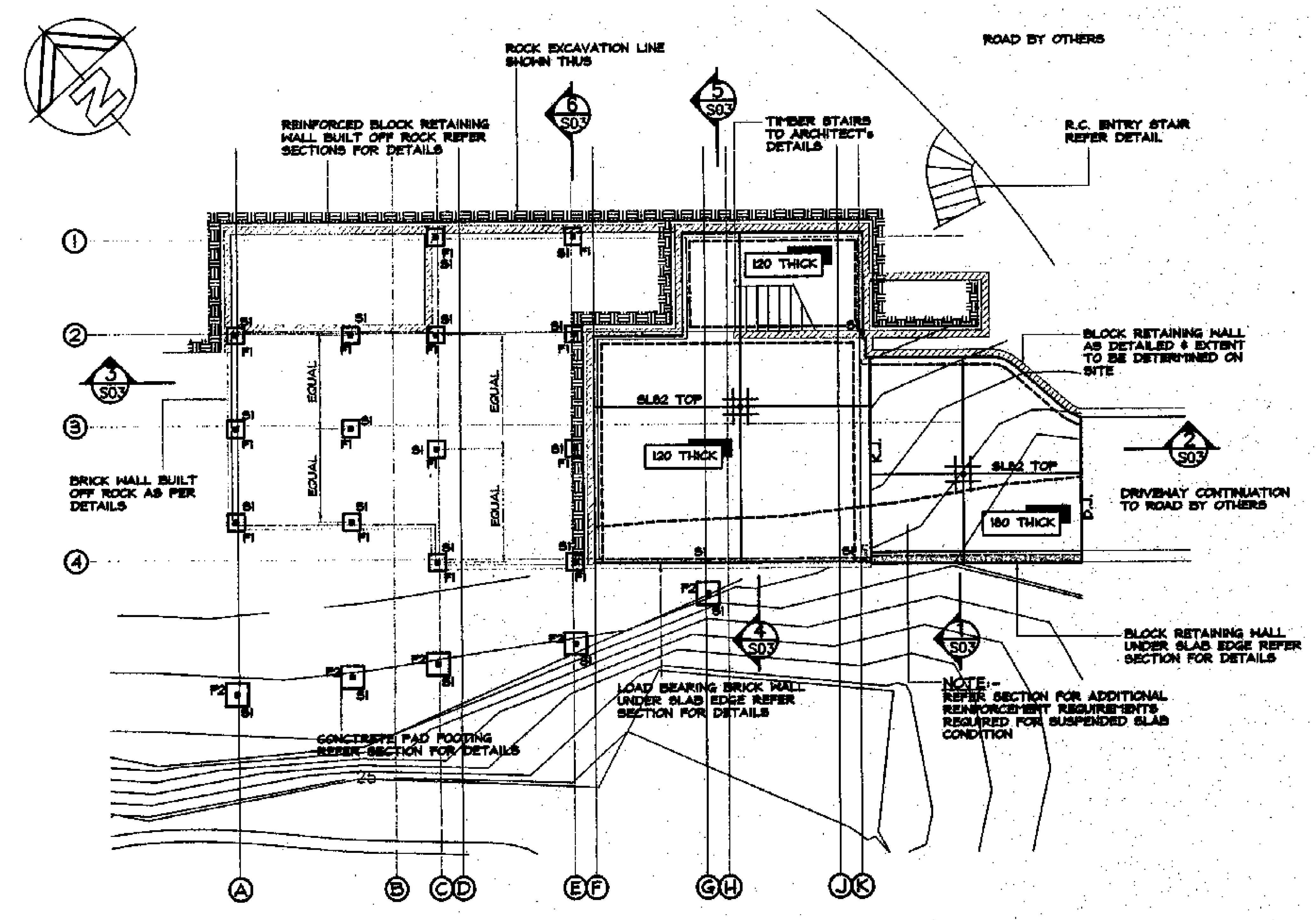
NORTHERN BEACHES Consulting Engineers P/L.
A.C.N. 076 121 618 A.B.N. 24 076 121 618
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail : nb@nbconsulting.com.au

Project:
PROPOSED NEW DWELLING AT BARRENJOEY & PALM BEACH ROADS PALM BEACH
for: RAYPOND DEVELOPMENT

Drawing Title:
HOUSE No.3
GENERAL NOTES AND DRAWING INDEX

Date:	Design:	Drawn:	Checked:
AUG. 2003	R.G.W.	HENK.	

Job No:	Drawing No:	Rev:
030704	S01	A

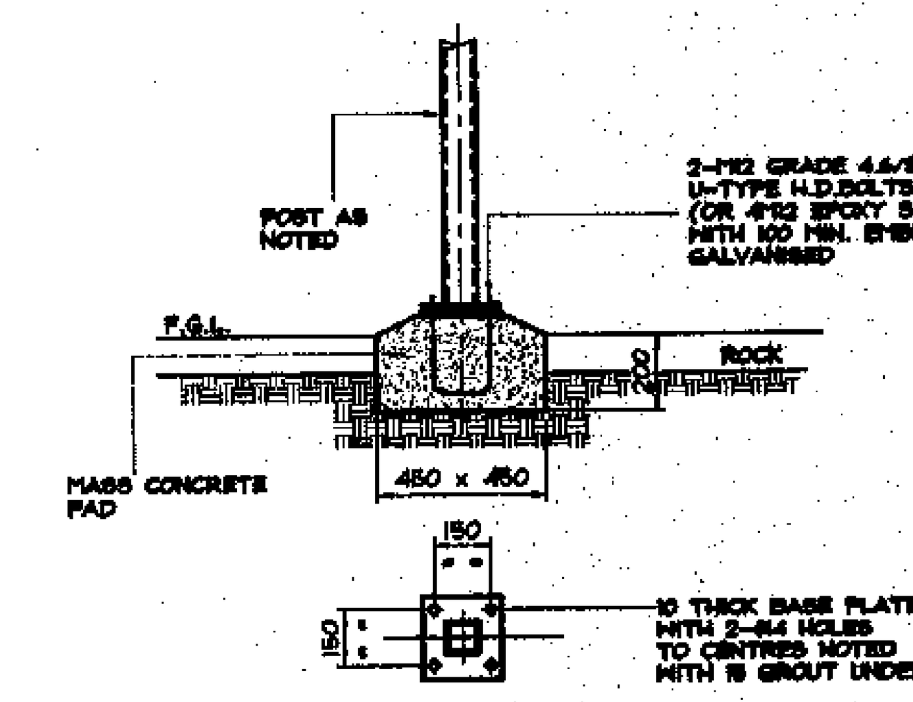


LEVEL 1 - FOOTING, SLAB LAYOUT PLAN

Scale 1:100

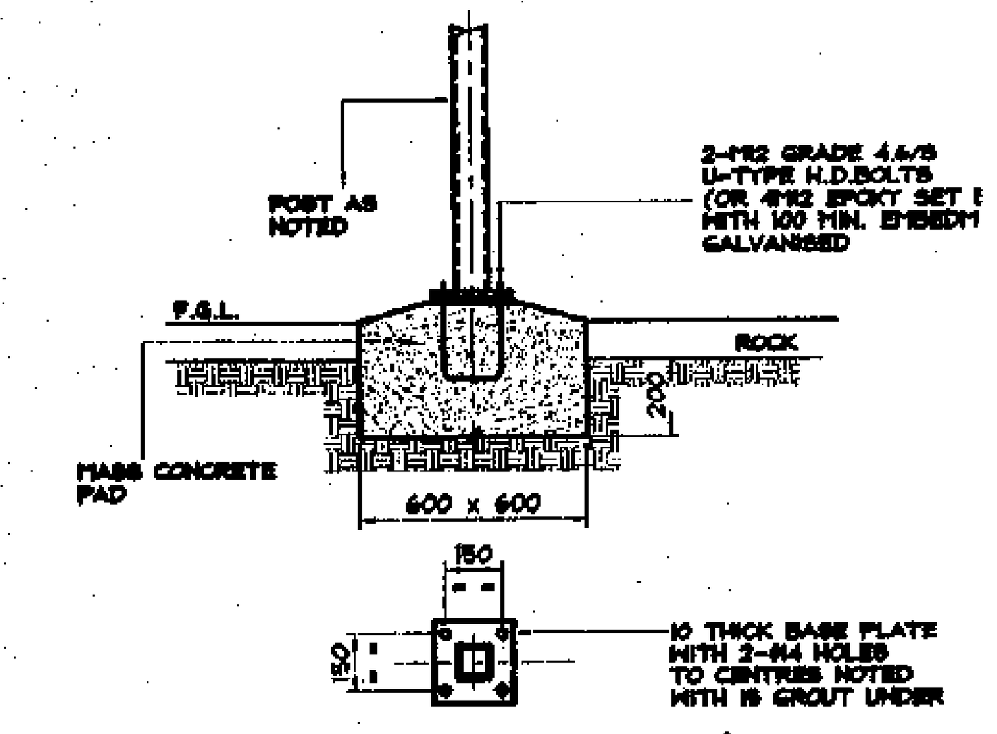
NOTE:-
S1 - DENOTES 90 x 90 x 4.0 S.H.S. POSTS

NOTE:-
ALL STRUCTURAL STEEL MEMBERS & BOLTS TO BE GALVANISED



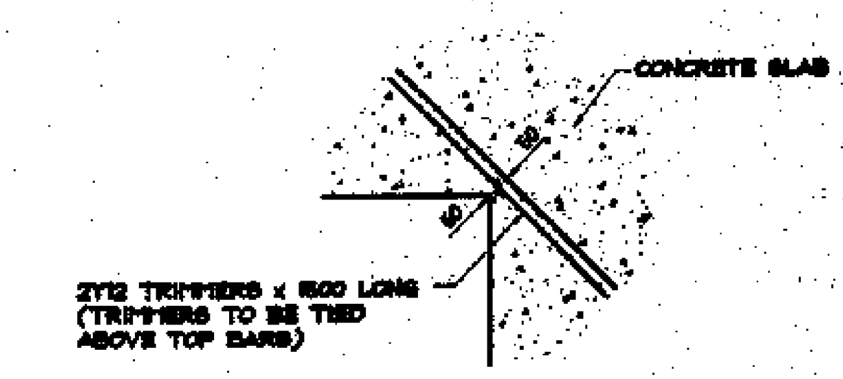
F1 PAD FOOTING DETAIL

Scale 1:20



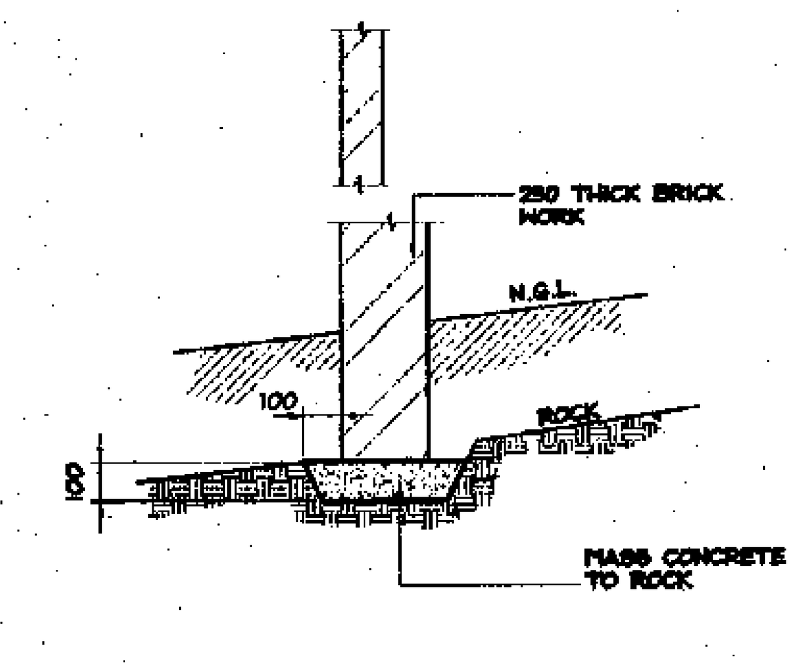
F2 PAD FOOTING DETAIL

Scale 1:20



TYPICAL SLAB RE-ENTRANT CORNER DETAIL

Scale = 1 : 20

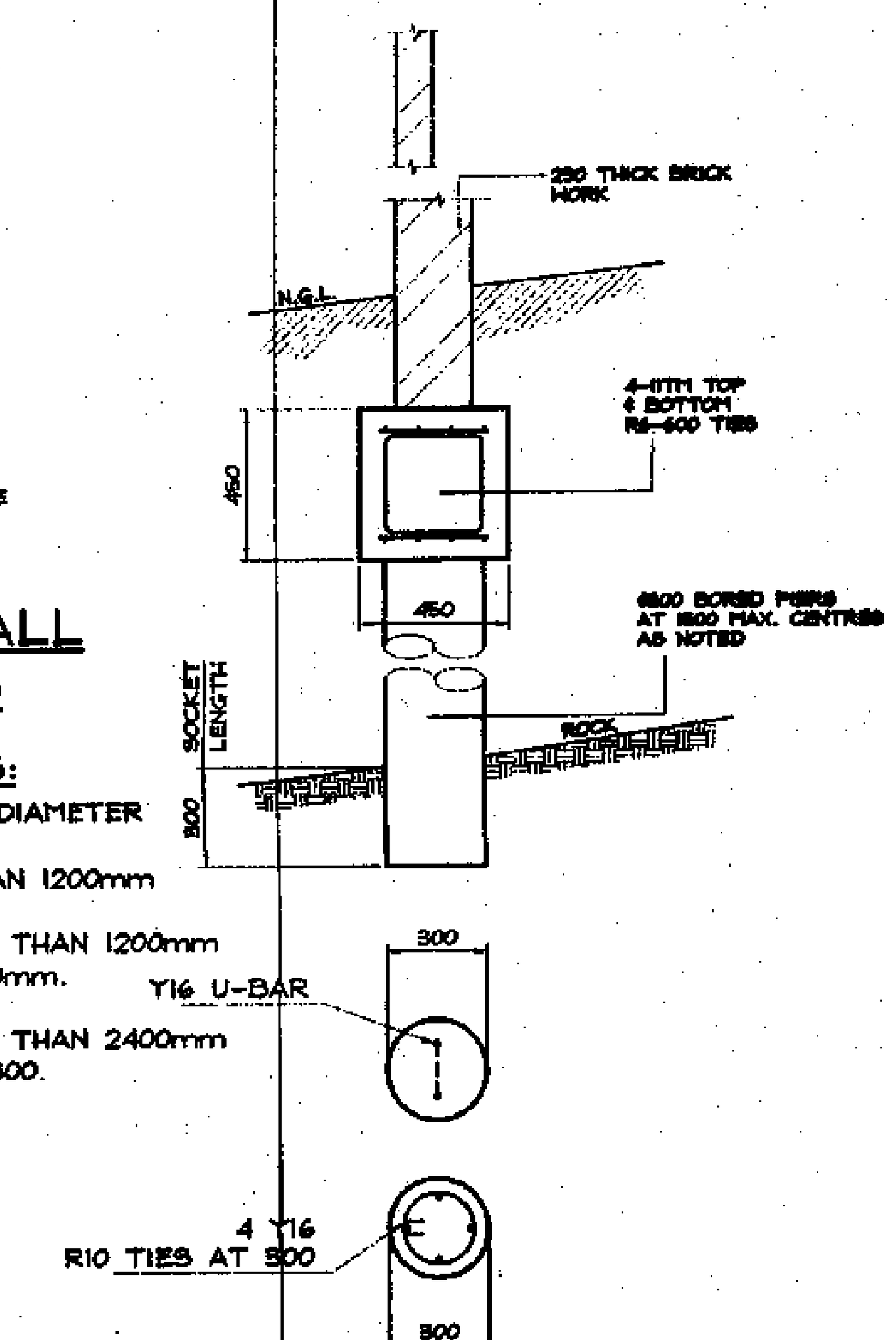


TYPICAL BRICKWALL FOOTING DETAILS

Scale 1:20

CONCRETE PIERS:

1. PIERS TO BE 300mm DIAMETER FOUNDED
2. FOR DEPTH LESS THAN 1200mm UNREINFORCED.
3. FOR DEPTH GREATER THAN 1200mm AND LESS THAN 2400mm. 1 Y16 U-BAR.
4. FOR DEPTH GREATER THAN 2400mm 4 Y16, R10 TIES AT 300.

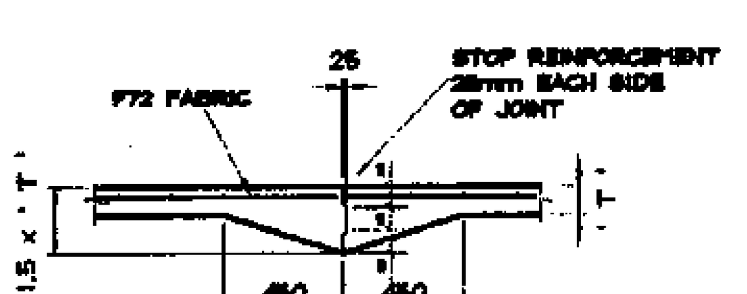


NOTES:

1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

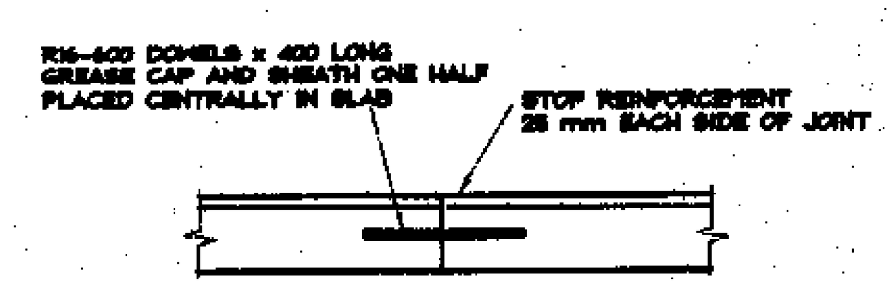
CONCRETE
F'c = 40 MPa EXPOSED
F'c = 25 MPa ON GRADE
F'c = 32 MPa SUSPENDED
COVER
45m.m. EXPOSED
30m.m. NOT EXPOSED

NOTE:-
GEOTECHNICAL ENGINEER TO APPROVE ALL FOOTING MATERIAL



KEYED JOINT DETAIL

DENOTED K.J. ON PLAN



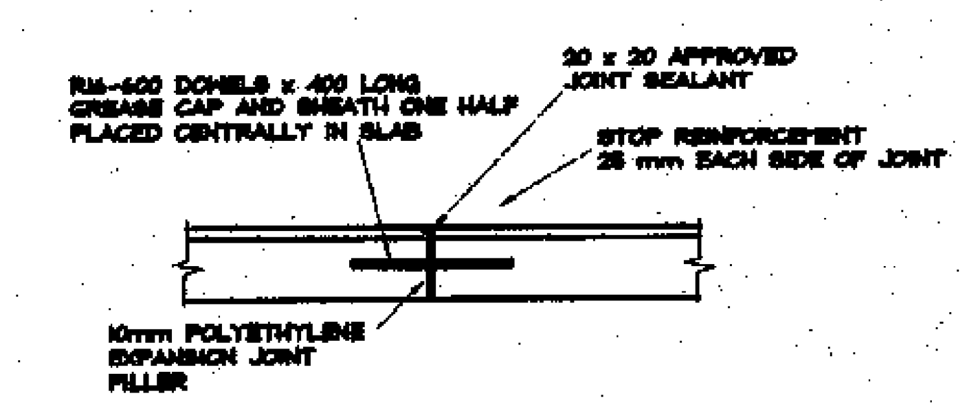
DOWEL JOINT DETAIL

DENOTED D.J. ON PLAN

SAW CUT NOTE: 45 DEEP x 3mm WIDE SAW CUT TO BE MADE AS SOON AS CONCRETE HAS CURED SUFFICIENTLY SO AS NOT TO DAMAGE THE SURFACE OF THE FLOOR SLAB

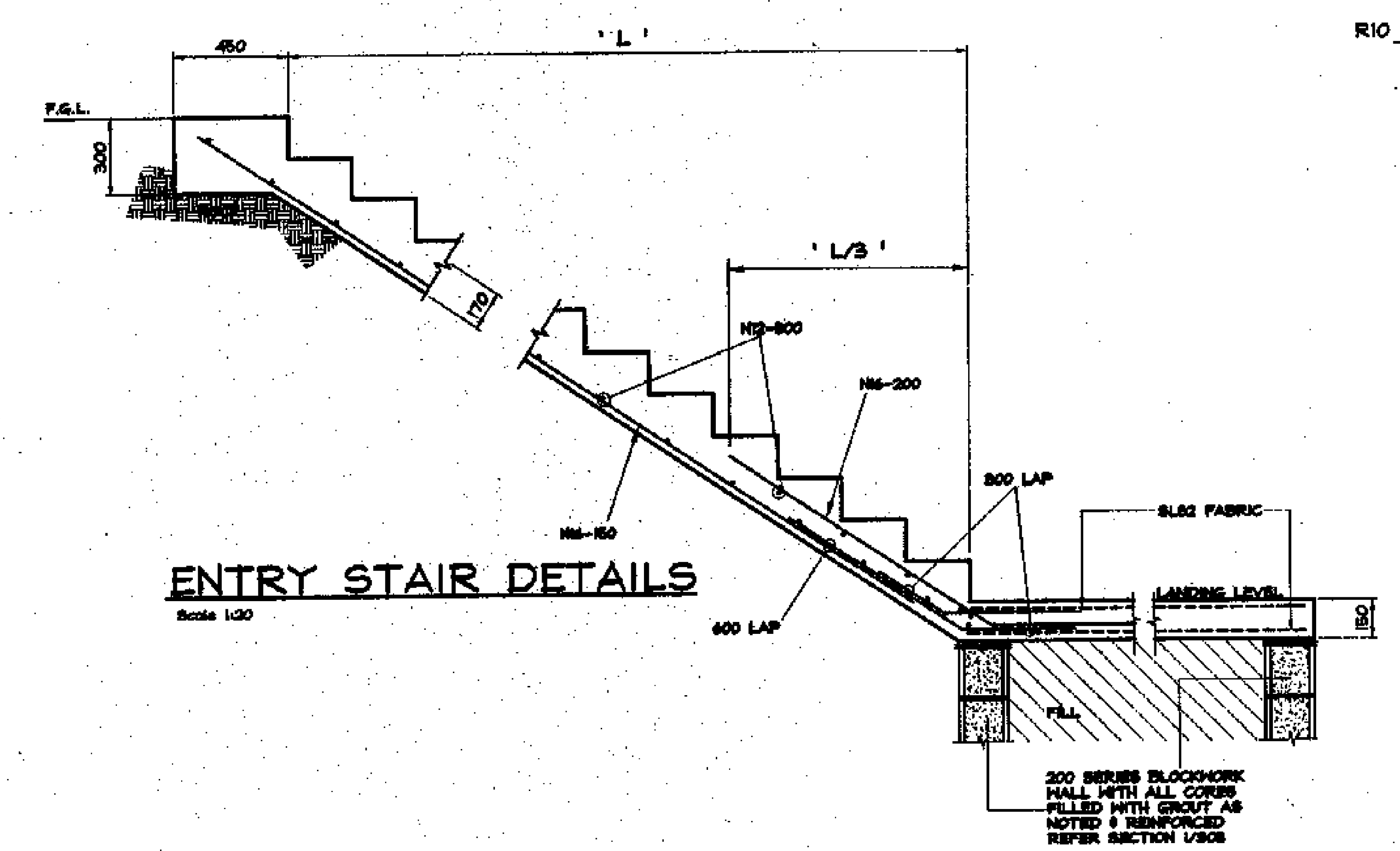
SAW CUT JOINT

DENOTED S.J. ON PLAN



EXPANSION JOINT DETAIL

DENOTED E.J. ON PLAN



ENTRY STAIR DETAILS

Scale 1:20

CITY PLAN SERVICES
Construction Cert. No: 24382 Approved Date: 22 OCT 2004
Certifying Authority: Brendan Bennett

This drawing has been prepared in general accordance with geotechnical recommendations contained in Douglas Partners Report
Signed 20/9/04
Douglas Partners Pty Ltd Geotechnics Environment Groundwater

ISSUED FOR CONSTRUCTION CERTIFICATE SUBMISSION ONLY

Date	Rev	Amendment
14.09.2004	A	ISSUED FOR CONSTRUCTION CERTIFICATE APPROVAL

A1

DOCUMENT CERTIFICATION
Date Sept. 04 Rick G. Wray (Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil),CPEng,MIEAust.,NPER. Institute of Engineers Membership No. 809438. I hereby state that this drawing is in compliance with the conditions of the development consent, the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

NORTHERN BEACHES Consulting Engineers P/L
A.C.N. 076 121 616 A.B.N. 34 076 121 616
Suite 207, 30 FISHER ROAD DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail: nb@nbconsulting.com.au

Project: PROPOSED NEW DWELLING AT BARRENJOEY & PALM BEACH ROADS PALM BEACH for: RAYPOND DEVELOPMENT

Drawing Title: HOUSE No.3 LEVEL 1-FOOTING, SLAB PLAN AND DETAILS

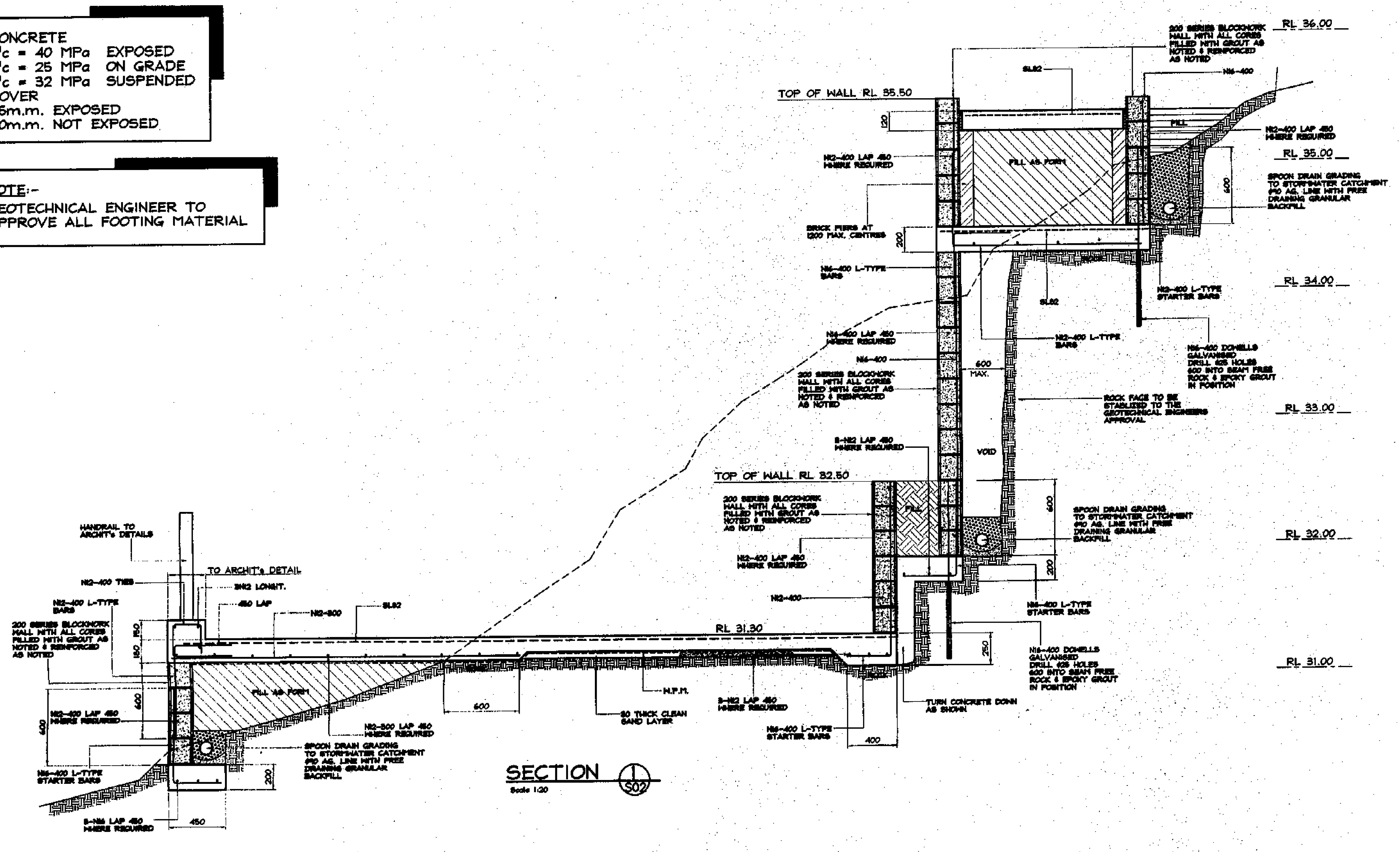
Date	Design	Drawn	Checked
AUG. 2003	R.G.W.	HENK.	

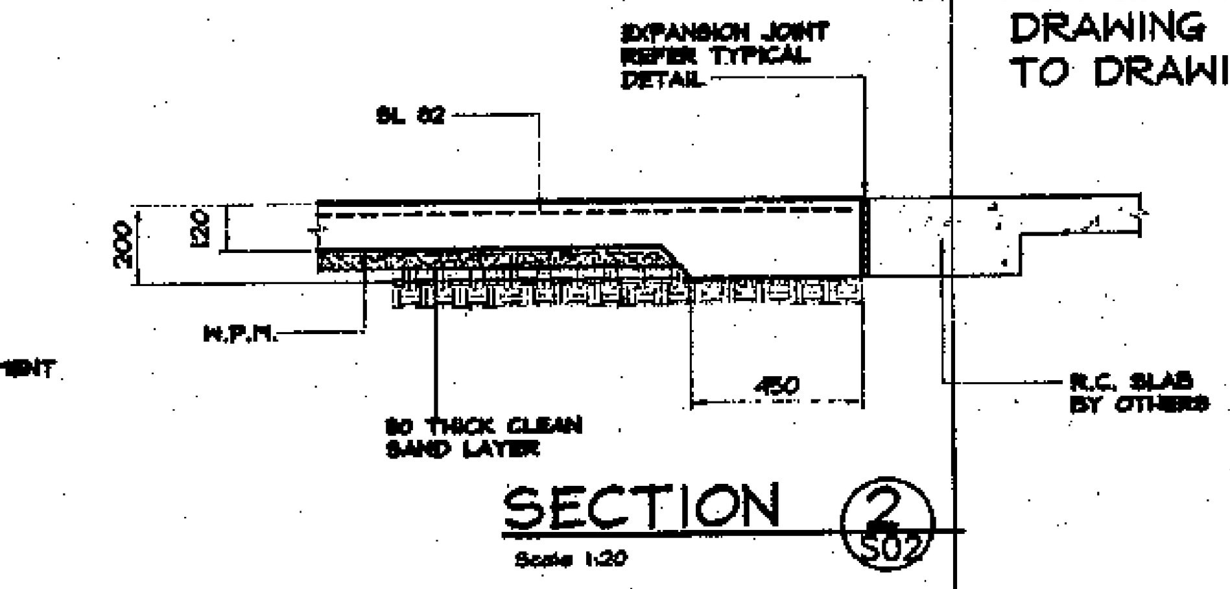
Job No	Drawing No	Rev
030704	S02	A

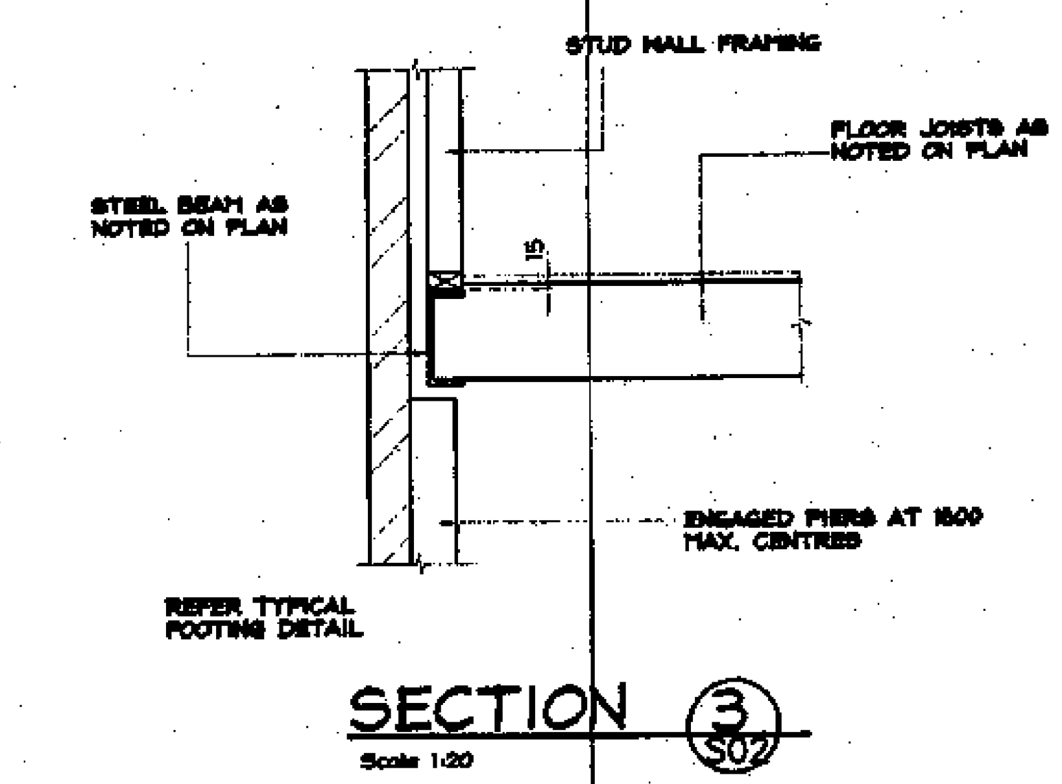
CONCRETE
F'c = 40 MPa EXPOSED
F'c = 25 MPa ON GRADE
F'c = 32 MPa SUSPENDED
COVER
45m.m. EXPOSED
30m.m. NOT EXPOSED

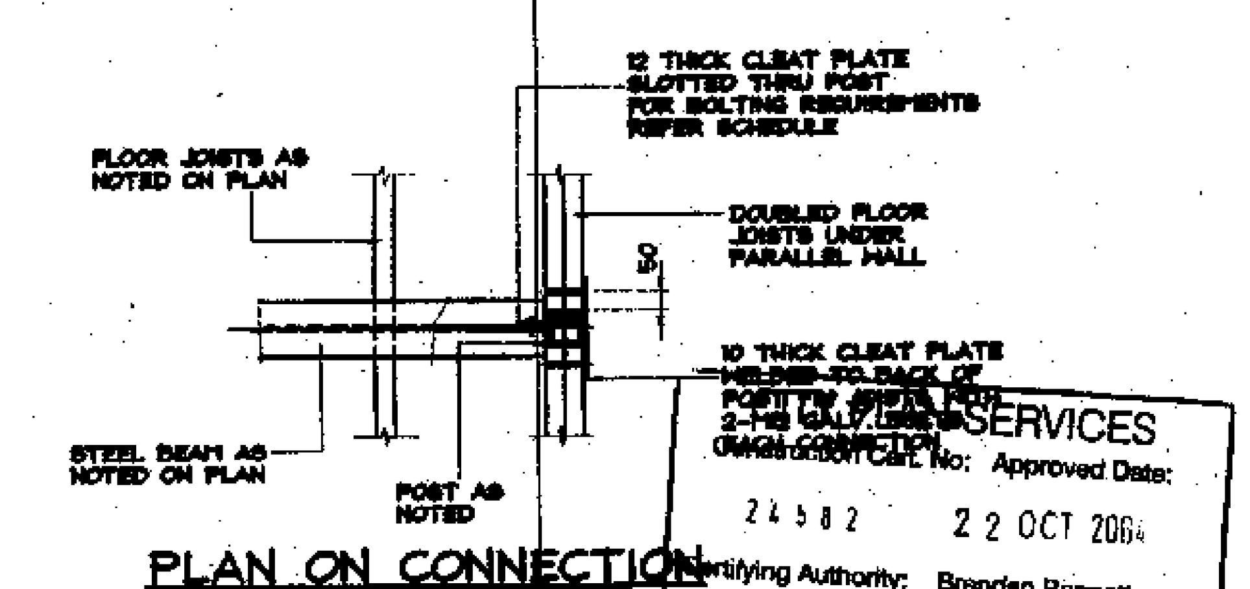
NOTE:-
GEOTECHNICAL ENGINEER TO APPROVE ALL FOOTING MATERIAL

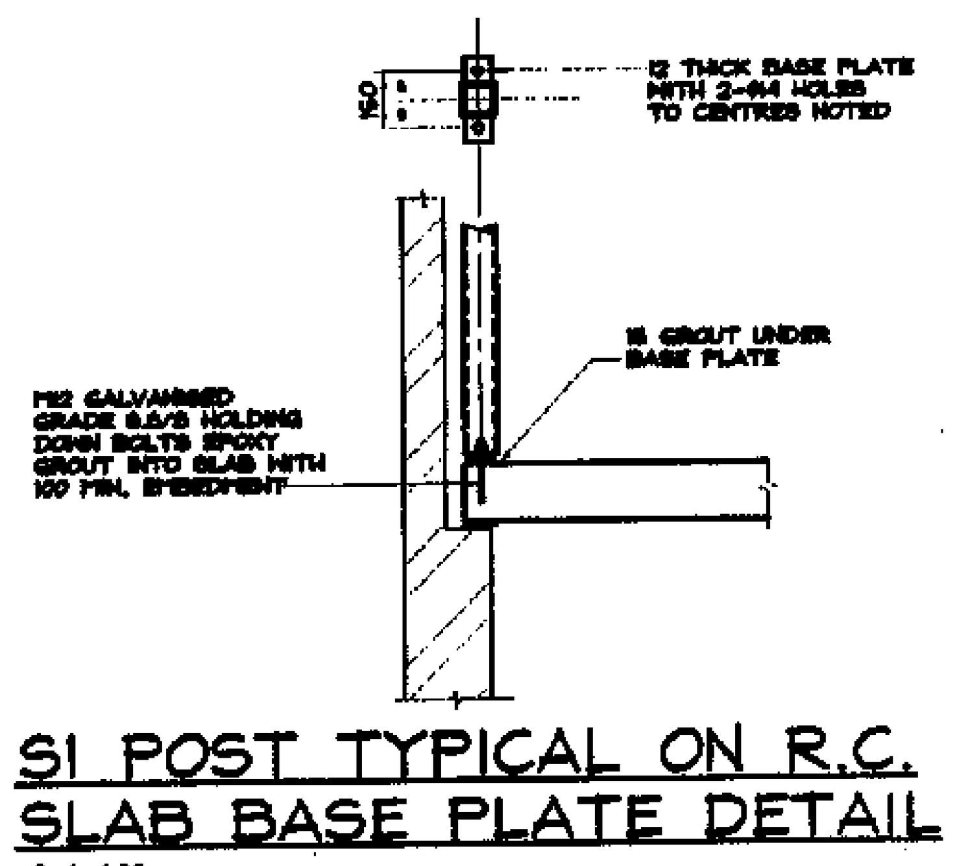
NOTES:
1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

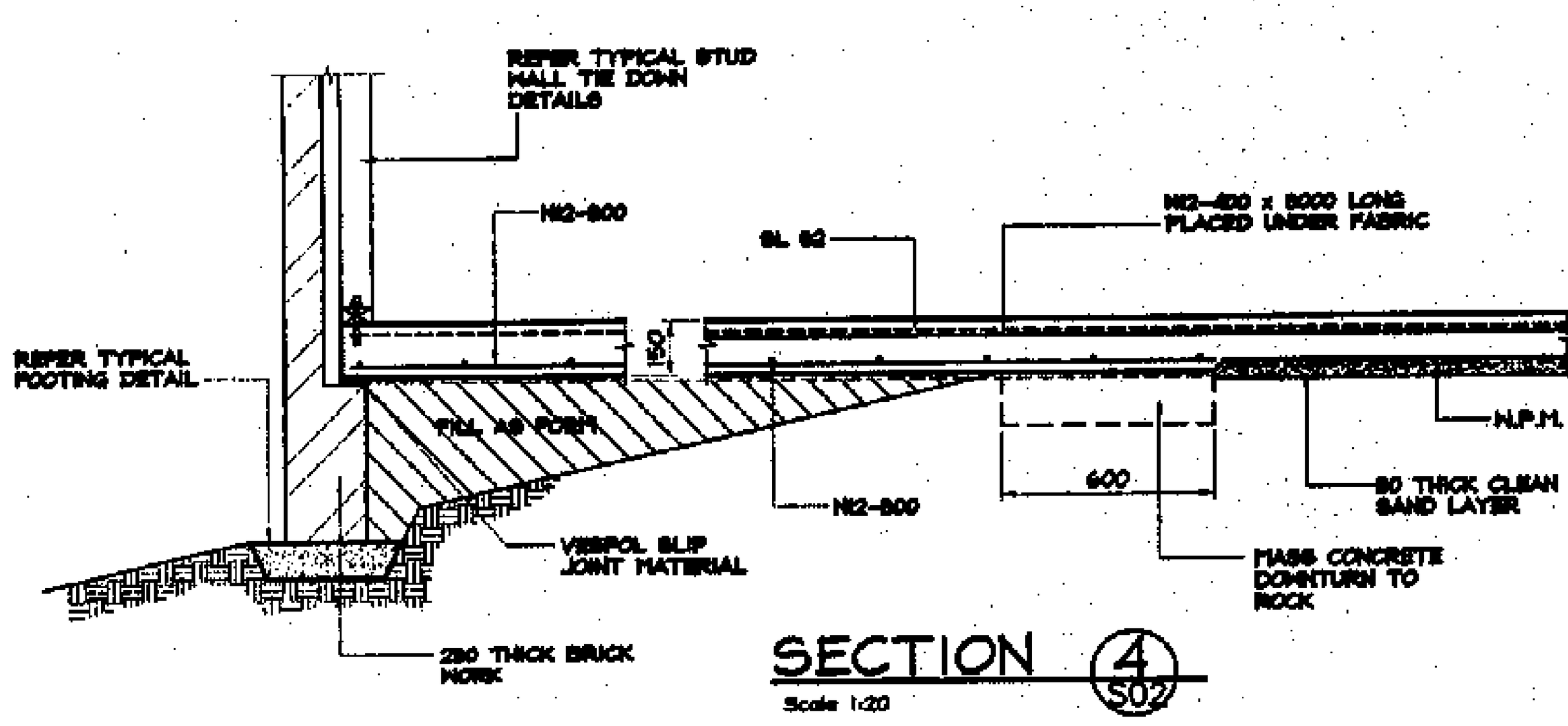


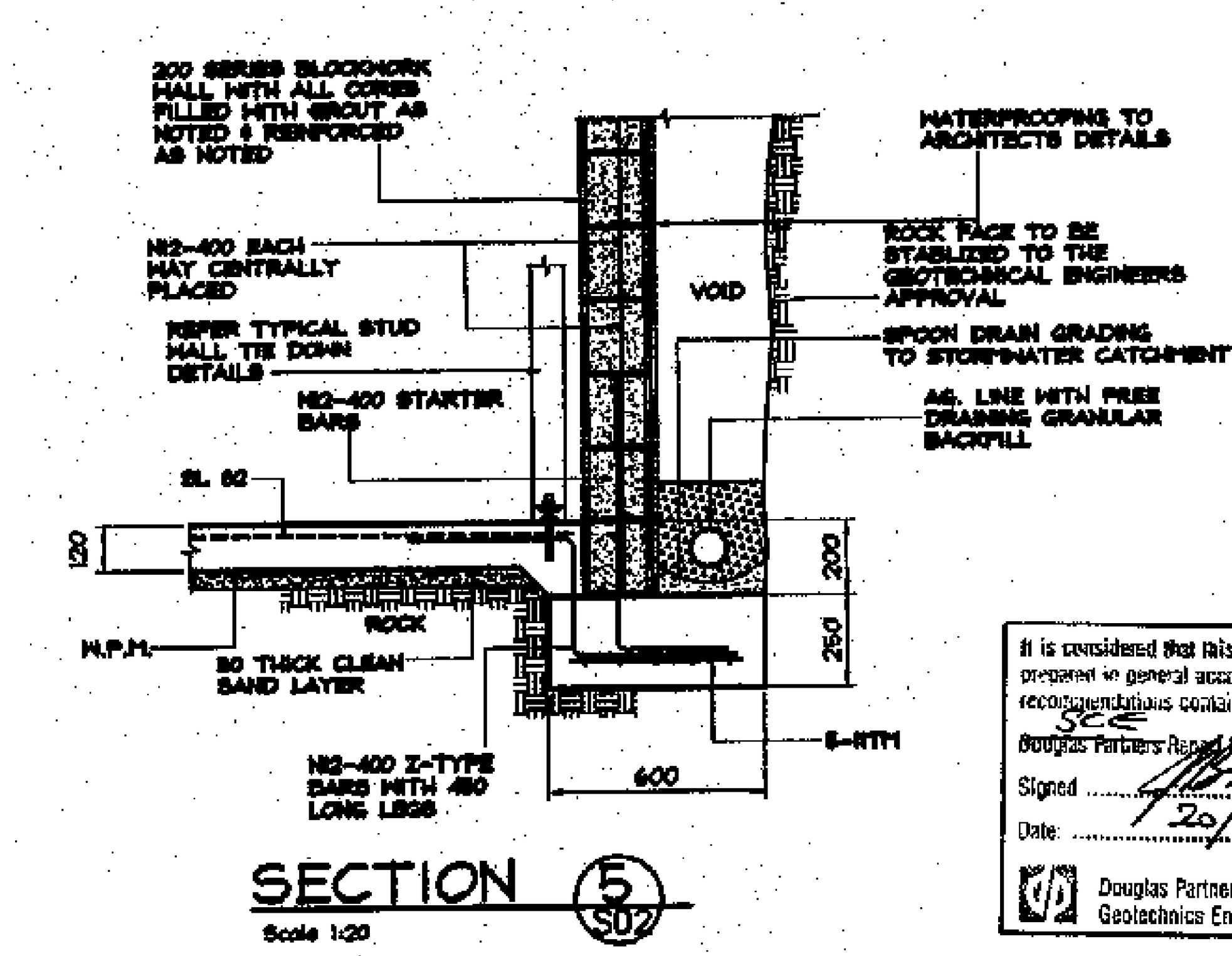




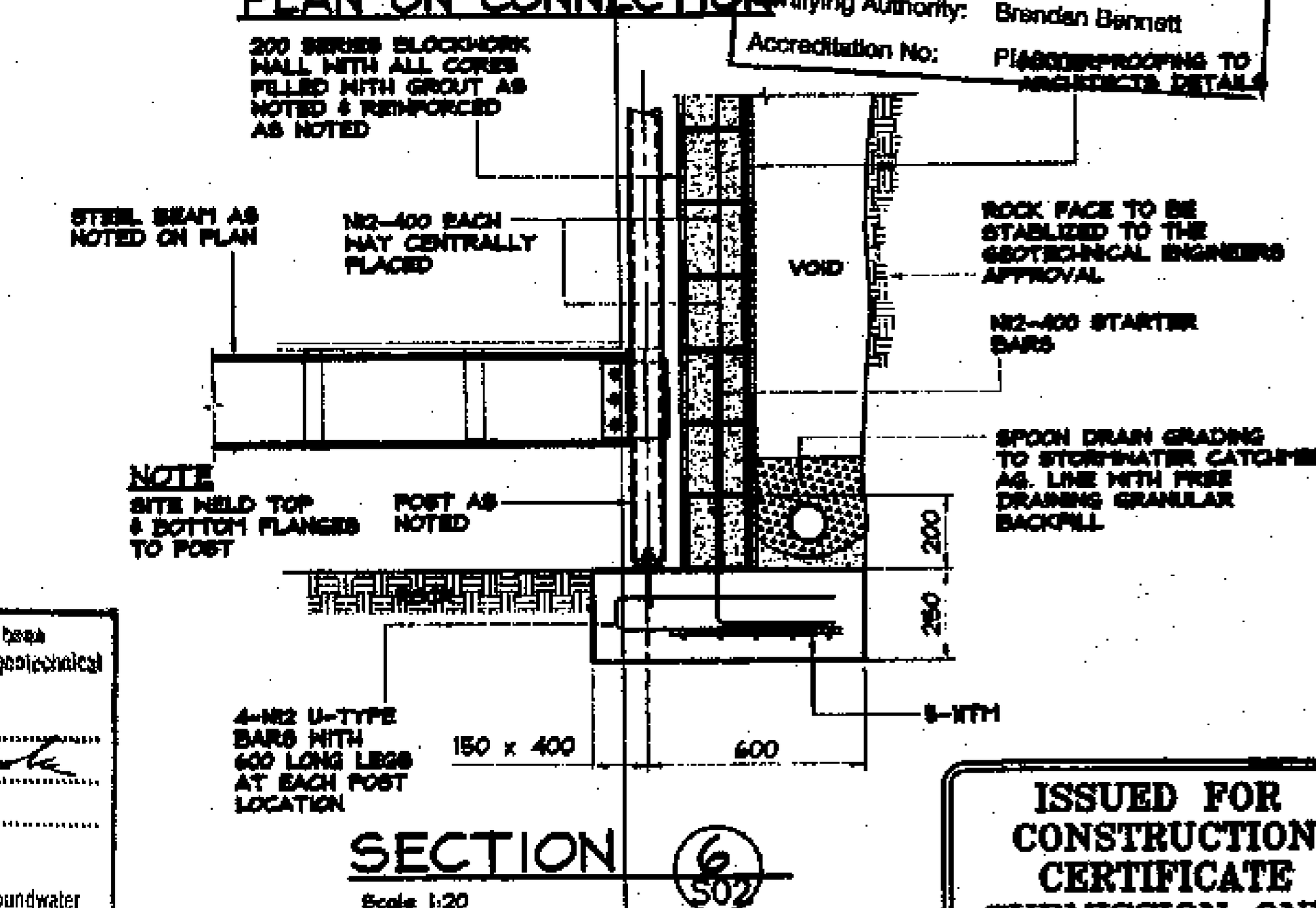








It is considered that this drawing has been prepared in general accordance with geotechnical recommendations contained in:
Douglas Partners Report No
Signed
Date 20/9/04
Douglas Partners Pty Ltd
Geotechnics Environment Groundwater



ISSUED FOR CONSTRUCTION CERTIFICATE SUBMISSION ONLY

A1

Date	Rev.	Amendment
14.09.2004	A	ISSUED FOR CONSTRUCTION CERTIFICATE APPROVAL

DOCUMENT CERTIFICATION
Date: Sept. 04
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer. I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER.
Institute of Engineers Membership No. 603488
I hereby state that this drawing is in compliance with the conditions of the development consent, the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

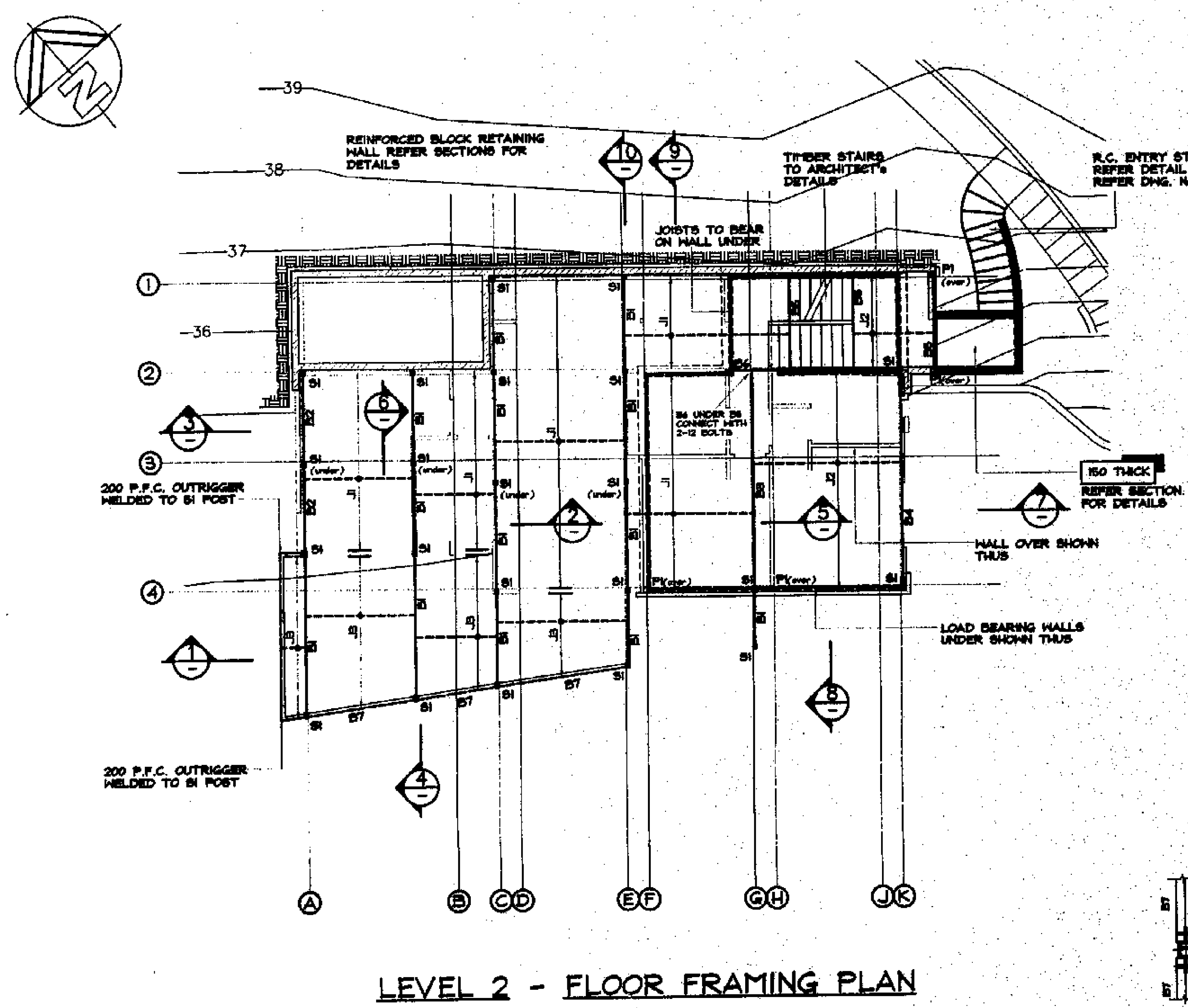
NORTHERN BEACHES Consulting Engineers P/L.
A.C.N. 076 121 616 A.B.N. 24 076 121 616
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail: nb@nbconsulting.com.au

Project:
PROPOSED NEW DWELLING AT BARRENJOEY & PALM BEACH ROADS PALM BEACH
for: RAYPOND DEVELOPMENT

Drawing Title:
HOUSE No.3
LEVEL 1-DETAIL SHEET

Date:	Design:	Drawn:	Checked:
AUG. 2003	R.G.W.	HENK.	

Job No:	Drawing No:	Rev:
030704	S03	A



LEVEL 2 - FLOOR FRAMING PLAN

NOTE:-
FLOOR JOISTS ARE TO BE DOUBLED UNDER PARALLEL WALLS & LOAD POINTS

MEMBER SCHEDULE

COLUMNS

S1 .... 90 x 90 x 4.0 S.H.S.

P1 .... 90 x 90 F7 TREATED PINE POST

FLOOR JOISTS

J1 .... 200 x 50 F7 TREATED PINE JOISTS AT 450 MAX. CENTRES

J2 .... 200 x 45 HYSPAN LVL JOISTS AT 450 MAX. CENTRES

J3 .... 200 x 50 F7 TREATED PINE JOISTS AT 450 MAX. CENTRES

FLOOR BEAMS

B1 .... 200 UB 22

B2 .... 200 P.F.C.

B3 .... 310 UB 40

B4 .... 250 P.F.C. PLUS 240 x 12 PL.

B5 .... DOUBLE FLOOR JOISTS

B6 .... 250 P.F.C.

B7 .... DOUBLE FLOOR JOISTS

NOTE:-
ALL STRUCTURAL STEEL MEMBERS & BOLTS TO BE GALVANISED

NOTES:

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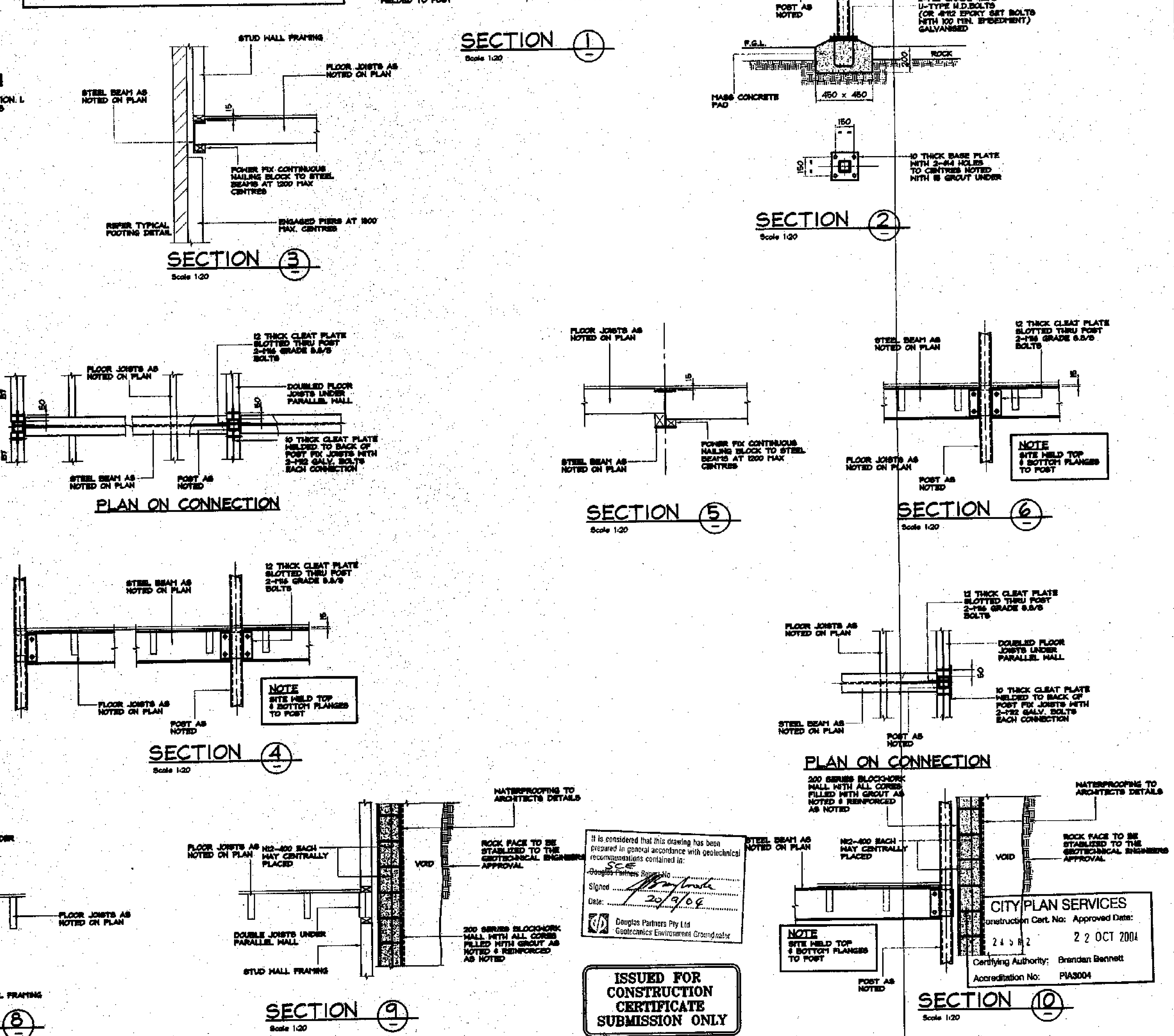


NOTE:-
GEOTECHNICAL ENGINEER TO APPROVE ALL FOOTING MATERIAL

CONCRETE
F'c = 40 MPa EXPOSED
F'c = 25 MPa ON GRADE
F'c = 32 MPa SUSPENDED
COVER
45m.m. EXPOSED
30m.m. NOT EXPOSED

ISSUED FOR CONSTRUCTION CERTIFICATE SUBMISSION ONLY

CITY PLAN SERVICES
Construction Cert. No: 24 ... 2 Approved Date: 22 OCT 2004
Certifying Authority: Brendan Bennett
Accreditation No: PIA3004

A1

Date:	Rev:	Amendment:
14.09.2004	A	ISSUED FOR CONSTRUCTION CERTIFICATE APPROVAL

DOCUMENT CERTIFICATION

Date: Sept 04 Rick G. Wray (Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil), CPEng, MIEAust., NPER. Institute of Engineers Membership No. 603938. I hereby state that this drawing is in compliance with the conditions of the development consent, the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

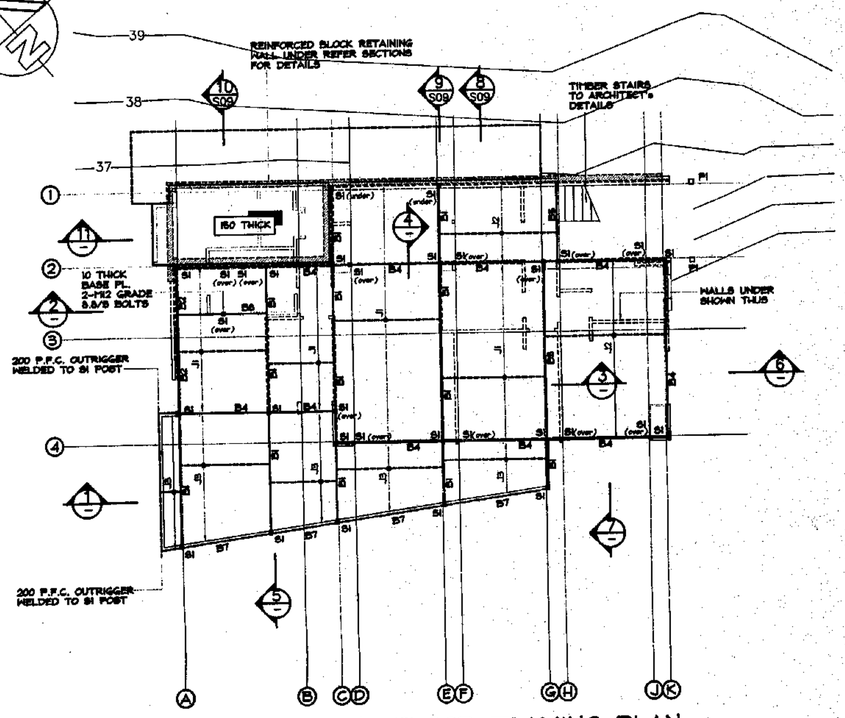
NORTHERN BEACHES Consulting Engineers P/L.
A.C.N. 076 121 616 A.B.N. 24 076 121 616
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail: nb@nbconsulting.com.au

Project: PROPOSED NEW DWELLING AT BARRENJOEY & PALM BEACH ROADS PALM BEACH for: RAYPOND DEVELOPMENT

Drawing Title: HOUSE No.3 LEVEL 2-FLOOR FRAMING PLAN AND DETAILS

Date:	Design:	Drawn:	Checked:
AUG. 2003	R.G.W.	HENK.	

Job No:	Drawing No:	Rev:
030704	S04	A



LEVEL 3 - FLOOR FRAMING PLAN

MEMBER SCHEDULE

COLUMNS
S1 ..... 90 x 90 x 4.0 S.H.S.

P1 ..... 90 x 90 F7 TREATED PINE POST

FLOOR JOISTS
J1 ..... 200 x 50 F7 TREATED PINE JOISTS AT 450 MAX. CENTRES
J2 ..... 200 x 45 LVL TIMBER JOISTS AT 450 MAX. CENTRES
J3 ..... 200 x 50 F7 TREATED PINE JOISTS AT 450 MAX. CENTRES

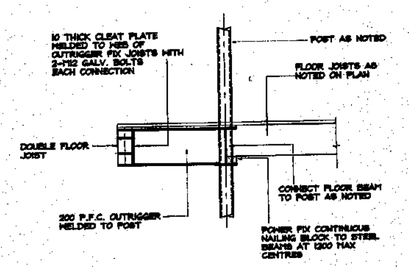
FLOOR BEAMS
B1 ..... 250 UB 37
B2 ..... 250 P.F.C.
B3 ..... 250 UB 37
B4 ..... 250 P.F.C.
B5 ..... DOUBLE FLOOR JOISTS
B6 ..... 250 P.F.C.
B7 ..... DOUBLE FLOOR JOISTS
B8 ..... 200 UB 25

NOTE:-
ALL STRUCTURAL STEEL MEMBERS & BOLTS TO BE GALVANISED

NOTE:-
FLOOR JOISTS ARE TO BE DOUBLED UNDER PARALLEL WALLS & LOAD POINTS

NOTE:-
GEOTECHNICAL ENGINEER TO APPROVE ALL FOOTING MATERIAL

CONCRETE
f'c = 40 MPa EXPOSED
f'c = 25 MPa ON GRADE
f'c = 32 MPa SUSPENDED
COVER
45m.m. EXPOSED
20m.m. NOT EXPOSED



SECTION 1
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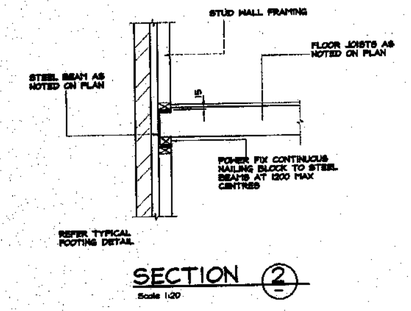

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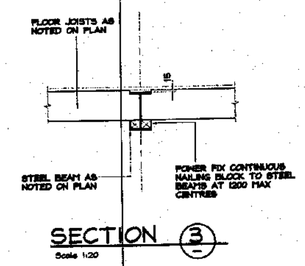
Scale 1:20



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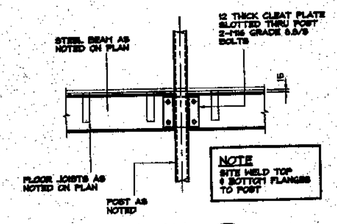
Scale 1:20



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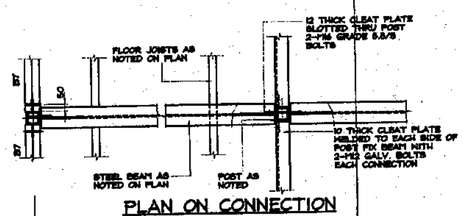
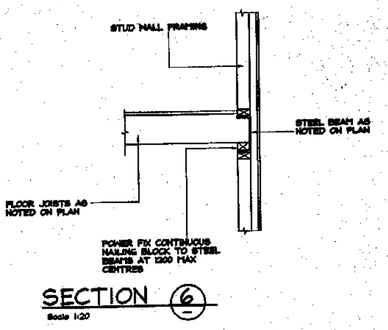
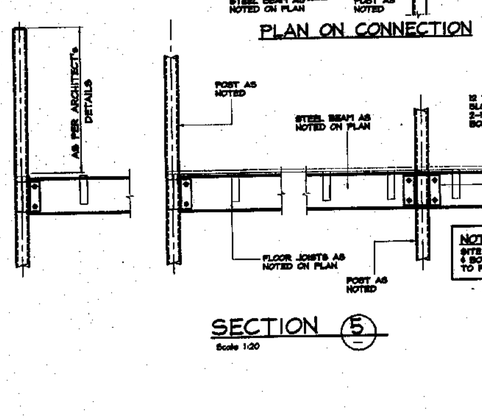
Scale 1:20



PLAN ON CONNECTION



SECTION 6
Scale 1:20



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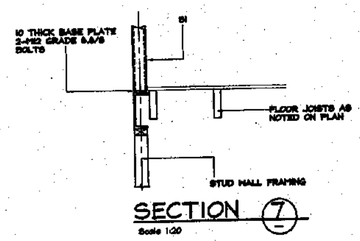

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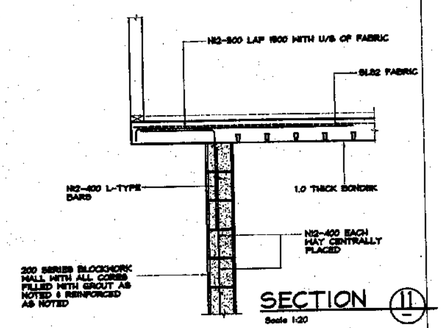

SECTION 11
Scale 1:20

NOTES:

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2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

CITY PLAN SERVICES
Construction Cert. No: 243/82 Approved Date: 22 OCT 2004
Certifying Authority: Brendan Bennett
Accreditation No: PIA3004

It is considered that this drawing has been prepared in general accordance with geotechnical recommendations contained in: SCE
Douglas Partners Report No.
Signed
Date: 20/9/04
Douglas Partners Pty Ltd Geotechnics Environment Groundwater

ISSUED FOR CONSTRUCTION CERTIFICATE SUBMISSION ONLY

A1

Date:	Rev:	Amendment:
14.09.2004	A	ISSUED FOR CONSTRUCTION CERTIFICATE APPROVAL

DOCUMENT CERTIFICATION
Date: 14th of Sept
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER.
Institute of Engineers Membership No. 809988
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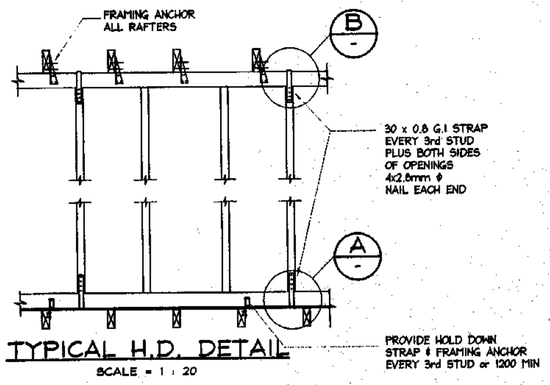
NORTHERN BEACHES Consulting Engineers P/L.
A.C.N. 076 121 618 A.B.N. 24 076 121 618
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail : nb@nbconsulting.com.au

Project:
PROPOSED NEW DWELLING AT BARRENJOEY & PALM BEACH ROADS PALM BEACH
for: RAYPOND DEVELOPMENT

Drawing Title:
HOUSE No.3
LEVEL 3-FLOOR FRAMING PLAN AND DETAILS

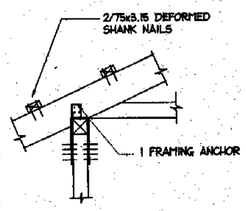
Date:	Design:	Drawn:	Checked:
AUG. 2003	R.G.W.	HENK.	

Job No:	Drawing No:	Rev:
030704	S05	A



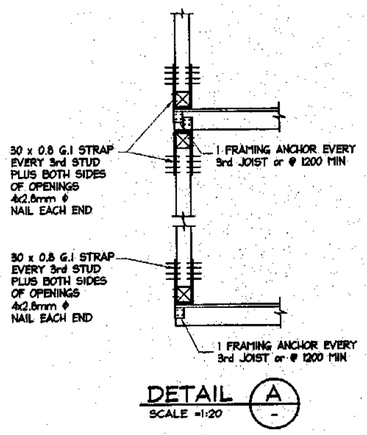
TYPICAL H.D. DETAIL

SCALE = 1 : 20



DETAIL B

SCALE =1:20



DETAIL A

SCALE =1:20

NOTES:

1. ORGANIC TERMITE TREATMENT TO BE CARRIED OUT TO PERIMETER OF ENTIRE BUILDING AND SUB-FLOOR AREAS. ANNUAL INSPECTIONS AND TREATMENT AS REQUIRED SHALL BE THE RESPONSIBILITY OF THE PROPRIETOR.
2. WALL FRAMING SHALL BE IN ACCORDANCE WITH AS 1684 TIMBER FRAMING CODE AND NSW TIMBER FRAMING MANUAL.
3. BRACE WALLS AND ROOF IN ACCORDANCE WITH AS 1684 TIMBER FRAMING CODE AND NSW TIMBER FRAMING MANUAL.
4. PROVIDE DOUBLE JOISTS BELOW ALL LOAD BEARING WALLS UNLESS NOTED OTHERWISE.
5. HOLD DOWN TO ROOF RAFTERS AND BEAMS SHALL BE IN ACCORDANCE WITH AS 1684 TIMBER FRAMING CODE AND AS 1170.2 WIND LOADING CODE.
6. TRIM FLOOR/ROOF OPENINGS WITH EQUIVALENT JOIST/RAFTER SIZES UNLESS NOTED OTHERWISE.
7. CLADDING OF ANY FORM IS NOT TO BE INSTALLED UNTIL ALL BRACING AND TIE DOWNS ARE COMPLETE AND CERTIFIED.
8. TIE DOWNS ARE TO BE INSTALLED AT THE TIME OF CONSTRUCTION OF WALL FRAMES.

NOTES:

1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

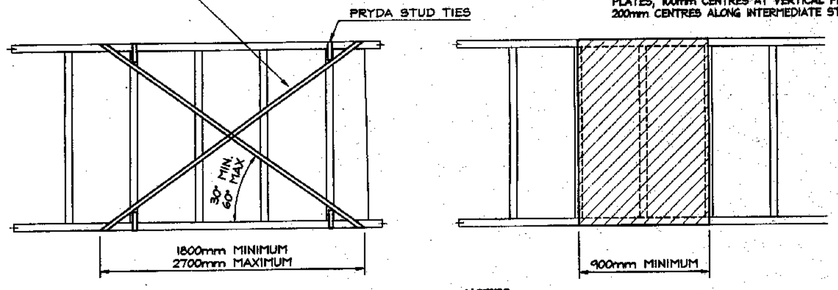
METAL TENSION STRAP BRACING:

PRYDA STRAP BRACING WITH TENSIONERS FIXED WITH TWO GALVANISED FLATHEAD NAILS ϕ3.15mm x 30mm LONG TO EACH STUD, AND THE FACE OF THE TOP AND BOTTOM PLATE. AND FOUR GALVANISED FLATHEAD NAILS ϕ3.15mm x 30mm LONG TO THE STRAP RETURN OVER THE TOP PLATE ABD UNDER THE BOTTOM PLATE.

PLYWOOD THICKNESS	
PLYWOOD STRESS GRADE	PLYWOOD THICKNESS MAXIMUM STUD SPACING 450mm
F8	7.0mm
F11	6.0mm
F14	4.0mm
F27	4.0mm

PLYWOOD BRACING:

FIX PLYWOOD PANELS WITH GALVANISED FLATHEAD NAILS ϕ2.8mm x 30mm LONG MINIMUM OR EQUIVALENT AT 50mm CENTRES ALONG TOP AND BOTTOM PLATES, 150mm CENTRES ALONG VERTICAL EDGES AND 300mm CENTRES ALONG INTERMEDIATE STUDS.
NAILS SHALL BE LOCATED A MINIMUM OF 7mm FROM PANEL EDGES. POWER DRIVEN GALVANISED NAILS OR COATED STAPLES MAY BE USED WHERE THEY PROVIDE AT LEAST THE EQUIVALENT STRENGTH TO HAND DRIVES ϕ2.8mm x 30mm LONG GALVANISED CLOUTS OR FLATHEAD NAILS. IN THE CASE OF POWER DRIVEN STAPLES, STAPLE SPACING SHALL BE 25mm CENTRES AT TOP AND BOTTOM PLATES, 100mm CENTRES AT VERTICAL PLYWOOD EDGES AND 200mm CENTRES ALONG INTERMEDIATE STUDS.



NOTES:

1. FOR POWER DRIVEN NAILS AND STAPLES REFER ABOVE.
2. NOGGINGS HAVE BEEN OMITTED FOR CLARITY.

TYPE A - WALL BRACING UNIT

SCALE = 1 : 20

NOTES:

1. FOR PLYWOOD THICKNESS REFER TO TABLE.
2. FOR POWER DRIVEN NAILS AND STAPLES REFER ABOVE.
3. PANEL EDGES SHALL BE SUPPORTED BY STUDS.
4. NOGGINGS HAVE BEEN OMITTED FOR CLARITY.

TYPE B - WALL BRACING UNIT

SCALE = 1 : 20

CITY PLAN SERVICES
Construction Cert. No: 24582 Approved Date: 22 OCT 2004
Certifying Authority: Brendan Bennett
Accreditation No: PIA3004

Not Geotechnically relevant

It is considered that this drawing has been prepared in general accordance with geotechnical recommendations contained in: DCE Douglas Partners Report No ..... Signed ..... Date: 20/9/04
Douglas Partners Pty Ltd Geotechnics Environment Groundwater

ISSUED FOR CONSTRUCTION CERTIFICATE SUBMISSION ONLY

A1

Date:	Rev:	Amendment:
14.09.2004	A	ISSUED FOR CONSTRUCTION CERTIFICATE APPROVAL

DOCUMENT CERTIFICATION

Date : 14th of Sept
Rick G. Wray .....
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil),CPEng,MIEAust.,NPER.
Institute of Engineers Membership No. 809938
I hereby state that this drawing is in compliance with the conditions of the development consent, the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

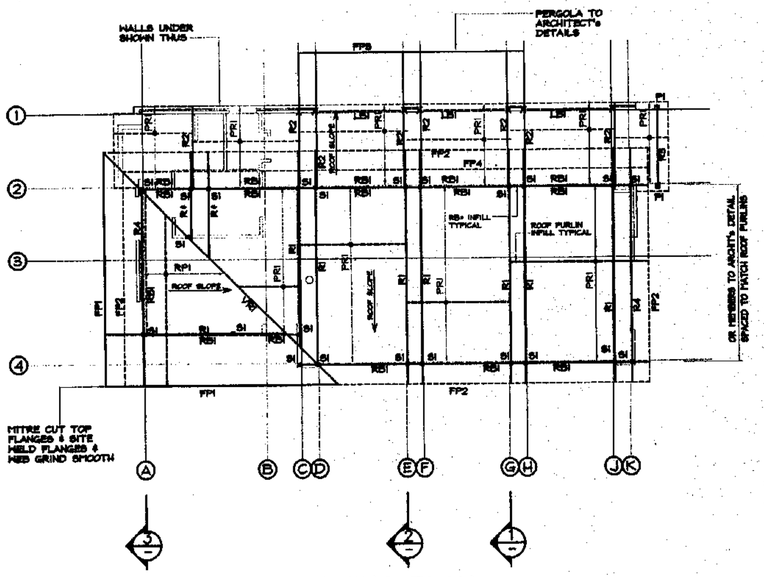
NORTHERN BEACHES Consulting Engineers P/L.
A.C.N. 076 121 616 A.B.N. 34 076 121 616
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail : nb@nbconsulting.com.au

Project: PROPOSED NEW DWELLING AT BARRENJOEY & PALM BEACH ROADS PALM BEACH for: RAYPOND DEVELOPMENT

Drawing Title: HOUSE No.3 MISCELLANEOUS DETAIL SHEET

Date:	Design:	Drawn:	Checked:
AUG. 2003	R.G.W.	HENK.	

Job No:	Drawing No:	Rev:
030704	S06	A



ROOF FRAMING PLAN
Scale 1:100

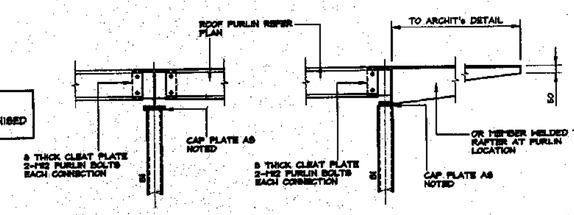
MEMBER SCHEDULE

COLUMNS
S1 ..... 90 x 90 x 4.0 S.H.S.
P1 ..... 90 x 90 F7 TREATED PINE POST

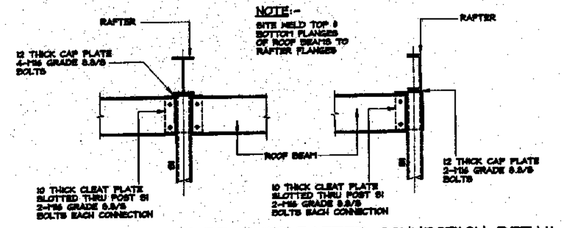
ROOF PURLINS
RP1 ..... 200 x 50 F7 PURLINS AT 600 MAX. CENTRES (OR C8502 PURLINS AT 600 MAX. CENTRES)
RP2 ..... 250 x 50 F7 PURLINS AT 600 MAX. CENTRES (OR C20016 PURLINS AT 600 MAX. CENTRES)

ROOF RAFTERS & BEAMS
R1 ..... 200 UB 22
R2 ..... 200 P.F.C.
R3 ..... 200 x 50 F7
R4 ..... 200 P.F.C.
VR1 ..... 250 UB 25
FP1 ..... 280 P.F.C.
FP2 ..... 75 x 50 x 6L
FP3 ..... 200 P.F.C.
FP4 ..... 100 x 75 x 6L
RB1 ..... 150 P.F.C.
LB1 ..... 200 P.F.C.
X ..... DENOTES DOUBLE STUD LOCATION

NOTE:-
ALL STRUCTURAL STEEL MEMBERS & BOLTS TO BE GALVANISED



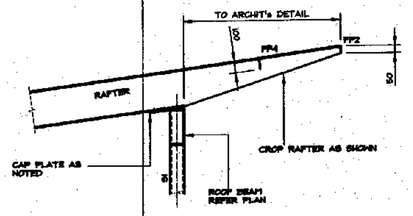
TYPICAL PURLIN TO RAFTER CONNECTION DETAIL



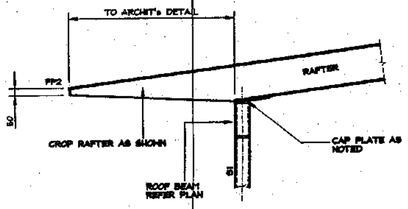
TYPICAL ROOF BEAM TO RAFTER CONNECTION DETAIL

NOTES:

1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.



DETAIL (A)
Scale 1:20



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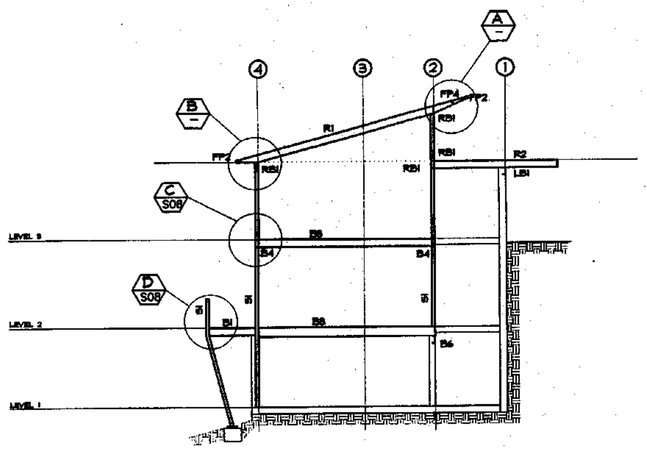

SECTION (1)
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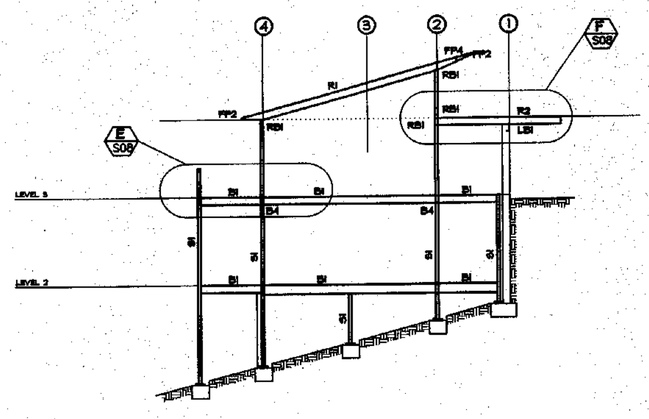

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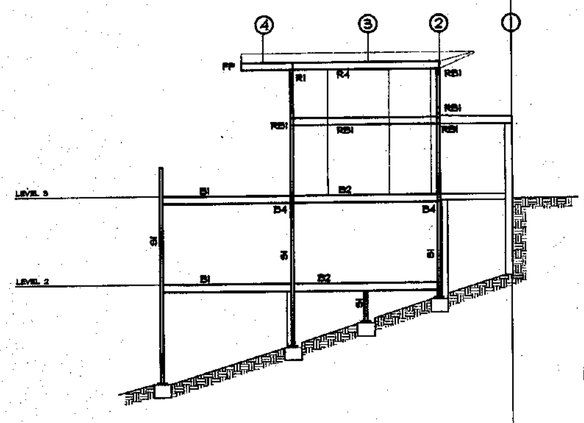


SECTION (3)
Scale 1:100

CITY PLAN SERVICES
Construction Cert. No: 2 4 3 8 2 Approved Date: 22 OCT 2004
Certifying Authority: Brendan Bennett
Accreditation No: PIA3004
Not Construction relevant

It is considered that this drawing has been prepared in general accordance with geotechnical recommendations contained in:
Douglas Partners Report No .....
Signed .....
Date: 20/9/04
Douglas Partners Pty Ltd Geotechnics Environment Groundwater

ISSUED FOR CONSTRUCTION CERTIFICATE SUBMISSION ONLY

A1

Date:	Rev:	Amendment:
14.09.2004	A	ISSUED FOR CONSTRUCTION CERTIFICATE APPROVAL

DOCUMENT CERTIFICATION
Date 14.9.04
Rick G. Wray .....
(Director Northern Beaches Consulting Engineers)

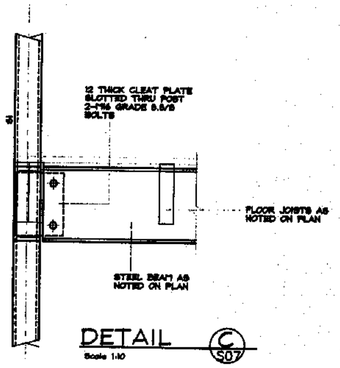
I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER.
Institute of Engineers Membership No. 809458
I hereby state that this drawing is in compliance with the conditions of the development consent, the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

NORTHERN BEACHES Consulting Engineers P/L.
A.C.N. 076 121 618 A.B.N. 24 076 121 618
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail : nbc@nbconsulting.com.au

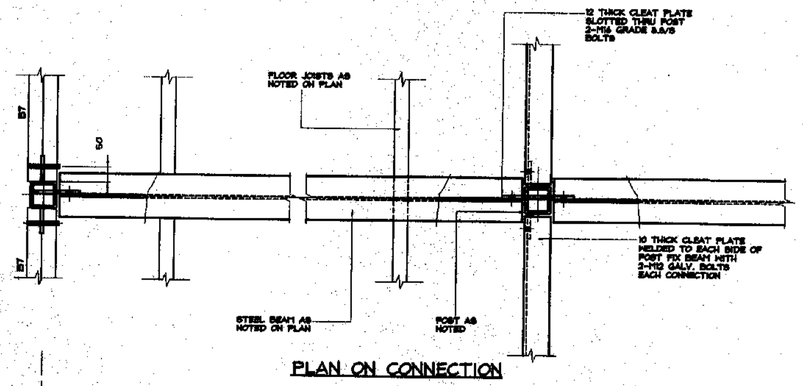
Project:
PROPOSED NEW DWELLING AT BARRENJOEY & PALM BEACH ROADS PALM BEACH
for: RAYPOND DEVELOPMENT

Drawing Title:
HOUSE No.3
ROOF FRAMING PLAN
SECTIONS & DETAILS

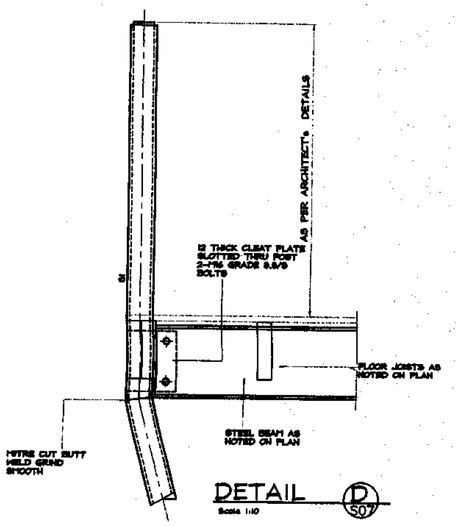
Date:	Design:	Drawn:	Checked:
AUG. 2003	R.G.W.	HENK.	
Job No:	Drawing No:	Rev:	
030704	S07	A	



DETAIL C S07
Scale 1:10



PLAN ON CONNECTION



DETAIL D S07
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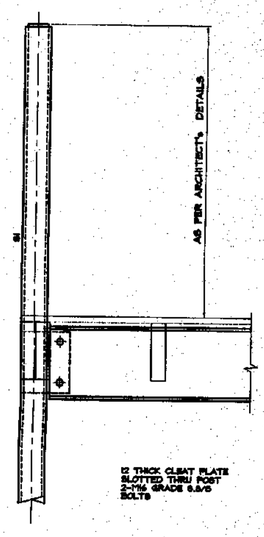
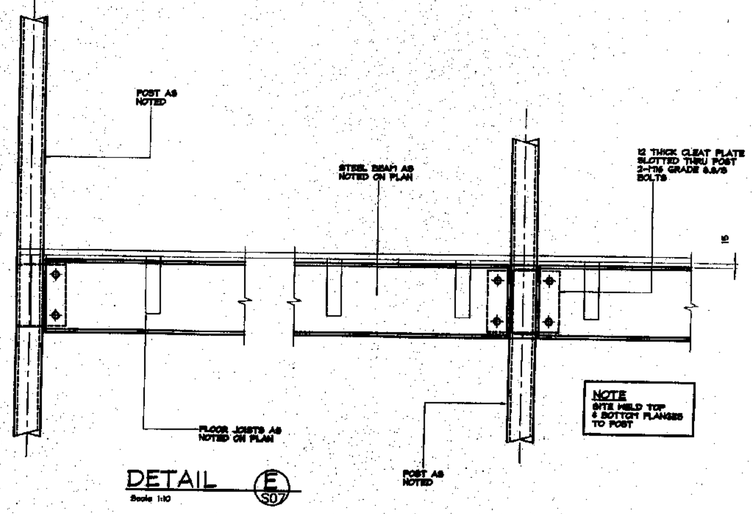
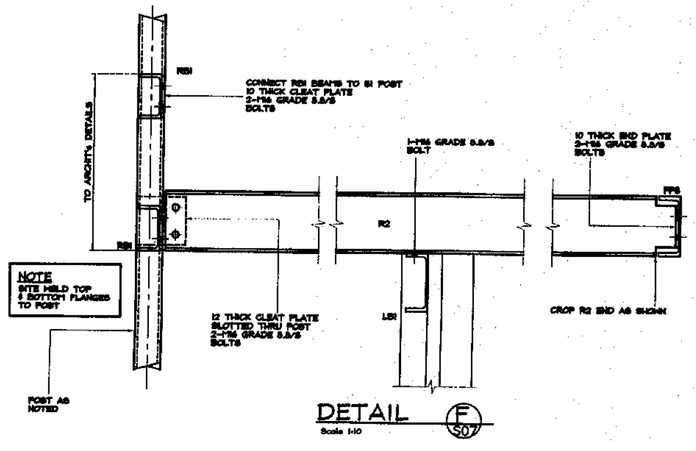




DETAIL E S07
Scale 1:10



DETAIL F S07
Scale 1:10

NOTES:

1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

CITY PLAN SERVICES
Construction Cert. No: 24582 Approved Date: 22 OCT 2004
Certifying Authority: Brendan Bennett
Accreditation No: PIA3004 Relevant
Not Geotechnically

It is considered that this drawing has been prepared in general accordance with geotechnical recommendations contained in:
Douglas Partners Report No:
Signed:
Date: 21/10/04
Douglas Partners Pty Ltd
Geotechnics Environment Groundwater

ISSUED FOR CONSTRUCTION CERTIFICATE SUBMISSION ONLY

A1

Date:	Rev:	Amendment:
14.09.2004	A	ISSUED FOR CONSTRUCTION CERTIFICATE APPROVAL

DOCUMENT CERTIFICATION
Date: Sept 04
Rick G. Wray .....
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER.
Institute of Engineers Membership No. 809936
I hereby state that this drawing is in compliance with the conditions of the development consent, the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

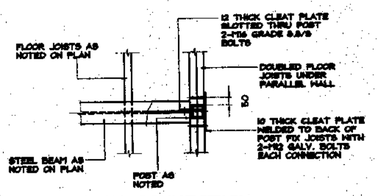
NORTHERN BEACHES Consulting Engineers P/L.
A.C.N. 076 121 616 A.B.N. 94 076 121 616
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail: nb@nbconsulting.com.au

Project:
PROPOSED NEW DWELLING AT BARRENJOEY & PALM BEACH ROADS PALM BEACH
for: RAYPOND DEVELOPMENT

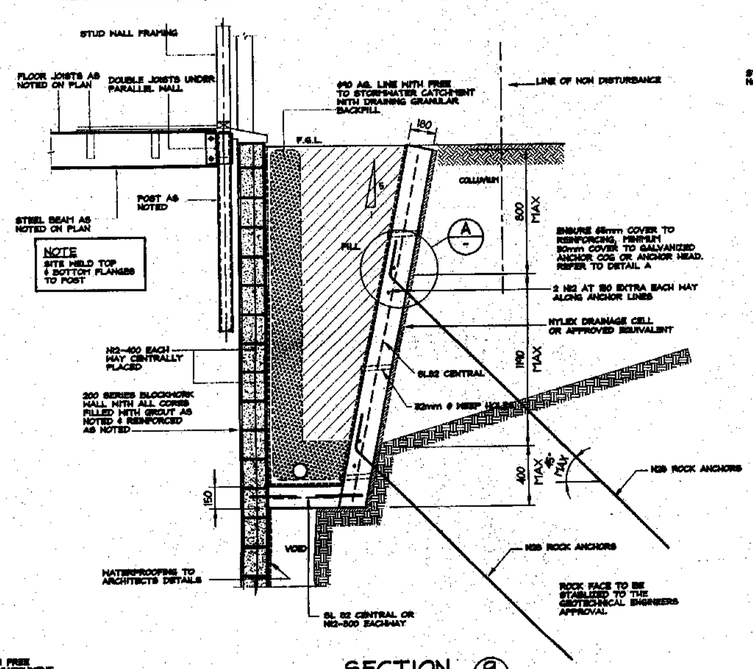
Drawing Title:
HOUSE No.3
ROOF FRAMING
DETAIL SHEET

Date:	Design:	Drawn:	Checked:
AUG. 2003	R.G.W.	HENK.	

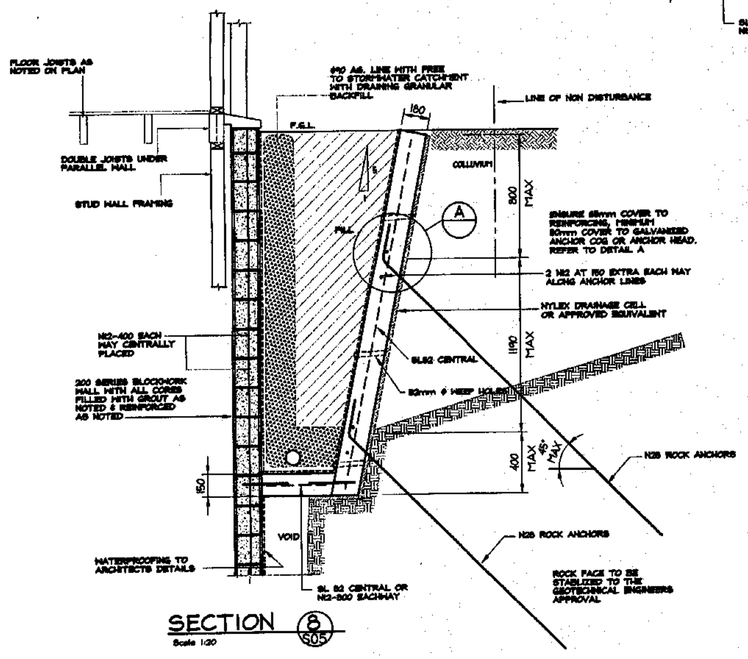
Job No:	Drawing No:	Rev:
030704	S08	A



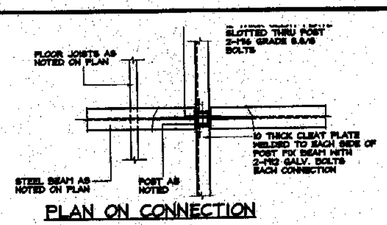
PLAN ON CONNECTION



SECTION 9 S05
Scale 1:20



SECTION 8 S05
Scale 1:20



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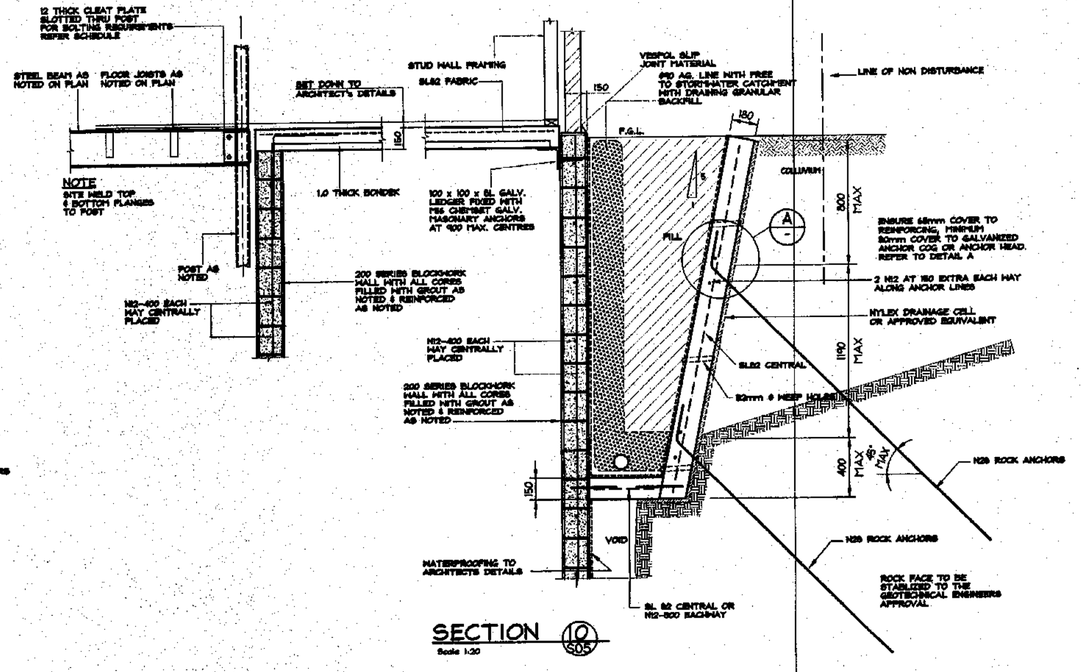


SECTION 10 S05
Scale 1:20

NOTES:

1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

CITY PLAN SERVICES
Construction Cert. No: 24 of 82 Approved Date: 22 OCT 2004
Certifying Authority: Brendan Bennett
Accreditation No: PIA3004

It is considered that this drawing has been prepared in general accordance with geotechnical recommendations contained in: Douglas Partners Report No: See
Signed: [signature]
Date: 22/9/04
Douglas Partners Pty Ltd Geotechnics Environment Groundwater

ISSUED FOR CONSTRUCTION CERTIFICATE SUBMISSION ONLY

A1

-	-	-
Date:	Rev:	Amendment:

DOCUMENT CERTIFICATION
Date Sept. 04' R.Wray
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER.
Institute of Engineers Membership No. 809188
I hereby state that this drawing is in compliance with the conditions of the development consent, the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

NORTHERN BEACHES Consulting Engineers P/L.
A.C.N. 076 121 616 A.B.N. 24 076 121 616
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail : nb@nbconsulting.com.au

Project: PROPOSED NEW DWELLING AT BARRENJOEY & PALM BEACH ROADS PALM BEACH for: RAYPOND DEVELOPMENT

Drawing Title: HOUSE No.3 SHORING SECTIONS

Date:	Design:	Drawn:	Checked:
AUG. 2003	R.G.W.	HENK.	

Job No:	Drawing No:	Rev:
030704	S09	-

DOWEL SCHEDULE

MATERIAL	SLOPE HEIGHT (H)	BOLTING REQUIREMENTS
COLLUVIUM AND RESIDUAL SOIL	UP TO 1.5m	2.5m LONG GALV. N28 COGGED DOWEL SPACED AT 2.0m CENTRES HORIZONTALLY & DIPPING AT 45°. INSTALLED IN 75ø HOLE BLOWN CLEAN & FULLY GROUTED.
	1.5m TO 2.0m	3.0m LONG GALV. N28 COGGED DOWEL SPACED AT 2.0m CENTRES HORIZONTALLY & DIPPING AT 45°. INSTALLED IN 75ø HOLE BLOWN CLEAN & FULLY GROUTED.
SILTSTONE/SANDSTONE EXTREMELY WEATHERED HIGHLY WEATHERED AND MODERATELY WEATHERED SILTSTONE	–	2.0m LONG GALV. N24 COGGED DOWEL SPACED AT 1.5m CENTRES BOTH HORIZONTALLY & VERTICALLY & DIPPING AT 10°. INSTALLED IN 75ø HOLES BLOWN CLEAN & FULLY GROUTED.
SILTSTONE SLIGHTLY WEATHERED FRESH	–	1.0m LONG GALV. N24 COGGED DOWEL SPACED AT 1.5m CENTRES BOTH HORIZONTALLY & VERTICALLY & DIPPING AT 10°. INSTALLED IN 75ø HOLES BLOWN CLEAN & FULLY GROUTED.

ANCHOR BOLTING SCHEDULE FOR BATTER IN ROCK

MATERIAL	SLOPE HEIGHT (H)	BOLTING REQUIREMENTS
SANDSTONE/SILTSTONE MEDIUM TO HIGH STRENGTH WITH 60° DAYLIGHTING JOINTS	2.5m	2.5m LONG 24ø CT BOLT (R24HT OR APPROVED EQUIVALENT) INSTALLED AT 2.0m CENTRES DIPPING AT 10°, INSTALLED IN 45ø HOLES, BLOWN CLEAN & FULLY GROUTED & TENSIONED TO 50kN.
SANDSTONE/SILTSTONE MEDIUM TO HIGH STRENGTH WITH 60° DAYLIGHTING JOINTS	3.0m	2.5m LONG 24ø CT BOLT (R24HT OR APPROVED EQUIVALENT) INSTALLED AT 1.5m CENTRES DIPPING AT 10°, INSTALLED IN 45ø HOLES, BLOWN CLEAN & FULLY GROUTED & TENSIONED TO 50kN.
SANDSTONE/SILTSTONE MEDIUM TO HIGH STRENGTH WITH 60° DAYLIGHTING JOINTS	4.5m	3.0m LONG 24ø CT BOLT (R24HT OR APPROVED EQUIVALENT) INSTALLED AT 1.5m CENTRES DIPPING AT 10°, INSTALLED IN 45ø HOLES, BLOWN CLEAN & FULLY GROUTED & TENSIONED TO 50kN.
SANDSTONE/SILTSTONE MEDIUM TO HIGH STRENGTH WITH 60° DAYLIGHTING JOINTS	6.0m	3.0m LONG 24ø CT BOLT (R24HT OR APPROVED EQUIVALENT) INSTALLED AT 1.5m CENTRES DIPPING AT 10°, INSTALLED IN 45ø HOLES, BLOWN CLEAN & FULLY GROUTED & TENSIONED TO 50kN.
SANDSTONE/SILTSTONE MEDIUM TO HIGH STRENGTH WITH 60° DAYLIGHTING JOINTS	9.0m	3.0m LONG 24ø CT BOLT (R24HT OR APPROVED EQUIVALENT) INSTALLED AT 1.3m CENTRES DIPPING AT 10°, INSTALLED IN 45ø HOLES, BLOWN CLEAN & FULLY GROUTED & TENSIONED TO 50kN.

NOTE:
ELEVATION OF ROCK STRATUM, EXTENT OF SHOTCRETE AND STABILISATION OF CUT BATTERS, REPRODUCED FROM ADVICE PROVIDED BY 'DOUGLAS PARTNERS'.

CONSTRUCTION SEQUENCE FOR BATTER IN COLLUVIUM SOIL

1) EXCAVATE COLUVIUM AND PIN STRIP DRAINS.
2) PLACE 60mm THICK "SHOTCRETE"
3) INSTALL MESH AS DETAILED ON DRAWING No's C07 & C08.
4) APPLY SECOND PASS OF "SHOTCRETE" TO DEPTHS ON DRAWING No's C07 & C08.
   NOTE: MINIMUM 180 THICK OVER TEMPORARY SHOTCRETE

NOTE:
GALVANIZED CT BOLTS COMPLETE WITH MECHANICAL ANCHOR, DIMPLED SHEATH AND GALVANIZED BALL WASHER, NUT AND PLATES

NOTE: ROCK ANCHORS

REFER TO : 'SPECIFICATION FOR PERMANENT ROCK ANCHORS' BY DOUGLES PARTNERS.

NOTES: SPRAYED CONCRETE WALLS

REINFORCEMENT:
Allowance to be made for texture application.
Minimum cover to all reinforcement to be:
65 mm to exposed face.
50 mm to face cast against ground.
All welded fabric shall be lapped as follows: 300mm minimum lap.
Mild steel rods denoted N12 are 12mm diameter D500 Grade deformed bars with 450mm minimum lap and 65mm minimum concrete cover.
Reinforcement to be held in its correct position at 800mm centres.

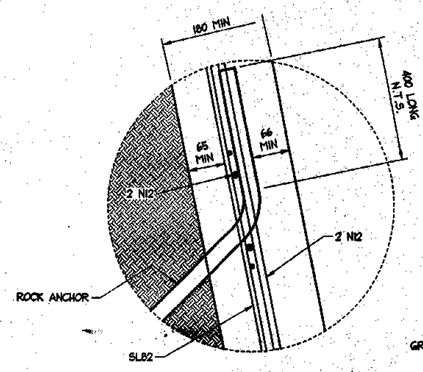
CONCRETE:
All workmanship and materials shall be carried out in accordance with AS 3600. Concrete design strength (F'c) at 28 days to be : 32 MPa.

NOTE:

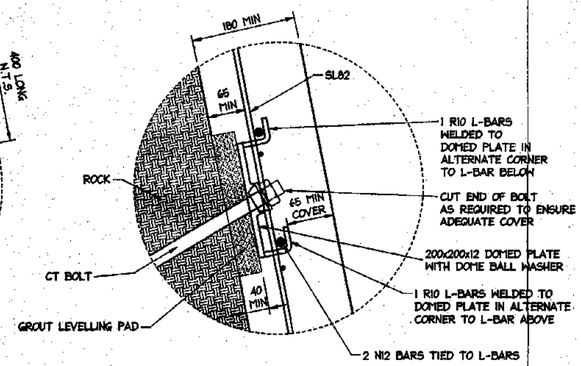
ANCHOR LENGTH, TYPE AND CENTRES TO BE SPECIFIED AND APPROVED ON SITE BY THE GEOTECHNICAL ENGINEER.
REFER TO ANCHOR BOLTING SCHEDULE ON DRAWING No. C20 FOR ANCHOR LENGTH AND SPACING.

NOTES:

1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

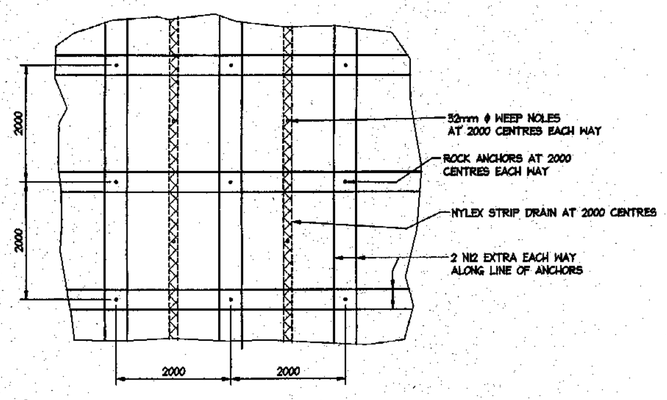


N24 ROCK ANCHOR

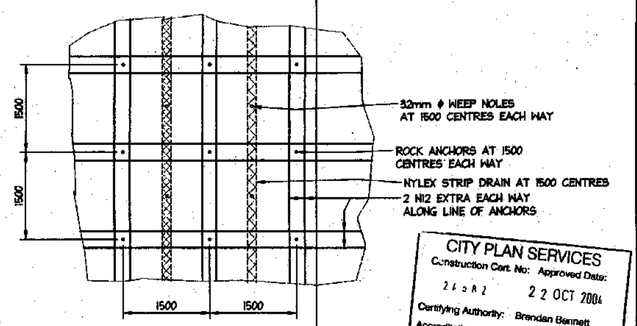


CT BOLT

DETAIL A (C07,08)
SCALE = 1:5



ANCHOR SETOUT ELEVATION TYPE A
SCALE = 1 : 50



ANCHOR SETOUT ELEVATION TYPE B
SCALE = 1 : 50

CITY PLAN SERVICES
Construction Cert. No: 245R2
Approved Date: 22 OCT 2004
Certifying Authority: Brendan Bennett
Accreditation No: PIA3004

It is considered that this drawing has been prepared in general accordance with geotechnical recommendations contained in:
Douglas Partners Report No: SEE
Signed: [signature]
Date: 22/9/04
Douglas Partners Pty Ltd Geotechnics Environment Groundwater

ISSUED FOR CONSTRUCTION CERTIFICATE SUBMISSION ONLY

A1

No.	Rev.	Amendment
–	–	–

Date:

DOCUMENT CERTIFICATION
Date: Sept 04'
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER.
Institute of Engineers Membership No. 803436
I hereby state that this drawing is in compliance with the conditions of the development consent, the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

NORTHERN BEACHES Consulting Engineers P/L.
A.C.N. 078 121 618 A.B.N. 24 078 121 618
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail : nb@nbconsulting.com.au

Project: PROPOSED NEW DWELLING AT BARRENJOEY & PALM BEACH ROADS PALM BEACH for: RAYPOND DEVELOPMENT

Drawing Title: HOUSE No.3 ANCHOR DETAILS

Date:	Design:	Drawn:	Checked:
SEPT 2004	R.G.W.	MC	

Job No:	Drawing No:	Rev:
030704	S10	–